Chapter 14
Cultural Resources

This chapter describes the affected environment and environmental consequences related to cultural resources for the dam and reservoir modifications proposed under SLWRI action alternatives. More detailed discussion of cultural resources is presented in *Cultural Resources Alternatives Assessment for the Shasta Lake Water Resources Investigation, Shasta and Tehama Counties, California* (Byrd et al. 2008) and *Native American Tribal Coordination, Shasta Lake Water Resources Investigation, California* (Nilsson et al. 2008), which were prepared for the project. These Technical Reports will not be publicly distributed because they contain confidential information on the locations of cultural resources.

14.1 Affected Environment

For the cultural resources assessment, studies were limited to the Shasta Lake and vicinity (77,088 acres) and the upper Sacramento River (16,113 acres), for a total of 93,201 acres (Byrd et al. 2008). Project impacts to cultural resources are not expected to extend beyond this primary study area. Shasta Lake and vicinity includes the existing reservoir, the maximum inundation area, and a 0.25-mile buffer. The 0.25-mile buffer encompasses the area around the reservoir where infrastructure would need to be relocated (recreation facilities, roads, utilities, trails, etc.). The majority of lands in the reservoir area are under Federal ownership and management responsibilities, and a detailed discussion of this topic can be found in Chapter 17. The upper Sacramento River is defined by the 100-year floodplain from Keswick Dam, north of Redding, southward to the Red Bluff Pumping Plant.

To evaluate the potential effects that the proposed undertaking may have on cultural resources within the 93,201-acre study area, archival and records searches were conducted. Information concerning potential Native American concerns within the study area was gathered from historic and ethnographic literature and from initial discussions with tribes and Native American individuals. The results of these efforts are summarized below, following a brief discussion of the regional context.

14.1.1 Regional Setting

This section provides a regional framework of the study area including sections on the prehistoric, ethnohistorical, and historical context of the study area. Because of the regional nature of cultural resources, the Shasta Lake vicinity and upper Sacramento River area are discussed together.

Prehistoric Context

The following presentation provides a temporally organized discussion of the archaeological record. There is a long history of archaeological investigations in the upper Sacramento Valley region, although the early investigations were sporadic rather than sustained research programs. Notably, a great deal of fieldwork has been carried out around Shasta Lake, largely on USFS lands. Radiocarbon dating and temporally diagnostic artifacts have been used to create a framework for understanding the age of cultural resources in the area as well as changes through time. This framework provides baseline information on how cultural resources can contribute to history and regional research issues.

The Terminal Pleistocene time segment (ca. 13,500-11,600 before present, calibrated using radiocarbon dating (cal BP)) is minimally represented and poorly understood in this region. What little evidence exists suggests that people passing through the area were wide-ranging, mobile hunters and gatherers who periodically exploited large game (Haynes 2002). Archaeological data from this time period, primarily represented by isolated fluted and/or bifacially thinned spear points and Pleistocene fauna remains, is limited to two cave sites in the study area.

The earliest evidence for occupation of the region largely falls between ca. 8000-5000 BP. Most assemblages dating to this interval are affiliated with the Borax Lake Pattern (Fredrickson 1974) and include wide-stemmed projectile points, handstones, milling slabs, and ovoid flake tools, along with a variety of other utilitarian items. The diversified nature of these artifact assemblages indicates people occupying the area were likely foragers who moved their residential bases frequently to exploit seasonal changes in resource distribution (Hildebrandt and Hayes 1983, 1993; Kowta et al. 2000; Sundahl and Henn 1993).

Several new projectile point forms appeared in the archaeological record around 5000 BP, including Squaw Creek Contracting-stemmed, Pollard Diamond-shaped, and McKee series. These points have been assigned to the Squaw Creek Pattern (5700-3200 BP) by Sundahl (1992b). Despite the appearance of these new forms, similarities in the rest of the assemblage composition with the preceding Borax Lake Pattern suggest people occupying the area during this time period were also relatively mobile foragers (Basgall and Hildebrandt 1989, Kowta et al. 2000).

A major change in the regional settlement-subsistence pattern appears to have occurred between ca. 4,000 to 1,600 years ago. This period has been identified as the Whiskeytown Pattern (Sundahl 1992b), and is represented by a wide range of corner- and side-notched projectile points assigned to the Clikapudi series, as well as hand stones, milling slabs, notched pebble net weights, and mortars and pestles (see also the Deadman and Kingsley complexes in Tehama County; Greenway 1982, Johnson 1984). Analysis of data from archaeological sites dating to this time period has led Basgall and Hildebrandt (1989) to

propose a shift from the preceding generalized forager strategy to a "fission-fusion" model of subsistence-settlement where larger groups of people occupied residential camps during the fall and winter months, but then split into smaller foraging groups who moved between productive resource patches during the remainder of the year. The fall-winter residential sites are thought to have been concentrated along the northern Sacramento Valley foothills, where salmon and acorns could be readily obtained (Baker 1990, Bevill and Nilsson 1993, Sundahl 1999).

Two distinct patterns have been identified as corresponding with the most recent time period (from 1,600 years ago to contact) in the region. The first, referred to as the Augustine Pattern/Shasta Complex, is thought to reflect a more sedentary subsistence-settlement adaptation than what was practiced in the preceding time periods. Initially, from 1,250 to 750 years ago, square-stemmed Gunther Barbed projectile points (with lower frequencies of expanding-stem variants), winged drills, bipointed fish gorges, bone gaming pieces, incised bone pendants, and varied shell beads are characteristic. These materials have been associated with the arrival of the Wintu in Northern California, and are thought to reflect a sedentary adaptation made possible by a subsistence system dependent on the large-scale storage of salmon and acorns (Broughton 1988; George 1981; Sundahl 1982, 1992a; Wohlgemuth 1992).

During this same time frame, a contrasting record is found in upland areas surrounding the northern Sacramento Valley. It is represented by much smaller sites and rather simple assemblages consisting of small side- and corner-notched projectile points, a limited number of Gunther series forms, hopper mortars and pestles, hand stones, milling slabs, and notched pebble weights. On the east side of the valley, these findings are assigned to the Tehama Pattern (Clewett and Sundahl 1982, Sundahl 1992a), and are thought to reflect a more mobile pattern of settlement by populations speaking Hokan languages (e.g., Yana) pushed to the hinterlands by the late-arriving Wintu, who ultimately restricted access to the Sacramento River.

Ethnohistorical Context

Ethnohistorical investigations indicate that at the end of the prehistoric era and into the historic era, much of the study area was primarily occupied by the Wintu (LaPena 1978), but some of their territorial boundaries have been contested for many years. The most commonly accepted map of Wintu territory was produced by Du Bois (1935), and shows that the Wintu controlled the Sacramento, McCloud, and Squaw Creek drainages, and all but the easternmost segment of the Pit River Arm. This arm crosses into a boundary area between Northern Yana (Johnson 1978, Sapir and Spier 1943) and Achomawi (Pit River) tribes (Olmsted and Stewart 1978). Wintu people also lived along the Sacramento River from Shasta Dam down to the confluence of the river with Cottonwood and Battle creeks. Nomlaki territory took over south of Cottonwood Creek/Battle Creek and extended down past what is now the Red Bluff Pumping Plant (Goldschmidt 1951, 1978).

There has been a great deal of ethnohistoric and ethnographic discussion of the Wintu owing largely to the records amassed by late nineteenth- and early twentieth-century observers. Therefore, the Wintu can be considered one of the best known Native American groups in California. Most of the villages were located on the McCloud and Pit rivers and the general area south of the Pit River to just south of Redding. One hundred and six (43 percent) of the named Wintu ethnographic villages fall within the current study area.

Historical Context

The area that would become Shasta and Tehama counties was not explored by Europeans during the Spanish period of California history. Initial exploration occurred in 1821 when a Mexican expedition explored the Sacramento River nearly as far north as the future site of Redding, encountering Native populations as they traversed the region. Subsequently, European trappers in Northern California spread European diseases that had disastrous effects on the Native Americans. Notably, a devastating epidemic spread through the Sacramento Valley during the 1830s that may have killed as much as 75 percent of the native population.

In 1848, mining (especially for copper) began along the Trinity River and other Sacramento River tributaries, bringing as many as 50,000 people to the area. American immigrants increasingly occupied territory, and new logging and mining operations destroyed hunting grounds and salmon fisheries that were part of the traditional home of Native Americans such as the Wintu. Criminal violence and the policy of relocation to reservations nearly eliminated the Native American population in the upper Sacramento River Valley by 1870. Those who remained lived in the mountains, like the Wintu, who maintained a salmon fishery along the McCloud River.

The mining boom led to the construction of smelters, mills, and towns (such as Keswick) that flourished in the late 1800s and early 1900s. Falling copper prices, growing environmental concerns over pollution from smelters, and the U.S. Government's efforts at protection and conservation of public lands ended major operations by the 1920s.

Logging started in 1852 and included sugar pine, white pine, red fir, and cedar. Sawmills quickly sprang up, along with associated roads. Transporting logs and milled lumber became easier after the completion of the railroad through Red Bluff and Redding, and the Blue Ridge Flume, completed in 1874. These transportation advances allowed lumber milling to be concentrated in the valley, and Red Bluff and other mill towns to thrive.

Agriculture dominated the valley land along the Sacramento River. Cattle farming was key initially, and remained an important product in the area through the mid-twentieth century, especially with the development of the dairy industry. Early settlers practiced dry farming, growing wheat and fruit, including peaches, pears, and plums. Farmers later diversified and transitioned

from wheat to fruits, nuts, vineyards, and vegetable crops in the late 1800s through the 1920s. Ultimately, intensive irrigated agriculture dominated the area.

Throughout the historic era, transportation was an important focus of infrastructure development. Over time, foot travel and transportation by horse or stage coach on a number of historic trails gave way to river, railroad, and ultimately, automobile travel. Hopeful settlers and miners poured into the study area along the California-Oregon Trail between 1840 and 1860, passing through the upper Sacramento River and Pit River valleys. A segment of the Siskiyou Trail was used by the northern railroad in 1877 and Interstate 5 follows this route today. Many early roads in the study area operated in conjunction with ferries across the Sacramento River. Several important bridges are located in the study area, along with the remains of many others, including the Centennial Bridge in Red Bluff and the Dog Creek Bridge in Shasta County.

Towns such as Red Bluff, Redding, Keswick, and Kennett boomed, along with the region's developing transportation network. The construction of Shasta and Keswick dams promoted a new period of prosperity that carried through the expansion of the lumber industry and the rise of the recreation industry in the mid-twentieth century.

Efforts to preserve the Nation's forests began in the late 1800s. The Shasta Forest Reserve was created in 1905. The area also included many homesteads and Indian allotments granted to local Wintus in the 1880s. In preparation for inundation by Shasta Lake, the United States purchased land including these allotments, homesteads, and many other properties in the late 1930s. Around the same time, fish were recognized as an important natural resource in California, and the first of several salmon fish hatcheries were constructed in 1872 at the salmon spawning grounds near the confluence of the McCloud and Pit rivers.

Recreation, especially in the mountains, also played an important role in the region's history. In the early twentieth century, private fishing clubs, such as the Bollibokka Club, flourished. In the 1930s, USFS began to encourage the recreational use of the forests by the broader public, constructing campgrounds and picnic areas. Recreation in the national forests expanded with the formation of Shasta Lake. New campgrounds were added, along with boat launches and access roads.

Hydroelectric power and water storage were also important facets of the region's history. Starting in 1922, Pacific Gas and Electric Company built dams and power plants in the Pit River area. In 1935, the Federal Government decided to proceed with building the CVP to store and deliver Sacramento River water as far south as Fresno County. Work was completed in the 1940s at Shasta Dam and Keswick Dam and Powerhouse, located downriver from Shasta Dam. Power generated at Shasta Dam and transmitted to the CVP pumps provided electricity to supply the lift pumps raising water into the main canal

system. The system used the natural channels of the Delta to move water from Redding to Tracy, the head of the Delta-Mendota Canal.

14.1.2 Archaeological Resources and Historical Structures

This section discusses known archaeological resources and historic structures within the primary study area.

Shasta Lake and Vicinity

A total of 134 cultural resources studies have been previously conducted that intersect or are fully contained within the Shasta Lake area. Of these, 80 percent were surveys, the remainder being overview/research designs, excavations, or other compliance reports. More than half of the surveys are considered to have had systematic coverage; the rest were either reconnaissance efforts or the methods were unknown. Overall, only 8 percent of the study area has been surveyed; 5 percent in a systematic manner and 3 percent using reconnaissance methods.

The records search identified 261 cultural resources within the study area, including 190 prehistoric sites, 45 historic-era resources, and 26 resources with both prehistoric and historic-era components.

The 215 recorded prehistoric-era resources and components are widely distributed throughout the study area and include the following:

- Forty-two major residential sites (thirteen with documented human remains)
- Thirty-seven residential sites
- Fifty-five artifact scatters
- Seventy-seven scatters of flaked stone tools and manufacturing debris
- Two caves
- Two sites of unknown character

The 71 recorded historic-era resources and components include the following:

- Thirteen structures, including seven bridges, one dam, one railroad bridge and grade, one aerial-tramway, one rock wall/alignment complex, one building foundation, and one concentration of wooden A-frames
- Seven linear features consisting of one railroad, five road segments and one line of wooden poles

- Seven mining locales that include two quarries and five sites with various mining-related features and residential elements.
- Fifteen artifact scatters
- Two ranching complexes
- Fourteen residential sites
- Two town complexes – both are mining-related and one includes a cemetery
- Two orchards represented by wooden poles and fruit trees
- One cemetery represented by two grave stones
- Seven historic-era Native American cemeteries, all but one of which is also associated with a major prehistoric residential component. Each of these cemeteries was subject to government removal of burials and reburial in a government cemetery outside the Shasta Lake inundation area and the current project area.
- One historic-era Native American residential site that also has a prehistoric residential component

Another 19 historic-era cemeteries (containing both Native American and Euro-American burials) within the footprint of Shasta Lake have not been formally recorded. They were subject to burial removal and subsequent reburial outside the reservoir area. It is possible that a number of these cemeteries may retain additional human remains, and are potentially subject to periodic exposure when the reservoir level fluctuates.

The vast majority of cultural resources discussed above have never been formally evaluated with respect to the eligibility for listing on the National Register of Historic Places (NRHP). The NRHP (also referred to as the National Register) is the Nation's official list of cultural resources worthy of preservation. Authorized under the National Historic Preservation Act of 1966 (NHPA), the NRHP is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. Properties listed in the NRHP include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. All properties and districts listed in or determined eligible for listing in the NRHP must be considered in the planning of Federal undertakings.

The Dog Creek Bridge is eligible for the NRHP. Shasta Dam and property has also been determined eligible for the NRHP as part of the CVP through a

consensus determination with the State Historic Preservation Officer (SHPO). Another 24 resources have been determined ineligible by consensus determination with the SHPO. These include 15 historic-era resources, seven prehistoric sites, and two resources with both prehistoric and historic-era components. The remaining cultural resources have yet to be evaluated with respect to their eligibility for listing on the NRHP.

Upper Sacramento River (Shasta Dam to Red Bluff)

Based on the records search results, 97 cultural resources studies intersect or are fully contained within this area. Of these, 86 percent are surveys, along with overviews, excavation reports, and historical architectural evaluation reports. Most of the surveys had systematic coverage methods (75 percent). In all, 23 percent of the area has been surveyed, mostly by systematic methods (15 percent), and the rest by reconnaissance methods.

A total of 79 recorded cultural resources fall within this area. These include 45 prehistoric sites, 20 historic-era resources, and 14 resources with both historic-era and prehistoric components.

The 59 prehistoric resources and components within the study area include the following:

- Thirteen major residential sites
- Twenty-two residential sites
- Seven rock shelters
- Five artifact scatters
- Five flaked stone tool and manufacturing debris scatters
- Four rock art (petroglyph) sites
- Three sites of unknown character

The recorded prehistoric sites are concentrated in the southern portion of the study area, from Battle Creek near Table Mountain southward (71 percent), along with a small concentration of sites at the northern end of the upper Sacramento River area near Redding (18.6 percent). Eleven prehistoric sites have been subjected to some form of archaeological excavation.

The 34 recorded historic-era resources and components within the study area include the following:

- Ten structures
- Seven linear features consisting of five roads, one wagon train, and a powerline
- Five flume remnants (two of which were associated with orchards)
- Three mining locales, including a mining complex and two adits
- Five artifact scatters
- One ranching complex
- The historic-era structures include five bridges, a ferry crossing, a rock wall, a dam, one concrete dance pavilion, and a power substation building complex
- Three historic-era Native American residential sites

One archaeological site (referred to as the Benton Track Site or Magmas) is currently listed on the NRHP. In addition, the Diestelhorst Bridge in Redding and the Anderson-Cottonwood Irrigation District Diversion Dam have been determined eligible for the NRHP. Two sites are listed as ineligible for the NRHP by the California Office of Historic Preservation.

14.1.3 Native American Resources

A strong likelihood exists that other important Native American heritage locations are present within the study area, based on ethnohistoric data and initial discussions with Native Americans. The study area was the focus of intensive Native American occupation during historic times, with a variety of religious, economic, historic, and other values identified by Native American groups. Ten groups, including those listed by the Native American Heritage Commission, represent Native American interests in the study area. They include the Grindstone Indian Rancheria, Paskenta Band of Nomlaki Indians, Pit River Environmental Council, Pit River Tribe of California, Redding Rancheria, Shasta Indian Nation, United Tribe of Northern California, Inc., Winnemem Wintu, Wintu Educational and Cultural Council, and the Wintu Tribe of Northern California Toyon-Wintu Center. Notably, the Winnemem Wintu and the Pit River tribes live within the Shasta Lake area, where they continue to actively practice many aspects of their traditional culture. Both groups have related that a complex cultural landscape of village sites, ceremonial areas, burial sites, and resource areas intersects the study area.

The Winnemem Wintu also documented the location of some 155 ancestral villages within the Shasta Lake area. At least 81 village locations are known along the lower McCloud River and lower Pit River. An additional 73 villages are known to have existed on the eastern side of the Sacramento River. These

village locations once contained between one and 30 houses each, some had associated cemeteries and each had a power place. Some of these villages are already under the waters of Shasta Lake, while others are just above the current Shasta Lake water level. The Winnemem Wintu have estimated that 120 of the known villages are still accessible (above the current high-water line).

Traditional Cultural Properties

Federal regulation defines Traditional Cultural Properties as properties that have "association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998). Examples of Traditional Cultural Properties include: a location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world; a location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice.

The records search at the Information Center revealed that no Traditional Cultural Properties have been formally recorded in the study area.

It is important to note that a traditional cultural properties may not meet the NRHP criteria for a historic property and that, conversely, a historic property may not meet the criteria for a traditional cultural property. However, in those instances where an undertaking may affect a historic property that is also considered by an Indian group to be a site of beliefs, customs, and practices of a living community, circumstances may warrant that in the course of the Section 106 review process, consideration for accommodating access to and ceremonial use of the property and that avoidance of adverse physical effects in accordance with Section 106 are identified.

Tribal consultation has clearly indicated that local Native American groups are deeply concerned regarding the environmental and cultural effects of the project. Native Americans who supplied information for the SLWRI provided general information on the number and nature of resources both in the general region and in specific locations that could meet the definition of Traditional Cultural Properties, which are also supported in ethnohistoric studies.

Members of the Pit River Madesi Band stated that 22 ethnographic villages and associated burial grounds are located within the existing reservoir and proposed reservoir areas. One tribal member also noted that several Traditional Cultural Properties exist within the Pit 6 and Pit 7 Dam areas.

The Winnemem Wintu have identified important localities within the study area, many of which are locations where ceremonies are regularly conducted. Along the McCloud River, these include Children's Rock, Coyote Rock, Dekkas Rock, doctoring pools near Nawtawaket Creek, Eagle Rock and

Samwel Cave, Hirz Bay, *Kaibai* village, North Gray Rocks, Puberty Rock, Saddle Rock, and *Watawacket* village and spiritual area. Along the Sacramento River, important localities include the Antlers area, Delta area, Doney Creek, Gregory Creek, LaMoine area, Packers Bay, Pollard's area, middle Salt Creek, and Sims area. The Winnemem Wintu have strong traditional and contemporary connections with the land, and their ongoing use of many archaeological and religious sites is fundamental to the well-being of their culture, particularly the education of their youth.

Indian Sacred Sites

Executive Order No. 13007 defines an Indian sacred site as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site."

Executive Order 13007 pertains only to Federally recognized tribes and Federally managed lands. For groups that are not formally recognized, sacred areas may be listed in the Sacred Lands files of the California Native American Heritage Commission. This commission has reviewed its files and identified sacred lands within the study area, however these lands may or may not meet the definition under EO 13007. Their locations are confidential.

14.2 Regulatory Framework

Under Federal and State of California (State) law, effects to significant cultural resources—which include archaeological remains, historic-period structures, and Traditional Cultural Properties—must be considered as part of the environmental analysis of a proposed project. This section provides a summary of key regulations for the protection of significant resources.

14.2.1 Federal

National Historic Preservation Act

Under Section 106 of the NHPA, Federal agencies must consider effects to eligible resources ("historic properties") from the proposed undertaking, in consultation with SHPO and other parties. This includes affording the Advisory Council a reasonable opportunity to comment on such undertakings. This includes identification (usually through archival research, field inventories, public interpretation, and/or test evaluations) of cultural resources eligible for the NRHP, assessment of adverse effects to eligible properties, and resolution of adverse effects. The implementing regulations at 36 CFR Part 800 define procedures to meet Section 106 responsibilities through consultation among the

Federal agency and other parties with an interest in the effects on historic properties.

Section 106 defines significant archaeological or historical resources as those which are listed on, or eligible for listing on, the NRHP. Eligible properties are those that retain sufficient integrity and meet one or more of the following criteria: "(a)...are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (d) that have yielded, or may be likely to yield, information important in prehistory or history" (36 Code of Federal Regulations (CFR) 60.4).

Executive Order 13007 – Indian Sacred Sites

Indian Sacred Sites as addressed in Executive Order 13007 (24 May 1996) establishes that Federal agencies are responsible for allowing federally recognized American Indian religious practitioners access to and ceremonial usage of Indian sacred sites on Federal land. An Indian Sacred Site is defined as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." The agency will keep the locations of such sites confidential and will avoid adversely affecting the integrity of these sites. To assist in the implementation of this Executive Order, an interagency memorandum of understanding was signed to improve the protection of tribal access to Indian Sacred Sites through enhanced and improved interdepartmental coordination and collaboration. The Memorandum of Understanding Among the U.S. Department of Defense, U.S. Department of the Interior, U.S. Department of Agriculture, U.S. Department of Energy, and the Advisory Council on Historic Preservation Regarding Interagency Coordination and Collaboration for the Protection of Indian Sacred Sites, was executed on November 30, 2012, and remains in effect until December 31, 2017.

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (Public Law 101-601; 25 United States Code 3001-3013) pertains to Native American burial sites and regulates the removal of human remains, funerary objects, sacred objects, and items of cultural patrimony on Federal and tribal lands. The Act requires permits for intentional removal or excavation of Native American human remains on Federal lands, covers cases of inadvertent discoveries, and dictates the ultimate disposition process of Native American human remains and cultural items.

American Indian Religious Freedom Act

The American Indian Religious Freedom Act (42 United States Code Section 1996) states that it is the policy of the United States to "protect and preserve for American Indians their inherent right of freedom to exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites." The provisions of American Indian Religious Freedom Act guarantee access to traditional sites on Federal lands for religious practices. Consultation under American Indian Religious Freedom Act with American Indian groups can simultaneously satisfy the requirements of NEPA.

Archaeological Resources Protection Act

The purpose of the Archaeological Resources Protection Act of 1979 (ARPA) (Public Law 95-96 – October 31, 1979) is to protect archaeological resources and sites that are located on public lands and Indian lands, and to foster increased cooperation between governmental authorities, the professional archaeological community, and private individuals in possession of archaeological resources. The act makes it unlawful to excavate, remove, or deface archaeological resources, to sell, purchase, or exchange those resources without applicable permit, and establishes criminal and civil penalties for any such violation.

Archaeological and Historic Preservation Act

This act was formerly known as the Reservoir Salvage Act of 1960, followed by the Moss-Bennet Act (Archaeological Recovery Act). The act can be found under 16 USC 469, and is intended to prevent irreparable loss or destruction of significant scientific, prehistorical, historical, or archeological data involving activities in connection with any Federal construction project or federally-licensed project, activity, or program through the recovery, protection, and preservation of such data, including preliminary survey or other investigation as needed.

14.2.2 State

Under CEQA, the lead non-Federal agency (state, county, city, or other) must consider potential effects to important or unique cultural resources. While the language and consultation process is somewhat different between the NHPA and CEQA, the definitions of eligible properties and of adverse impacts are essentially the same. Evaluations under CEQA consider a resource's potential eligibility to the California Register of Historical Resources.

California law also protects Native American burials, skeletal remains, and associated grave goods regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains (California Health and Safety Code Section 7050.5, California Public Resources Code Sections 5097.94 et seq.).

14.2.3 Regulatory Compliance

Currently, there is no undertaking authorized by Congress involving the raising of Shasta Dam. Federal agencies may conduct nondestructive planning activities without completing Section 106, provided that the actions do not prohibit subsequent consideration of alternatives to avoid, minimize, or mitigate the undertaking's adverse effects on historic properties. This environmental document is in support of a feasibility study. Should the undertaking be authorized, Section 106 would resume early in that planning process (36 CFR Section 800. 1(c)).

Under Section 106, these efforts would include the following:

- A complete pedestrian survey and inventory of cultural resources within the area of potential effect (APE) of the selected alternative
- Ethnographic and ethnohistoric investigations to obtain greater detail regarding areas of importance to Native American tribes and groups
- Evaluations to determine whether cultural resources identified within the APE are eligible for inclusion in the NRHP
- Assessment of potential adverse effects to historic properties and consultation to resolve any identified adverse effects

Cultural resources are evaluated for inclusion in the NRHP based on criteria found at 36 CFR Part 60. Once a resource has been evaluated, the lead Federal agency determines eligibility in consultation with the SHPO and other consulting parties, as applicable. Where appropriate this process will include the USFS in the consultation to ensure appropriate consideration is given to the Shasta-Trinity National Forest Land and Resource Management Plan (STNF LRMP). The overall project actions, as authorized by Congress, may not be consistent with the STNF LRMP standards and guidelines (USFS 1995). A project-specific STNF LRMP amendment may be required for the standards associated with caves, visual quality, late successional reserves, riparian reserves, survey and manage species, and Shasta snow-wreath. The USFS decision would include a project specific exception to these standards.

In this process, previous determinations of eligibility may need to be reevaluated because of the passage of time or other factors, and it is important to acknowledge the special expertise of Indian tribes when assessing the eligibility of properties to which they attach ceremonial and cultural significance. It would be possible to evaluate some cultural resources with survey-level data. However, test excavations may be necessary to accurately evaluate many archaeological resources to determine if they are, in fact, historic properties.

The lead Federal agency is required to consider the effects of any potential project on historic properties within the APE. The criteria for assessing adverse effects are found in 36 CFR Part 800.5(a)(1), which states that "an adverse effect is found when an undertaking may alter, directly or indirectly, any characteristic of a historic property that qualify the property for inclusion in the National Register…" Examples of adverse effects include physical destruction, alteration, a change in the property's setting, or the introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features (36 CFR Part 800.5(a)(2)).

As part of the Section 106 process, the lead Federal agency is responsible for making a finding regarding whether the undertaking would have an adverse effect on historic properties. This assessment of adverse effects is made in consultation with SHPO, Indian tribes that attach religious and cultural significance to identified historic properties and other consulting parties. Reclamation would then seek concurrence on the findings of effect from the SHPO and the USFS, on National Forest Lands.

Consultation then continues among Reclamation, USFS, other applicable Federal agencies, SHPO, and other consulting parties on possible options for avoiding, minimizing, or mitigating the adverse effects. This includes notifying the Council when adverse effects are found and inviting the Council to participate. If SHPO, Reclamation, USFS, other applicable Federal agencies, and the Council (if participating) agree to measures to resolve adverse effects to historic properties, these are formalized in an MOA. Other consulting parties may be invited to sign the MOA. The Section 106 process (36 CFR Part 800.14) is completed once the terms of the MOA have been met. Alternatively, the Federal agencies may elect to enter into a programmatic agreement (PA) that would be developed as an alternative procedure to implement the Section 106 process (36 CFR Part 800.14). In rare cases, if consultation fails to result in agreement on resolving adverse effects, consultation may be terminated pursuant to the process detailed in 36 CFR Part 800.7.

14.3 Environmental Consequences and Mitigation Measures

This chapter is organized by the project alternatives described in Chapter 2, "Alternatives," and discusses environmental consequences associated with implementation of the project alternatives. It also describes potential mitigation measures associated with impacts to cultural resources that are significant or potentially significant.

The environmental setting for this chapter includes only the primary study area, Shasta Lake and vicinity, and the upper Sacramento River between Shasta Dam and the Red Bluff Pumping Plant, as explained in Section 14.1. No potential impacts are expected in the extended study area; therefore, only impacts to

cultural resources in the primary study area will be discussed. The extended study area is not discussed further in this section.

14.3.1 Impact Assessment Methods and Assumptions

The standard Section 106 process of the NHPA follows a series of steps that are described in the 36 CFR Part 800 regulations that implement the NHPA. These steps are as follows:

- Initiate Section 106 Process, 36 CFR Part 800.3
- Identify Historic Properties, 36 CFR Part 800.4
- Assess Adverse Effects, 36 CFR Part 800.5
- Resolve Adverse Effects, 36 CFR Part 800.6

"Adverse effects" are defined below in Section 14.3.2. In the event that historic properties within the APE for an undertaking would be subject to adverse effects, the lead Federal agency would consider ways to minimize or mitigate ("resolve") such effects, in consultation with the SHPO and other signatories and consulting parties. This often requires an MOA or PA among the consulting parties (Part 800.6).

Section 106 regulations allow Federal agencies to conduct "nondestructive project planning activities before completing compliance with Section 106" (36 CFR Part 800.1[c]), and the regulations encourage Federal agencies to consider a broad range of alternatives during the planning process for the undertaking. The SLWRI feasibility-level study is such a "nondestructive project planning" document, as there is no authorization for raising Shasta Dam at this time. Reclamation will not have a specific undertaking until such time as Congress makes a decision regarding whether to authorize a project that would involve raising the dam and appropriates funding for this purpose.

The purpose of the feasibility study has been to gather existing data that can be used in future environmental documents to estimate the impacts to the types of historic properties known to be present, based on existing data and consultations.

As part of compliance with 36 CFR Part 800 regulations, Reclamation conducted an analysis of the APE to assess which portions of the APE have been previously inventoried, and to identify all previously recorded cultural resources. Methods used for the cultural resources analysis included archival records searches (that identified previously recorded sites, site records, and Native American ethnographic studies), agency consultation, Native American consultations, and comparisons of the study alternatives. Information on archaeological and historical structures was obtained for sites within the primary study area that may be affected by alternative plans. Sensitivity

analyses were also conducted for prehistoric and historic-era resources to address data gaps using methods tailored to each data set. Native American issues and resource locations within the primary study area were discussed during meetings with local Native American groups and individuals.

Also included in the analysis was an assessment of the effects of inundation and drawdown on cultural resources located within the pool of a reservoir. Previous reservoir studies have shown that the greatest impacts occur in the zone of inundation and drawdown (fluctuation zone), where cultural resources are repeatedly exposed to scouring, wave action, wet/dry cycles, and de-vegetation. This means that the most significant impacts will occur where an undertaking increases the size of the fluctuation zone–particularly if it includes areas that are above the current high-water line and thus have not previously been subject to inundation.

Archaeological and Historic-Era Structural Resources

The prior cultural resources inventory efforts and the resulting recorded cultural resources had been previously discussed in Section 14.1.2. Overall, the frequency and distribution of recorded sites within the project study area only give a limited and incomplete picture of the actual number of resources. This is because only a very small percentage of the project area has been systematically inventoried for cultural resources. To estimate site densities for the project area as a whole, sensitivity analysis was undertaken. Separate sensitivity analyses for prehistoric and historic-era sites were conducted to predict where unrecorded sites should be concentrated within unsurveyed areas. The resulting site-density predictions provide the most accurate estimate of site sensitivity by alternative available at present. The following discussion presents the methods and approach taken.

The archival research done for this study was designed to identify the types of cultural resources known to be present in the study area. However, the frequency and distribution of formally recorded resources give only a limited and incomplete picture of the actual number of resources. This is mainly due to limited systematic surveys comprising only 5 percent of the Shasta study area and 15 percent of the upper Sacramento River. As such, there are undoubtedly many more cultural resources that have not been identified or formally recorded.

A comparative sensitivity analysis was therefore conducted that took into account both documented and likely but undocumented resources (including archaeological sites and historic-era structures) for each of the alternatives proposed for raising Shasta Dam. The sensitivity analysis was restricted to the Shasta Lake and vicinity, and did not include the upper Sacramento River since no impact differences between alternatives have been identified within this area.

Separate sensitivity analyses using methods tailored to each data set were conducted for prehistoric and historic-era sites to estimate the total number of

cultural resources present within each alternative (see Byrd et al. (2008) for methodological details and specific data). The prehistoric sensitivity analysis used a weights-of-evidence quantitative analysis to predict the overall density and distribution of sites. In contrast, the historic-era sensitivity analysis gathered archival data (mainly maps) within the study area to make predictions regarding the number and type of potential unrecorded historic-era resources (both structures and sites) by alternative. Results of the prehistoric and historic-era sensitivity analyses were integrated to provide quantitative estimates of the total number of cultural resources after full inventory. These estimates are for planning purposes only; additional pedestrian surveys would be needed if one of the affirmative alternatives were to go forward.

A second records search was completed to identify recorded cultural resources in specific areas of the upper Sacramento River where construction activities would take place in certain alternatives associated with ecosystem restoration, including spawning gravel augmentation and floodplain and riparian habitat restoration. For these construction areas, existing access roads were excluded, but a records search buffer of 0.25 mile was added to all other project elements. It should be noted that the proposed construction areas are concept-level, and may be relocated or deleted as a result of design development, consultation, or other factors.

Traditional Cultural Properties

Public and stakeholder coordination meetings were conducted on behalf of Reclamation with Indian tribes and Native American groups whose traditional territories overlap the study area to identify Traditional Cultural Properties, ceremonial locations, and other areas of concern to the Native American community. This included meetings and/or workshops with groups and individuals representing major tribes and/or extended family groups in the Shasta/Redding area regarding potential effects to cultural resources from a plan to enlarge Shasta Dam and Reservoir. The primary intent of these meetings was to strengthen communication with tribal groups and individuals; solicit, clarify, and document major concerns and issues; and establish a preferred method/approach to maintaining effective communication during the remainder of the SLWRI and in future endeavors.

Federally recognized Native American tribes were invited to begin the consultation process at an information meeting, followed by additional contact by telephone to learn of their concerns regarding the SLWRI, and to gain an initial sense of where sensitive resource localities are situated within the primary study area. Non-Federally recognized Native American groups and individuals with an interest in the study area were also contacted. There were also in-person visits to tribal members to collect information.

Seven tribal groups were invited to an information meeting held on April 4, 2007, in Redding, California. The purpose of the meeting was to provide general information about the SLWRI, initiate Section 106 consultation with

groups desiring to participate in the project, and introduce Elena Nilsson, a consultant for Reclamation, as the Native American Tribal Coordination study lead. Invitations were sent to the groups shown in Table 14-1.

Table 14-1. Native American Groups Involved in Consultations

Native American Group
Grindstone Indian Rancheria of Wintun-Wailaki Indians[1]
Paskenta Band of Nomlaki Indians[1]
Pit River Tribe[1]
Redding Rancheria[1]
Shasta Indian Nation
Winnemem Wintu
Wintu Tribe of Northern California/Toyon-Wintu Center

Note:
[1] Federally recognized tribe as of 2012 (http://www.bia.gov/cs/groups/public/documents/text/idc-041248.pdf)

From August 2007 to March 2008, nine meetings were held with Native American groups whose traditional territories overlap with the SLWRI study area. The purpose of the meetings was to solicit, clarify, and document major concerns and issues regarding the project, and to establish a preferred method/approach to maintaining effective communication during the remainder of the SLWRI study and in future endeavors. Five groups participated in these meetings, including the Grindstone Indian Rancheria (one meeting), Paskenta Band of Nomlaki Indians (one meeting), Pit River Tribe (three meetings), Shasta Indian Nation (one meeting), and Winnemem Wintu (three meetings).

Currently, no formal Traditional Cultural Properties (as defined by Federal regulations) are formally recorded at the Information Center. The California Native American Heritage Commission, however, has stated that sacred lands (as defined by this commission) are present in the study area. Based on consultations, meetings, statements, letters, and public comments provided by Native Americans and previous ethnographic and ethnohistoric studies, it is predicted that a considerable number of Traditional Cultural Properties and other areas of special concern are present in the study area.

14.3.2 Criteria for Determining Significance of Effects

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by, or result from, the proposed action. Under NEPA, the significance of an effect is used to determine whether an EIS must be prepared. An environmental document prepared to comply with CEQA must identify the potentially significant environmental effects of a proposed project. A "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially

reduce significant environmental effects (State and CEQA Guidelines, Section 15126.4(a)).

Federal Criteria

Under Federal regulation (36 CFR Section 800(a)(1)):

> *"An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative."*

Examples of adverse effects (36 CFR Section 800(a)(2)) include the following:

- Physical destruction, damage, or alteration, including moving the property from its historic location
- Isolation from, or alteration of, the setting
- Introduction of intrusive elements
- Neglect leading to deterioration or destruction
- Transfer, sale, or lease from Federal ownership

Adverse effects often can be resolved or mitigated through additional research, public education, and/or other means.

State Criteria

California regulations require that effects to cultural resources be considered only for resources meeting the criteria for eligibility to the California Register of Historical Resources, outlined in Section 5024.1 of the California Public Resources Code. Demolition, replacement, substantial alteration, or relocation of an eligible resource are actions that could change those elements of the resource which make it eligible. The following eligibility criteria were developed using guidance provided by the State CEQA Guidelines, and they consider the context and intensity of the environmental effects as required under NEPA. Under the State CEQA Guidelines, impacts on cultural resources may be considered significant if a project alternative would result in any of the following:

- Cause a substantial adverse change in the significance of a historical resource, as defined in Guidelines Section 15064.5
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Guidelines Section 15064.5
- Disturb human remains, including those interred outside formal cemeteries

According to the above criteria, the project would be considered to have a significant impact on cultural resources if it would result in any of the following:

- Substantial adverse change in the significance of an historical resource
- Substantial adverse change in the significance of a unique archaeological resource
- Disturbance or destruction of unique paleontological resource or site or unique geologic feature
- Disturbance of any human remains, including those interred outside of formal cemeteries
- Elimination of important examples of the major periods of California history or prehistory

Under CEQA an impact to a cultural resource can be reduced to a less-than-significant level through mitigation. Statements of impact significance are relative to both existing conditions (Year 2012) and future conditions (Year 2030), unless stated otherwise. Only those elements of a resource which contribute to its eligibility need to be considered; effects to noncontributing elements are less than significant.

14.3.3 Direct and Indirect Effects

This section describes the environmental consequences of the SLWRI alternatives, and proposed mitigation measures for any impacts determined to be significant or potentially significant.

No-Action Alternative

Dam construction, infrastructure and facilities relocation, additional reservoir area inundation, and construction activities adjacent to the upper Sacramento River would not occur under the No-Action Alternative. Therefore, no additional cultural resources above the current reservoir level would be impacted, and conditions would be the same as existing.

Shasta Lake and Vicinity

Impact Culture-1 (No-Action): Disturbance or Destruction of Archaeological and Historical Resources Due to Construction or Inundation Archaeological sites (as well as historic cemetery locations) within the existing Shasta Lake fluctuation zone will continue to be impacted by fluctuations in the height of the reservoir during ongoing operations with the No-Action Alternative. As stated above, dam construction, infrastructure and facilities relocation, and additional inundation as a result of the proposed action alternatives would not occur under the No-Action Alternative; therefore, no new impacts on cultural resources related to construction or inundation are expected. Mitigation is not required for the No-Action Alternative, as the proposed activities related to the action alternatives would not occur. Responsibilities to manage ongoing impacts from the No-Action Alternative may fall under other Federal or State laws which would be separate from any implementation requirements related to the action alternatives.

Impact Culture-2 (No-Action): Inundation of Traditional Cultural Properties Any Traditional Cultural Properties within the existing Shasta Lake fluctuation zone will continue to be impacted by fluctuations in the height of the reservoir during ongoing operations with the No-Action Alternative. As stated above, additional inundation as a result of the proposed action alternatives would not occur under the No-Action Alternative; therefore, no new impacts on cultural resources related to inundation are expected. Mitigation is not required for the No-Action Alternative. Responsibilities to manage ongoing impacts from the No-Action Alternative may fall under other Federal or State laws which would be separate from any implementation requirements related to the action alternatives.

Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Culture-3 (No-Action): Disturbance or Destruction of Archaeological and Historical Resources near the Upper Sacramento River Due to Construction Archaeological sites (as well as historic cemetery locations) in or near the upper Sacramento River will continue to be impacted by water operations with the No-Action Alternative. As stated above, construction activities adjacent to the upper Sacramento River would not occur under the No-Action Alternative; therefore, no impacts on cultural resources related to construction are expected. Mitigation is not required for the No-Action Alternative. Responsibilities to manage ongoing impacts from the No-Action Alternative may fall under other Federal or State laws which would be separate from any implementation requirements related to the action alternatives.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Cultural resources potentially impacted by this alternative include those within: (1) the proposed additional 1,229-acre inundation area; (2) the portion of the proposed fluctuation zone for this alternative within the existing reservoir area; and (3) those portions of the 0.25-mile buffer around the reservoir where

infrastructure would need to be relocated (recreation facilities, roads, utilities, trails, etc.). It should be noted that sites typically extend into the inundation and reservoir area for more than one alternative.

Shasta Lake and Vicinity

Impact Culture-1 (CP1): Disturbance or Destruction of Archaeological and Historical Resources Due to Construction or Inundation Raising Shasta Dam would have a direct impact on cultural resources. This impact would be significant. As noted, previous reservoir studies indicate that impacts are greatest in the zone of inundation and drawdown (fluctuation zone), where cultural resources are repeatedly exposed to scouring, wave action, wet/dry cycles, and de-vegetation. This means that the most significant impacts will occur where an undertaking increases the size of the fluctuation zone.

Sensitivity analyses, which are summarized at the beginning of this section, estimate that, with complete surveys, impacts associated with CP1 inundation and areas would include approximately 212±54 prehistoric resources (Table 14-2). The historic-era archival study documented 355 localities that may potentially contain historic-era remains within this inundation area.

Sensitivity analyses estimate that, with complete surveys, the CP1 fluctuation zone would include approximately 675±172 prehistoric resources. The historic-era archival study documented 529 localities that may potentially contain historic-era remains.

Table 14-2. Cultural Resources Impacts for CP1

Inundation Area	
Prehistoric sites	212±54
Historic-era archival localities	355
Fluctuation Zone	
Prehistoric sites	675±172
Historic-era archival localities	529
0.25-Mile Buffer	
All cultural resources	Fewer than CP2

Notes:
Mean prehistoric site estimates are based on weights-of-evidence quantitative analysis.
An undetermined number of sites will actually be subject to mitigation under NHPA Section 106.

Sensitivity analyses estimate that with complete surveys, the 0.25-mile buffer area for CP1 would include approximately 728±212 prehistoric resources. The historic-era archival study documented 773 localities that may potentially contain historic-era remains. Although the full extent and locations of project impacts within the buffer zone related to construction are not yet available for CP1, impacts would occur within only a small percentage of the overall buffer zone concentrated near the reservoir.

Although it is impossible at this stage to say how many of these resources will be determined eligible for listing under NHPA, and how many of the eligible resources will sustain adverse impacts from this alternative, this impact would be significant. Adverse effects will be avoided, minimized, or mitigated through project redesign, when warranted, or through the development and implementation of an MOA or PA, as discussed in Section 14.3.4.

Impact Culture-2 (CP1): Inundation of Traditional Cultural Properties Due to the confidential nature of sacred land filings, some sites have been identified within the study area, but specific locations are unknown. Several Native American groups have identified Traditional Cultural Properties and important ceremonial locations that would be adversely impacted by CP1. This impact would be significant.

In addition, places used for traditional practices that may be Traditional Cultural Properties have been identified within the study area. These locations are also confidential.

Two particularly important Winnemem Wintu ceremonial locations that would be impacted by CP1 include Puberty Rock and the doctoring pools near Nawtawaket Creek. CP1 could increase the frequency of inundation of Puberty Rock, restricting the Winnemem Wintu from holding the puberty ceremony at this important location during certain periods. Although Puberty Rock would still be accessible for portions of the year, when lake levels are lower, CP1 would increase the frequency of inundation. The relocation of the rock to higher ground is not possible, as, in the Winnemem worldview, its location is preordained and connected with the nearby “two sisters” mountain (Bollibokka Mountain). Puberty Rock also marks the location of an extensive village with housepits and burials. CP1 would inundate additional burials at this location, which would require removal and relocation. The Winnemem Wintu have estimated that 120 ancestral villages still accessible above the current high waterline of Shasta Lake would be adversely impacted by CP1.

The Pit River Madesi Band members state that 22 ethnographic villages, associated burial grounds, and several Traditional Cultural Properties are located within the existing reservoir and proposed inundation or fluctuation areas.

The local Native American community has identified several locations in the study area where ceremonial activities are carried out; notable among these are Puberty Rock and the doctoring pools near Nawtawaket Creek. Inundation or other adverse impacts to these places likely cannot be mitigated because the importance of the identified properties is inextricably tied to physical location, and relocation of these features away from the inundation area is not possible.

Although it is impossible at this stage to say how many of these resources will be adversely impacted due to inundation as a result of implementing CP1, this

impact would be potentially significant. These sites cannot be relocated and continue their importance to Native American cultural practices. Adverse effects will be avoided, minimized, or mitigated through project redesign, when warranted, or through the development and implementation of an MOA or PA. However it is unlikely that effects would be resolved for many Traditional Cultural Properties. Mitigation for this impact is proposed in Section 14.3.4, but it is unlikely that adequate mitigation is available to reduce the impact to a less-than-significant level.

Upper Sacramento River (Shasta Dam to Red Bluff)
Impact Culture-3 (CP1): Disturbance or Destruction of Archaeological and Historical Resources near the Upper Sacramento River Due to Construction
Construction activities adjacent to the upper Sacramento River associated with downstream ecosystem enhancements would not occur under CP1; therefore, no impacts on significant cultural resources related to construction are expected. Mitigation for this impact is not needed, and thus not proposed.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Cultural resources potentially impacted by this alternative include those within (1) the proposed additional 1,734-acre inundation area, (2) the portion of the proposed fluctuation zone for this alternative within the existing reservoir area, and (3) those portions of the 0.25-mile buffer around the reservoir where infrastructure would need to be relocated (recreation facilities, roads, utilities, trails, etc.).

Shasta Lake and Vicinity
Impact Culture-1 (CP2): Disturbance or Destruction of Archaeological and Historical Resources Due to Construction or Inundation Raising Shasta Dam and enlarging Shasta Reservoir would have a direct impact on cultural resources. This impact would be significant. Sensitivity analyses estimate that, with complete surveys, inundation associated with CP2 would include approximately 224±57 prehistoric resources (Table 14-3). The historic-era archival study documented 371 localities that may potentially contain historic-era remains within this inundation area.

Table 14-3. Cultural Resources Impacts for CP2

Inundation Area	
Prehistoric sites	224±57
Historic-era archival localities	371
Fluctuation Zone	
Prehistoric sites	675±172
Historic-era archival localities	529
0.25-Mile Buffer	
All cultural resources	Fewer than CP3

Notes:
Mean prehistoric site estimates are based on weights-of-evidence quantitative analysis.
An undetermined number of sites will actually be subject to mitigation under NHPA Sec. 106.

Sensitivity analyses estimate that, with complete surveys, the fluctuation zone for CP2 would include approximately 675±172 prehistoric resources. The historic-era archival study documented 529 localities that may potentially contain historic-era remains.

Sensitivity analyses estimate that, with complete surveys, the 0.25-mile buffer zone for CP2 would include approximately 728±212 prehistoric resources. The historic-era archival study documented 773 localities that may potentially contain historic-era remains. Although the full extent and locations of project impacts related to construction activities within the buffer zone are not yet available for this alternative, they would occur within only a small percentage of the overall buffer zone concentrated near the reservoir.

Although it is impossible at this stage to say how many of these resources will be determined eligible, and how many of the eligible resources will sustain adverse impacts from CP2, this impact would be significant. Inundation or other adverse impacts to affected resources likely cannot be mitigated because the importance of the identified properties and ceremonial locations is inextricably tied to physical location, and relocation of these features away from the inundation area is not possible. Adverse effects will be resolved through project redesign, when warranted, or through the development of an MOA or PA, as discussed in Section 14.3.4.

Impact Culture-2 (CP2): Inundation of Traditional Cultural Properties
Alternative CP2 is similar to Alternative CP1 with respect to the potential to cause significant impacts to Traditional Cultural Properties by inundation or affected by the fluctuation zone. The Native American Heritage Commission (NAHC) identified sacred land filings within the study area, and local Native American groups have provided information related to many locations in the inundation and fluctuation zone. These locations are generally confidential, thus making it unclear whether or not they are situated within the CP2 area. For the same reasons that apply to CP1, this impact would be significant. Adverse effects will be avoided, minimized, or mitigated through project redesign, when warranted, or through the development and implementation of an MOA or PA.

However it is unlikely that effects would be resolved for many Traditional Cultural Properties. Mitigation for this impact is proposed in Section 14.3.4, but it is unlikely that adequate mitigation is available to reduce the impact to a less-than-significant level.

Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Culture-3 (CP2): Disturbance or Destruction of Archaeological and Historical Resources near the Upper Sacramento River Due to Construction

Construction activities adjacent to the upper Sacramento River associated with downstream ecosystem enhancements would not occur under CP2; therefore, no impacts on cultural resources related to construction are expected. Mitigation for this impact is not needed, and thus not proposed.

CP3 – 18.5-Foot Dam Raise, Anadromous Fish Survival and Agricultural Water Supply Reliability

Cultural resources potentially impacted by this alternative include those within (1) the proposed additional 2,497-acre inundation area, (2) the portion of the proposed fluctuation zone for this alternative within the existing reservoir area, and (3) those portions of the 0.25-mile buffer around the reservoir where infrastructure would need to be relocated (recreation facilities, roads, utilities, trails, etc.).

Shasta Lake and Vicinity

Impact Culture-1 (CP3): Disturbance or Destruction of Archaeological and Historical Resources Due to Construction or Inundation Raising Shasta Dam would have a direct impact on cultural resources. This impact would be significant. Sensitivity analyses estimate that, with complete surveys, inundation associated with CP3 would include approximately 243±63 prehistoric resources (Table 14-4). The historic-era archival study documented 391 localities that may potentially contain historic-era remains within this inundation area.

Table 14-4. Cultural Resources Impacts for CP3

Inundation Area	
Prehistoric sites	243±63
Historic-era archival localities	391
Fluctuation Zone	
Prehistoric sites	675±172
Historic-era archival localities	529
0.25-Mile Buffer	
All cultural resources	Fewer than CP5, same as CP4

Notes:
Mean prehistoric site estimates are based on weights-of-evidence quantitative analysis.
An undetermined number of sites will actually be subject to mitigation under NHPA Sec. 106.

Sensitivity analyses estimate that, with complete surveys, the fluctuation zone for CP3 would include approximately 675±172 prehistoric resources. The historic-era archival study documented 529 localities that may potentially contain historic-era remains.

Sensitivity analyses estimate that, with complete surveys, the 0.25-mile buffer zone for CP3 would include approximately 728±212 prehistoric resources. The historic-era archival study documented 773 localities that may contain historic-era remains. Although the full extent and locations of project impacts related to construction activities within the buffer zone are not yet available for this alternative, they would occur within only a small percentage of the overall buffer zone concentrated near the reservoir.

Although it is impossible at this stage to say how many of these resources will be determined eligible, and how many of the eligible resources will sustain adverse impacts from CP3, this impact would be significant. Inundation or other adverse impacts to affected resources likely cannot be mitigated because the importance of the identified properties and ceremonial locations is inextricably tied to physical location, and relocation of these features away from the inundation area is not possible. Adverse effects will be resolved through project redesign, when warranted, or through the development of an MOA or PA, as discussed in Section 14.3.4.

Impact Culture-2 (CP3): Inundation of Traditional Cultural Properties CP3 is similar to CP1 with respect to the potential to cause significant impacts to Traditional Cultural Properties by inundation or affected by the fluctuation zone. The NAHC identified sacred land filings within the study area, and local Native American groups have provided information related to many locations in the inundation and fluctuation zone. These locations are generally confidential, thus making it unclear whether or not they are situated within the CP3 area. Adverse effects will be avoided, minimized, or mitigated through project redesign, when warranted, or through the development and implementation of an MOA or PA. However it is unlikely that effects would be resolved for many Traditional Cultural Properties. Mitigation for this impact is proposed in Section 14.3.4, but it is unlikely that adequate mitigation is available to reduce the impact to a less-than-significant level.

Upper Sacramento River (Shasta Dam to Red Bluff)
Impact Culture-3 (CP3): Disturbance or Destruction of Archaeological and Historical Resources near the Upper Sacramento River Due to Construction
Construction activities adjacent to the upper Sacramento River associated with downstream ecosystem enhancements would not occur under CP3; therefore, no impacts on cultural resources related to construction are expected. Mitigation for this impact is not needed, and thus not proposed.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply Reliability

Cultural resources potentially impacted by this alternative include those within (1) the proposed additional 2,497-acre inundation area, (2) the portion of the proposed fluctuation zone for this alternative within the existing reservoir area, and (3) those portions of the 0.25-mile buffer around the reservoir where infrastructure would need to be relocated (recreation facilities, roads, utilities, trails, etc.). CP4 and CP4A include downstream ecosystem enhancements with spawning gravel augmentation and floodplain and riparian habitat restoration, both of which would entail construction activities adjacent to the upper Sacramento River.

Shasta Lake and Vicinity

Impact Culture-1 (CP4 and CP4A): Disturbance or Destruction of Archaeological and Historical Resources Due to Construction or Inundation

Raising Shasta Dam would have a direct impact on cultural resources. This impact would be significant for CP4 or CP4A. Sensitivity analyses estimate that with complete surveys, inundation associated with CP4 and CP4A would include approximately 243±63 prehistoric resources (Table 14-5). The historic-era archival study documented 391 localities for CP4 and CP4A that may potentially contain historic-era remains within this inundation area.

Table 14-5. Cultural Resources Impacts for CP4 and CP4A

Inundation Area	**CP4**	**CP4A**
Prehistoric sites	243±63	243±63
Historic-era archival localities	391	391
Fluctuation Zone		
Prehistoric sites	601±154	675±172
Historic-era archival localities	524	529
0.25-Mile Buffer		
All cultural resources	Fewer than CP5, same as CP3	Fewer than CP5, same as CP3

Notes:
Mean prehistoric site estimates are based on weights-of-evidence quantitative analysis.
An undetermined number of sites will actually be subject to mitigation under NHPA Sec. 106.

Sensitivity analyses estimate that, with complete surveys, the fluctuation zone for CP4 would include approximately 601±154 prehistoric resources. Sensitivity analyses estimate that, with complete surveys, the fluctuation zone for CP4A would include approximately 675±172 prehistoric resources. The historic-era archival study documented 524 localities for CP4 and 529 localities for CP4A that may potentially contain historic-era remains.

Sensitivity analyses estimate that, with complete surveys, the 0.25-mile buffer zone for CP4 and CP4A would include approximately 728±212 prehistoric resources. The historic-era archival study documented 773 localities for CP4 and CP4A that may potentially contain historic-era remains. Although the full

extent and locations of project impacts related to construction activities within the buffer zone are not yet available, they would occur within only a small percentage of the overall buffer zone concentrated near the reservoir.

Although it is impossible at this stage to say how many of these resources will be determined eligible, and how many of the eligible resources will sustain adverse impacts, this impact would be significant for CP4.

Although it is impossible at this stage to say how many of these resources will be determined eligible, and how many of the eligible resources will sustain adverse impacts, this impact would be significant for CP4A.

Inundation or other adverse impacts to affected resources likely cannot be mitigated because the importance of the identified properties and ceremonial locations is inextricably tied to physical location, and relocation of these features away from the inundation area is not possible. Adverse effects will be resolved through project redesign, when warranted, or through the development of an MOA or PA, as discussed in Section 14.3.4.

Impact Culture-2 (CP4 and CP4A): Inundation of Traditional Cultural Properties CP4 and CP4A are similar to CP1 with respect to the potential to cause significant impacts to Traditional Cultural Properties by inundation or affected by the fluctuation zone. The NAHC identified sacred land filings within the study area, and local Native American groups have provided information related to many locations in the inundation and fluctuation zone. These locations are generally confidential, thus making it unclear whether or not they are situated within the CP4 and CP4A area. For the same reasons that apply to CP1, this impact would be significant. Adverse effects will be avoided, minimized, or mitigated through project redesign, when warranted, or through the development and implementation of an MOA or PA. However it is unlikely that effects would be resolved for many Traditional Cultural Properties. Mitigation for this impact is proposed in Section 14.3.4, but it is unlikely that adequate mitigation is available to reduce the impact to a less-than-significant level.

Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Culture-3 (CP4 and CP4A): Disturbance or Destruction of Archaeological and Historical Resources near the Upper Sacramento River Due to Construction Previous cultural resource studies indicated the presence of cultural resources in or near proposed downstream construction areas related to spawning gravel augmentation and floodplain and riparian habitat restoration. This impact would be significant for CP4 or CP4A.

A total of 17 cultural resources have been recorded within the records search areas, consisting of eight prehistoric sites, six historic-era resources, and three resources with prehistoric and historic-era components. As mapped, thirteen of these cultural resources exist only in the 1/8-mile buffer areas, and only four of

these cultural resources extend into proposed construction areas. It should be noted that the proposed construction areas are concept-level and may be relocated or deleted as a result of design development, consultation, or other factors.

Although it is impossible at this stage to say how many eligible resources will sustain adverse impacts from CP4 or CP4A, this impact would be significant. Adverse effects will be resolved through project redesign, when warranted, or through the development of an MOA or PA, as discussed in Section 14.3.4.

CP5 – 18.5-Foot Dam Raise, Combination Plan

Cultural resources potentially impacted by this alternative include those within (1) the proposed additional 2,497-acre inundation area, (2) the portion of the proposed fluctuation zone for this alternative within the existing reservoir area, and (3) those portions of the 0.25-mile buffer around the reservoir where infrastructure would need to be relocated (recreation facilities, roads, utilities, trails, etc.). CP5 also includes downstream ecosystem enhancements with spawning gravel augmentation and floodplain and riparian habitat restoration, both of which would entail construction activities adjacent to the upper Sacramento River.

Shasta Lake and Vicinity

Impact Culture-1 (CP5): Disturbance or Destruction of Archaeological and Historical Resources Due to Construction or Inundation Raising Shasta Dam would have a direct impact on cultural resources. This impact would be significant. Sensitivity analyses estimate that, with complete surveys, inundation associated with CP5 would include approximately 243±63 prehistoric resources (Table 14-6). The historic-era archival study documented 391 localities that may potentially contain historic-era remains within this inundation area.

Table 14-6. Cultural Resources Impacts for CP5

Inundation Area	
Prehistoric sites	243±63
Historic-era archival localities	391
Fluctuation Zone	
Prehistoric sites	675±175
Historic-era archival localities	529
0.25-Mile Buffer	
All cultural resources	Largest quantity

Notes:
Mean prehistoric site estimates are based on weights-of-evidence quantitative analysis.
An undetermined number of sites will actually be subject to mitigation under NHPA Sec. 106.

Sensitivity analyses estimate that, with complete surveys, the fluctuation zone for CP5 would include approximately 675±172 prehistoric resources. The

historic-era archival study documented 529 localities that may potentially contain historic-era remains.

Sensitivity analyses estimate that, with complete surveys, the 0.25-mile buffer zone for CP5 would include approximately 728±212 prehistoric resources. The historic-era archival study documented 773 localities that may potentially contain historic-era remains. Although the full extent and locations of project impacts related to construction activities within the buffer zone are not yet available for this alternative, they would occur within only a small percentage of the overall buffer zone concentrated near the reservoir.

Although it is impossible at this stage to say how many of these resources will be determined eligible, and how many of the eligible resources will sustain adverse impacts from CP5, this impact would be significant. Inundation or other adverse impacts to affected resources likely cannot be mitigated because the importance of the identified properties and ceremonial locations is inextricably tied to physical location, and relocation of these features away from the inundation area is not possible. Adverse effects will be resolved through project redesign, when warranted, or through the development of an MOA or PA, as discussed in Section 14.3.4.

Impact Culture-2 (CP5): Inundation of Traditional Cultural Properties
Alternative CP5 is similar to Alternative CP1 with respect to the potential to cause significant impacts to Traditional Cultural Properties by inundation or affected by the fluctuation zone. The NAHC identified sacred land filings within the study area, and local Native American groups have provided information related to many locations in the inundation and fluctuation zone. These locations are generally confidential, thus making it unclear whether or not they are situated within the CP5 area. For the same reasons that apply to CP1, this impact would be significant. Adverse effects will be avoided, minimized, or mitigated through project redesign, when warranted, or through the development and implementation of an MOA or PA. However it is unlikely that effects would be resolved for many Traditional Cultural Properties. Mitigation for this impact is proposed in Section 14.3.4, but it is unlikely that adequate mitigation is available to reduce the impact to a less-than-significant level.

Upper Sacramento River (Shasta Dam to Red Bluff)
Impact Culture-3 (CP5): Disturbance or Destruction of Archaeological and Historical Resources near the Upper Sacramento River Due to Construction
This impact would be significant. Previous cultural resource studies indicated the presence of cultural resources in or near proposed downstream construction areas related to spawning gravel augmentation and floodplain and riparian habitat restoration.

A total of 17 cultural resources have been recorded within the records search areas, consisting of eight prehistoric sites, six historic-era resources, and three resources with prehistoric and historic-era components. As mapped, thirteen of

these cultural resources exist only in the 1/8-mile buffer areas, and only four of these cultural resources extend into proposed construction areas. It should be noted that the proposed construction areas are concept-level and may be relocated or deleted as a result of design development, consultation, or other factors.

Although it is impossible at this stage to say how many eligible resources will sustain adverse impacts from CP5, this impact would be significant. Adverse effects will be resolved through project redesign, when warranted, or through the development of an MOA or PA, as discussed in Section 14.3.4.

14.3.4 Mitigation Measures

This section discusses mitigation measures for each significant impact described in the environmental consequences section, as presented in Table 14-7. In coordination with project designers, there will be opportunities to avoid, minimize, or mitigate adverse effects to historic properties through project redesign or through the development of an MOA or PA. An MOA or PA will ensure compliance with Section 106 and resolution of adverse effects.

Table 14-7. Summary of Mitigation Measures for Cultural Resources

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact Culture-1: Disturbance or Destruction of Archaeological and Historical Resources Due to Construction or Inundation	LOS before Mitigation	NI	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure Culture-1: Develop and Implement measures identified in an NHPA Section 106 MOA or PA				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Culture-2: Inundation of Traditional Cultural Properties	LOS before Mitigation	NI	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure Culture-2:Adverse effects will be avoided, minimized, or mitigated through project redesign, when warranted, or through the development and implementation of an MOA or PA				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU

Table 14-7. Summary of Mitigation Measures for Cultural Resources (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact Culture-3: Disturbance or Destruction of Archaeological and Historical Resources near the Upper Sacramento River Due to Construction	LOS before Mitigation	NI	NI	NI	NI	S	S
	Mitigation Measure	None required.	No mitigation needed; thus, none proposed.			Mitigation Measure Culture-3: Implement Mitigation Measure Culture-1: Develop and Implement measures identified in an NHPA Section 106 MOA or PA	
	LOS after Mitigation	NI	NI	NI	NI	LTS	LTS

Key:
LOS = level of significance
LTS = less than significant
MOA = Memorandum of Agreement
NHPA = National Historic Preservation Act
NI = No Impact
PA = Programmatic Agreement
S = significant
SU = significant and unavoidable

No-Action Alternative

No mitigation measures are required for this alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

As this alternative is likely to cause significant, adverse impacts to historic properties, it will be necessary to mitigate those impacts.

Mitigation Measure Culture-1 (CP1): Develop and Implement measures identified in an NHPA Section 106 MOA or PA Avoid, minimize, or mitigate adverse effects through project redesign, when warranted, or through the development and implementation of an MOA or PA.

These impacts would be less than significant after mitigation.

Mitigation Measure Culture-2 (CP1) Avoid, minimize, or mitigate adverse effects to Traditional Cultural Properties through project redesign, when warranted, or through the development and implementation of an MOA or PA.

This impact would remain significant and unavoidable after mitigation.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

As this alternative is likely to cause significant, adverse impacts to historic properties, it will be necessary to mitigate those impacts.

Mitigation Measure Culture-1 (CP2): Develop and Implement measures identified in an NHPA Section 106 MOA or PA Avoid, minimize, or mitigate adverse effects through project redesign, when warranted, or through the development and implementation of an MOA or PA.

These impacts would be less than significant after mitigation.

Mitigation Measure Culture-2 (CP2) Avoid, minimize, or mitigate adverse effects to Traditional Cultural Properties through project redesign, when warranted, or through the development and implementation of an MOA or PA.

This impact would remain significant and unavoidable after mitigation.

CP3 – 18.5-Foot Dam Raise, Anadromous Fish Survival and Agricultural Water Supply Reliability

As this alternative is likely to cause significant, adverse impacts to historic properties, it will be necessary to mitigate those impacts.

Mitigation Measure Culture-1 (CP3): Develop and Implement measures identified in an NHPA Section 106 MOA or PA Avoid, minimize, or mitigate adverse effects through project redesign, when warranted, or through the development and implementation of an MOA or PA.

These impacts would be less than significant after mitigation.

Mitigation Measure Culture-2 (CP3) Avoid, minimize, or mitigate adverse effects to Traditional Cultural Properties through project redesign, when warranted, or through the development and implementation of an MOA or PA.

This impact would remain significant and unavoidable after mitigation.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply Reliability

As CP4 or CP4A are likely to cause significant, adverse impacts to historic properties, it will be necessary to mitigate those impacts.

Mitigation Measure Culture-1 (CP4 and CP4A): Develop and Implement measures identified in an NHPA Section 106 MOA or PA Avoid, minimize, or mitigate adverse effects through project redesign, when warranted, or through the development and implementation of an MOA or PA.

These impacts would be less than significant after mitigation.

Mitigation Measure Culture-2 (CP4 and CP4A) Avoid, minimize, or mitigate adverse effects to Traditional Cultural Properties through project redesign, when warranted, or through the development and implementation of an MOA or PA.

This impact would remain significant and unavoidable after mitigation.

Mitigation Measure Culture-3 (CP4 and CP4A): Implement Mitigation Measure Culture-1 (CP4 and CP4A): Develop and Implement measures identified in an NHPA Section 106 MOA or PA This mitigation measure is the same as Mitigation Measure Culture-1 (CP4 and CP4A). Implementation of Mitigation Measure Culture-1 (CP4 and CP4A) would reduce Impact Culture-3 (CP4 and CP4A) to a less than significant level.

CP5 – 18.5-Foot Dam Raise, Combination Plan

As this alternative is likely to cause significant, adverse impacts to historic properties, it will be necessary to mitigate those impacts.

Mitigation Measure Culture-1 (CP5): Develop and Implement measures identified in an NHPA Section 106 MOA or PA Avoid, minimize, or mitigate adverse effects through project redesign, when warranted, or through the development and implementation of an MOA or PA.

These impacts would be less than significant after mitigation.

Mitigation Measure Culture-2 (CP5) Avoid, minimize, or mitigate adverse effects to Traditional Cultural Properties through project redesign, when warranted, or through the development and implementation of an MOA or PA.

This impact would remain significant and unavoidable after mitigation.

Mitigation Measure Culture-3 (CP5): Implement Mitigation Measure Culture 1 (CP5): Develop and Implement measures identified in an NHPA Section 106 MOA or PA This mitigation measure is the same as Mitigation Measure Culture-1 (CP5). Implementation of Mitigation Measure Culture-1 (CP5) would reduce Impact Culture-3 (CP5) to a less than significant level.

14.3.5 Cumulative Effects

Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," gives an overview of the cumulative effects analysis, including significance criteria, and discusses the relationship of this analysis to the CALFED Programmatic Cumulative Impacts Analysis. Table 3-1, "Present and Reasonably Foreseeable Future Actions Included in the Analysis of Cumulative Impacts, by Resource Area," in Chapter 3, lists the projects considered quantitatively and qualitatively within the cumulative impacts analysis. This cumulative impacts analysis accounts for potential project impacts combined with the impacts of existing facilities, conditions, land uses, and reasonably foreseeable actions expected to occur in the study area on a qualitative and quantitative level. None of the programs or projects listed in Table 3-1 under Quantitative Analysis would impact cultural resources in the primary study, nor overlap with resources affected in the extended study

area. The remainder of this analysis is focused on programs and projects in the Qualitative Analysis section of Table 3-1.

Past programs and projects have impacted cultural resources in the primary and extended study area through land use changes, inundation, erosion, construction, abandonment and illegal activities. The past projects such as Shasta Dam and Reservoir, road construction, and recreation development have cumulatively impacted cultural resources. Reasonably foreseeable projects listed on Table 3-1 that may impact cultural resources include but are not limited to Antlers Bridge Replacement, Moody Flats Quarry, and Mountain Gate at Shasta Mixed Use Area Plan. The project alternatives would result in a cumulatively considerable incremental contribution to a significant cumulative impact related to effects on cultural resources in the primary study area. Also in the Upper Sacramento River (Shasta Dam to Red Bluff) region of the extended study area, the project would result in a cumulatively considerable incremental contribution to a significant cumulative impact on cultural resources. The SLWRI alternatives would not impact cultural resources in other areas of the extended study area, so there would be no cumulative impacts from the project in these areas.

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Chapter 15
Indian Trust Assets

15.1 Affected Environment

This section describes the affected environment related to Indian Trust Assets (ITA) for the proposed dam and reservoir modifications under SLWRI action alternatives.

The affected environment for ITAs is the primary study area, within which all construction activities will take place, and which includes Shasta Lake's expanded inundation area, relocations within approximately 0.25 miles of the shoreline, and the upper Sacramento River from Shasta Dam to the Red Bluff Pumping Plant.

The extended study area would only be affected by changes in CVP and SWP operations, and includes the Sacramento River to the Delta and the CVP and SWP water service areas. For additional details on the primary and extended study areas, please refer to Section 1.3 and Figures 1-1 and 1-2 of the EIS. Since the action alternatives are not anticipated to have potential impacts to ITAs as a result of changes in CVP and SWP operations, an analysis of potential impacts to ITAs was determined unwarranted.

Indian Trust Lands in the region around the primary study area are shown in Figure 15-1.

Several Federally recognized tribes are located in the region surrounding the primary study area (Table 15-1).

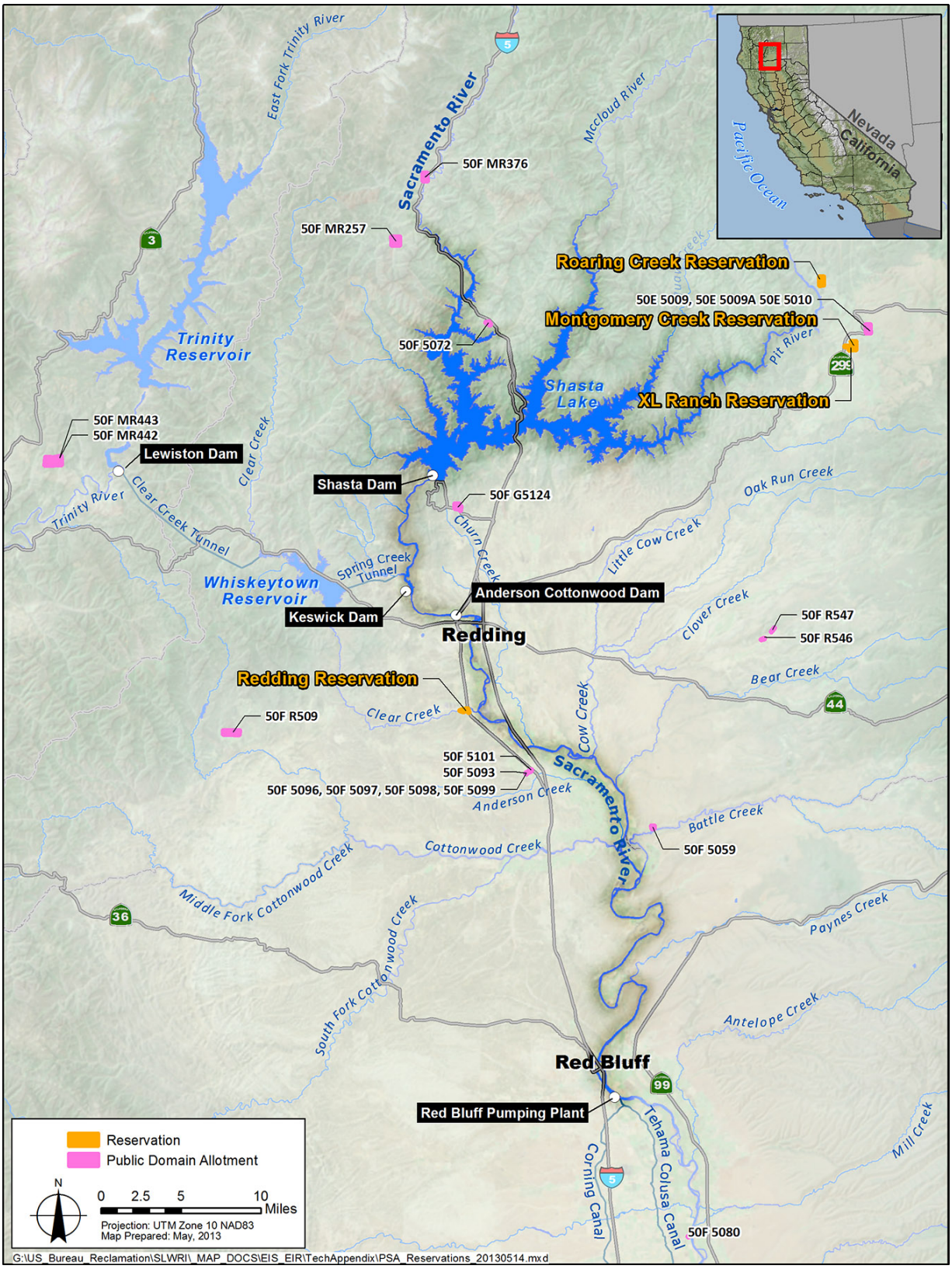

Figure 15-1. Reservations, Rancherias and Public Domain Allotments in Primary Study Area

Table 15-1. Federally Recognized Tribes in Region Surrounding Primary Study Area

Tribe	Affiliation
Grindstone Indian Rancheria of Wintun- Wailaki Indians	Wintun, Wailaki
Paskenta Band of Nomlaki Indians	Nomlaki
Pit River Tribe Environmental Office	Pit River, Wintun
Pit River Tribe	Pit River Achumawi Wintun
Redding Rancheria	Wintu, Pit River, Yana

15.2 Regulatory Framework

ITAs are legal interests in property held in trust by the U.S. for Federally recognized Indian tribes or individual Indians. An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITAs can include land, minerals, Federally reserved hunting and fishing rights, Federally reserved water rights, and in-stream flows associated with trust land. Beneficiaries of the Indian trust relationship are Federally recognized Indian tribes with trust land; the United States is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the United States. The characterization and application of the United States trust relationship have been defined by case law that interprets Congressional acts, executive orders, and historic treaty provisions.

The Federal Government, through treaty, statute, or regulation, may take on specific, enforceable fiduciary obligations that give rise to a trust responsibility to Federally recognized tribes and individual Indians possessing trust assets. Courts have recognized an enforceable Federal fiduciary duty with respect to Federal supervision of Indian money or natural resources, held in trust by the Federal Government, where specific treaties, statutes, or regulations create such a fiduciary duty.

Consistent with President William J. Clinton's 1994 memorandum, *Government-to-Government Relations with Native American Tribal Governments* (Federal Register, Vol. 59, No. 85, May 4, 1994, pages 22951–22952), Reclamation assesses the effect of its programs on tribal trust resources and Federally recognized tribal governments. Reclamation is tasked to actively engage Federally recognized tribal governments and consult with such tribes on a government-to-government level when its actions affect ITAs. The U.S. Department of the Interior Departmental Manual, Part 512.2 (1995), ascribes the responsibility for ensuring protection of ITAs to the heads of bureaus and offices. The Department of the Interior is required to "protect and preserve Indian trust assets from loss, damage, unlawful alienation, waste, and depletion" (Secretarial Order No. 3215, *Principles for the Discharge of the Secretary's Trust Responsibility*, Reclamation 2000). It is the general policy of the

Department of the Interior to perform its activities and programs in such a way as to protect ITAs and avoid adverse effects whenever possible. Reclamation complies with procedures contained in Departmental Manual, Part 512.2, guidelines, which protect ITAs. Reclamation carries out its activities in a manner that protects trust assets and avoids adverse impacts, when possible. When Reclamation cannot avoid adverse impacts, it will provide appropriate mitigation or compensation. Reclamation is responsible for assessing whether action alternatives CP1 through CP5 have the potential to affect ITAs. Reclamation will comply with procedures contained in Departmental Manual, Part 512.2, guidelines, which protect ITAs.

15.3 Environmental Consequences and Mitigation Measures

This section discusses environmental consequences and potential mitigation associated with ITAs that could result from implementing the alternatives described in this EIS.

15.3.1 Methods and Assumptions

A detailed description of both the primary and extended study areas was provided to the Bureau of Indian Affairs' Regional ITA Coordinator. The Regional ITA Coordinator examined both the project area descriptions and records held by the Bureau of Indian Affairs and Reclamation, and determined that the proposed action does not have potential to affect ITAs. There are no ITAs in the primary study area.

15.3.2 Direct and Indirect Effects

The following section describes the potential environmental consequences of the project.

No-Action Alternative

Under the No-Action Alternative, there are no potential impacts to ITAs because no new facilities would be constructed and existing operations would continue as historically.

CP1 Through CP5

There are no tribes possessing legal property interests held in trust by the United States in the study area for any of the proposed comprehensive plans (CP1 through CP5). The nearest ITA is a Public Domain Allotment approximately 5 miles north-northwest of the project location. This property would not be affected by inundation from the enlarged reservoir or have ground disturbing activities.

Cumulative Impacts

There are no potential impacts to ITAs as a result of the proposed action; therefore, the proposed action would not contribute to cumulative impacts to ITAs.

Chapter 16
Socioeconomics, Population, and Housing

16.1 Affected Environment

This chapter describes socioeconomics, population, and housing characteristics in the primary and extended study areas. For a more detailed discussion of the information presented in this chapter, see the *Socioeconomics, Population, and Housing Technical Report*.

16.1.1 Socioeconomics

Socioeconomics covers age, race/ethnicity, income/poverty, employment and labor force, business and industry, and government and finance. For a more detailed discussion of the information presented in this chapter, see the *Socioeconomics, Population, and Housing Technical Report*.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Race/Ethnicity In 2010, the white population represented more than 90 percent of the populations of Shasta and Tehama counties, but substantial increases were observed in many minority groups (U.S. Census Bureau 2010a). Tehama County's minority populations also increased between 2000 and 2010. Trends observed in the two counties generally coincide with statewide trends; Hispanic, Asian-Pacific Islander, and American Indian populations all grew by more than 9 percent over the 10-year period.

Income/Poverty Jurisdictions within the primary study area have underperformed when compared to the statewide averages for income levels and poverty rates. Median household incomes in Shasta and Tehama counties were sizably lower than the statewide average in 2000 and 2010, although Shasta County experienced a substantial increase in the 10-year period. With median household incomes of $42,931 and $39,392 in 2010, respectively, Shasta and Tehama counties had incomes averaging between $17,000 and $20,000 less than the statewide average for 2010 (U.S. Census Bureau 2011a). Overall poverty rates and child poverty rates also have been higher in the primary study area than in the State of California (State) as a whole.

Employment and Labor Force Because of the cyclical nature of the area's natural resource-related industries and other factors, Shasta and Tehama counties were characterized by substantially higher unemployment rates during the 1990s (Shasta County 2004). Unemployment rates in both counties have continued to increase and have exceeded State rates since 2007. From 2007

through 2010, unemployment rates in the two counties ranged between 1.8 percent and 3.3 percent above the statewide rate. The two counties recorded similar unemployment rates (varying between 0.1 and 0.7 percent) since 2007. In 2010, Tehama County registered a 15.6 percent unemployment rate, while unemployment in Shasta County totaled 15.7 percent of the population (EDD 2010a). As a result of its larger population, Shasta County maintained a labor force of just under 84,400 people in 2010, or more than three times that of Tehama County.

Business and Industry Economic activities in the primary study area coincide in many ways with the industrial composition of California as a whole. Education and health services, followed by governmental services, made up the top two industrial sectors both locally and statewide in 2010. In Shasta and Tehama counties, employees in the education and health services, which includes teachers and health workers, and government employees accounted for more than 40 percent of the total workforce. Similarly, retail trade, which includes general merchandise stores, food and beverage stores, and other miscellaneous stores and retailors, also ranks in the top five industries in both counties and California generally.

Some differences also exist between the industrial makeup of the two counties and that of California as a whole. For example, manufacturing plays an important role in Tehama County (7.6 percent) and California (10.0 percent) as a whole, but a comparatively small role in Shasta County. Professional and business services registers as the third largest industry at the statewide level (12.5 percent), but represents a smaller portion of employment in Shasta County (9.7 percent) and Tehama County (7.0 percent). Additionally, farm employment makes up a sizeable portion of the total workforce in Tehama County (8.3 percent), but accounts for a comparatively small portion of the workforce in Shasta County (3.1 percent) and California as a whole (2.3 percent).

Projections of future growth depict slightly different economic trends in Shasta and Tehama counties than at the statewide level. California's construction industry is expected to grow by 26 percent by 2020 (compared to 2010 levels), and the wholesale trade industry is expected to grow by more than 25 percent in that time. The construction industry represents the fifth largest growth industry in Tehama County (9.4 percent); however, it does not rank in the top growth industries in Shasta County. The wholesale trade industry also represents the fourth and third growth industries in Shasta and Tehama counties, respectively, but growth rates are expected to be less than the State rate (U.S. Census Bureau 2011a).

Established businesses, along with new businesses that locate in the area, will play an important role in the expansion of the local economy, as projected by the State. Table 1-11 in the *Socioeconomics, Population, and Housing Technical Report* displays a number of the major employers in the primary study area. This list of employers includes a range of businesses with a payroll

of more than 500 people. Three of the 10 businesses provide health care to local residents. Other employers with a payroll of over 500 people include: a wholesale nursery; insurance, pest management, and fuel management companies; a college; a manufacturer of industrial materials (mill work); and a wholesale distributor, identified as employing more than 1,000 people (EDD 2013a, 2013b).

Government and Finance Shasta and Tehama counties are the critical local governments in the primary study area. Each county has a primary urban center (Redding in Shasta County and Red Bluff in Tehama County), with a limited number of small cities and towns, and large amounts of rural land surrounding it. Because the two counties are largely rural, their total revenues and expenditures are relatively low when compared to other jurisdictions in California.

Revenues generated by Shasta County are used for a range of governmental activities. As described in the *Socioeconomics, Population, and Housing Technical Report*, expenditures increased from $302.8 million in the 2007 – 2008 fiscal year to $319.7 million in the 2008 – 2009 fiscal year. Expenditures decreased substantially in the 2009 – 2010 fiscal year to $309.6 million, as a result of decreased spending on transportation-related projects. Welfare, social services, and other public assistance have consistently been the largest expenditures for Shasta County (totaling more than $94.1 million in 2010), but remained relatively constant between 2007 and 2010. Police, fire, and other public safety activities represented the second largest expenditure category with more than $79.7 million in the 2009 – 2010 fiscal year.

Observed trends in Tehama County's revenues and expenditures have been generally similar to those experienced in Shasta County. Because of its smaller size, Tehama County's total revenues are substantially less than those of Shasta County ($112.3 million in the 2009 – 2010 fiscal year, compared to $309.6 million in Shasta County), but Tehama County experienced an overall decrease in revenue growth between 2007 and 2010.

Expenditures in Tehama County also are consistent with the trends observed in Shasta County.

Lower Sacramento River and Delta

Race/Ethnicity Overall, the majority of people in the nine-county lower Sacramento River and Delta portion of the extended study area are white (57.4 percent), but the proportion of population identified as white varies substantially between counties. In 2010, the white population of Glenn County (71.1 percent) was the highest proportion of any county in the area, while Sacramento and San Joaquin counties had the lowest proportion of white residents (51.0 percent) (U.S. Census Bureau 2010b). These proportions were less than that observed at the statewide level in 2010 (57.6 percent).

Income/Poverty Income and poverty characteristics for the lower Sacramento River and Delta area are similar to those for California as a whole. The median household income of the majority of counties within the nine-county area is similar to or higher than the statewide median household income ($59,641).

Poverty levels for both individuals and children in the lower Sacramento River and Delta counties are similar to the statewide level. Sacramento (16.6 percent), San Joaquin (17.7 percent), Glenn (18.2 percent), Yolo (19.9 percent), and Butte (20.3 percent) had higher overall poverty rates than California as a whole (15.5 percent) in 2010 (U.S. Census Bureau 2011b). The percentage of people below the poverty level is expected to follow national and statewide economic trends.

Employment and Labor Force Employment and labor trends in the nine lower Sacramento River and Delta counties generally are consistent with statewide trends. The area maintains a labor force of more than 1.9 million people, representing approximately 10 percent of California's labor force (18.3 million).

In the nine-county area in 2010, approximately 13.2 percent of the labor force was classified as unemployed, as compared to 12.4 percent statewide for the same period. Although the total unemployment rate was only 0.8 percent greater than the State's unemployment rate, unemployment within the lower Sacramento River and Delta counties varied substantially. Generally, the counties with the highest unemployment rates in 2010 had greater dependence on the agricultural industry and a reduced industrial diversity. Frequently, unemployment rates tend to be higher in rural areas than in urban areas, and farm workers commonly have seasonal and temporary jobs.

Business and Industry Business and industry in the lower Sacramento River and Delta counties are composed primarily of five sectors: government; educational and health services; professional and business services; retail trade; and leisure and hospitality (U.S. Census Bureau 2011b). These consistently rank in the top five sectors of the nine lower Sacramento River and Delta counties.

Government and Finance A total of 55 cities and towns and a range of special districts are located within the nine counties of the lower Sacramento River and Delta. This collection of governmental entities provides valuable public services to the lower Sacramento River and Delta area—education, fire protection, employment development, emergency services, and crime prevention and control. These agencies and special districts rely primarily on tax revenue disbursed by the State government, local sales and property taxes and fees, and the disbursement of Federal funds. This greater reliance on existing tax structures and rates, and a productive economic base, makes relatively reliable and affordable CVP and SWP water and power even more valuable, because its availability and affordability helps foster local business activity, and thus indirectly helps sustain the fiscal health of local service

providers. Similarly, flood protection provided by Shasta Dam helps protect and sustain the appraised value of property within the dam's floodplain, again helping to protect the fiscal health of local service providers.

Total revenues and expenditures vary substantially between the nine counties of the lower Sacramento River and Delta because of the relative sizes of the counties and the services they provide. Revenues include payments received through taxes, licenses and permits, grants from other governments, charges for services, and others. Expenditures include payments made by a jurisdiction to buy goods, pay its employees, and provide services to its residents. Glenn County had the smallest total of revenues and expenditures, each at $82.2 million for 2009-2010, while Sacramento County had the greatest total of revenues and expenditures at $2.4 billion and $2.5 billion, respectively, for 2009-2010 (Glenn County 2009; Sacramento County 2009).

CVP/SWP Service Areas

Race/Ethnicity The population within the CVP and SWP service areas continues to diversify. The proportion of the statewide population made up of minority groups has been steadily increasing. The population of individuals in California who identify themselves as Asian–Pacific Islander or multiracial experienced double-digit population growth between 2000 and 2010 (U.S. Census Bureau 2002, 2010b). Hispanics are the largest minority population in California and many members of this ethnic group work on farms that receive some or all of their water from the CVP and SWP.

Income/Poverty Poverty levels for both individuals and children in California increased slightly between 2000 and 2010. The percentage of people below the poverty level is expected to follow national and statewide economic trends.

Employment and Labor Force Employment and labor force trends observed in the CVP and SWP service areas generally are synonymous with the trends observed at the statewide level because of the expanse of the CVP and SWP service areas. California's total labor force increased consistently from year to year between 2007 and 2010. Between 2007 and 2008, the labor force increased by approximately 282,100 individuals, which was the largest annual increase over the 4-year period. Between 2009 and 2010, the labor force increased by approximately 108,100 individuals. California's total labor force exceeded 18.3 million in 2010.

Although increases in the State's total labor force were relatively consistent, the State's unemployment rate fluctuated between 2007 and 2010. The State's unemployment rate was 5.4 percent in 2007 and increased steadily over the next 4 years to 12.4 percent. This increase in the unemployment rate at the State level coincided with similar national employment trends (EDD 2010a).

Business and Industry Business and industry trends for the CVP and SWP service areas are assumed to be equal to those at the statewide level because of

the expanse of these service areas. The education and health services sector represents the largest industry in California, measured by total employees. Government is California's second largest work sector, and the retail trade, professional and business services, and leisure and hospitality industries all play important roles in the State's economy.

Government and Finance The State represents the most appropriate level of detail for the CVP and SWP service areas because of the expanse of the service areas and the interdependent nature of government and finance provision. California currently ranks as the seventh largest economy in the world and provides goods and services to more than 38 million people, making it the largest state in the nation. As a result, State government manages a large annual volume of revenues and expenditures. The State's adopted 2012–2013 budget includes a total of approximately $132.9 billion in revenues and transfers and $142.4 billion in total expenditures (State of California 2012). Many of the State's expenditures represent grants and other funding, made available to local jurisdictions throughout California. These funds may be used for a variety of services, such as health and human services, environmental protection, and resource management.

16.1.2 Population

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

The area surrounding Shasta Dam includes generally smaller cities and towns with two larger, primary urban areas in each of the two counties (Shasta County and Tehama County). Almost 39 percent of the population in Shasta County and more than 65 percent in Tehama County lived in unincorporated areas in 2010. By comparison, only 17.2 percent of the population in the entire State lived in unincorporated areas in 2010. In total, the populations of Shasta and Tehama counties make up less than 1 percent of the total population in California.

The cities of Redding and Red Bluff are the two largest urban areas in the primary study area. Redding, with a total of 91,561 residents in 2010, is the most populous city in the region. Red Bluff is the second largest city in the region and the largest city in Tehama County, with a total of 13,825 residents in 2010. Remaining cities within the primary study area – Anderson, Shasta Lake, and Tehama – all contained fewer than 11,000 residents in 2010.

Although Shasta and Tehama counties are still comparatively small, both counties have been growing substantially over the past 15-20 years. Since 1990, the population of Shasta County has increased by more than 25 percent. During that time, the populations of Redding and Anderson have increased by approximately 38 percent and 30 percent, respectively. A similar situation has been observed in Tehama County, where the total population has grown by more than 27 percent since 1990. Most of this new growth has occurred in the unincorporated areas of Tehama County, rather than in its cities.

Shasta and Tehama counties are expected to continue this growth trend, with substantial growth in Tehama County. The State of California projects that Shasta County's population will increase by 27 percent by 2050, to a total of approximately 233,500 residents (DOF 2012). This increase is less than that total expected at the statewide level (32.0 percent). Tehama County is expected to have a larger population increase compared to the state level, where the population is expected to increase approximately 44 percent between 2010 and 2050 (DOF 2012).

Lower Sacramento River and Delta

As described in the *Socioeconomics, Population, and Housing Technical Report*, roughly 4 million people live in the nine-county area that makes up the lower Sacramento River and Delta area (Butte, Colusa, Contra Costa, Glenn, Sacramento, San Joaquin, Solano, Sutter, and Yolo counties). This population represents approximately 11 percent of California's total population. Sacramento County and Contra Costa County are the two largest counties in the area, with approximately 1.4 million and 1.0 million residents, respectively, in 2010 (DOF 2010). All of the nine-county area is expected to grow at a faster rate than California as a whole (32.0 percent increase) through 2050. Population increases of at least 34 percent are expected in all nine counties in the area, over that time (DOF 2012).

CVP/SWP Service Areas

In 2010, California contained a total of 38.7 million residents. Approximately 80 percent of the State's population resided in the incorporated areas of its 58 counties (DOF 2010). Similar to the State as a whole, most of the population of the CVP and SWP service areas is concentrated within urban areas. Outside of these fast-growing population centers, most of the lands within the CVP and SWP service areas are rural, with irrigated agriculture being the predominant land use and driver of the local and regional economies.

California's population has increased by almost 25 percent since 1990, and it is projected to increase by approximately 32 percent to more than 51 million people by 2050. This substantial population increase will result in a sizeable increase in water and energy demand across the State. The proportion of the statewide population made up of minority groups has been steadily increasing.

16.1.3 Housing

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

As shown in the *Socioeconomics, Population, and Housing Technical Report*, as would be expected, provision of housing in the primary study area generally coincides with the population trends discussed above. Shasta County (77,857 units in 2010) maintains almost three times the amount of housing units as that of Tehama County (27,729 units) (DOF 2010). Of the nearby cities, Redding provides the largest supply of housing in the region, with more than 38,000

housing units. Redding's units represent roughly half the total housing units in Shasta County. Red Bluff provides the second largest housing stock in the area, with more than 6,000 units. Within Redding and Anderson, the increase in housing units between 1990 and 2010 was substantially greater than the percentage increase at the State level (21.5 percent). Redding observed the greatest increase in housing units since 1990 (40.9 percent).

Overall, single-family dwelling units are the predominant housing type in the primary study area. Vacancy rates generally were higher than the statewide average (5.9 percent), with the exception of Redding (5.0 percent) and Anderson (5.8 percent). Tehama County registered the highest vacancy rate in the primary study area, with 10.9 percent of all its housing units vacant. The average household size in jurisdictions of the primary study area ranged from as low as 2.33 persons per household (Tehama) to as high as 2.64 persons per household (Anderson and Shasta Lake). All of these totals were lower than the average number of persons per household at the statewide level (2.96 persons).

Lower Sacramento River and Delta

As shown in the *Socioeconomics, Population, and Housing Technical Report*, housing characteristics in the nine lower Sacramento River and Delta counties generally are similar to those at the statewide level. In 2010, the area contained approximately 1.6 million housing units. Similar to population, this total represents approximately 11 percent of California's housing stock (approximately 14 million houses). Overall, single-family housing makes up a larger proportion of the total housing stock in the nine-county area (72.7 percent) than recorded at the statewide level (64.4 percent) in 2010 (DOF 2010).

The vacancy rate in the nine-county area in 2010 was higher (5.3 percent) than the rate observed at the statewide level (4.8 percent). Vacancy in the majority of counties (six of nine counties) within the lower Sacramento River and Delta area was substantially lower than California as a whole (DOF 2010).

Average household size in the lower Sacramento River and Delta area is generally lower than that observed at the statewide level. In total, an average of 2.82 persons lived in the households of the nine-county area in 2010. This compared to an average of 2.96 persons for California as a whole (DOF 2010).

CVP/SWP Service Areas

A description of housing in the CVP and SWP service areas is not included because it would not be affected by the project.

16.2 Regulatory Framework

The analysis of socioeconomic resources is guided primarily by Federal laws and policies. State and local laws and policies typically promote economic development and diversity, environmental justice, public health and safety, and

housing, and address the concerns of the residents within their jurisdictions. As noted in the following discussion, NEPA documents must include an assessment of potential conflicts with State and local plans and policies.

16.2.1 Federal

The major Federal laws and regulations guiding the assessment of socioeconomic resources are summarized below.

National Environmental Policy Act

Section 102 of NEPA requires Federal agencies to "insure the integrated use of the natural and social sciences" in planning and decision making (42 U.S. Code Section 4332).

Section 1502.16(c) of NEPA requires Federal agencies to identify potential conflicts between a proposed action and related plans and policies of Federal, State, and local agencies and Indian tribes. This requirement helps Federal agencies identify potential conflicts that may cause adverse effects on the social and economic environment of a study area because many agency and tribal plans and policies are designed to protect the people residing within their jurisdictions and/or the local economy they depend on for their economic livelihoods.

Council on Environmental Quality

The Council on Environmental Quality's "Regulations for Implementing the Procedural Provisions of NEPA" (40 Code of Federal Regulations (CFR) Sections 1500–1508) provide guidance related to social and economic impact assessment by noting that the "human environment" assessed under NEPA is to be "interpreted comprehensively" to include "the natural and physical environment and the relationship of people with that environment" (40 CFR 1508.14). Furthermore, these regulations require agencies to assess "aesthetic, historic, cultural, economic, social, or health" effects, whether direct, indirect, or cumulative (40 CFR 1508.8). Some Federal agencies, including the U.S. Bureau of Land Management and USFS, have developed socioeconomics-related handbooks and instructional memoranda to help EIS preparers comply with NEPA, with respect to socioeconomics resources.

Executive Order 12898 – Environmental Justice

In 1994, President Bill Clinton issued Executive Order 12898 regarding environmental justice. It requires Federal agencies to "identify and address" disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States. The Council on Environmental Quality issued guidance in 1997, to help Federal agencies incorporate environmental justice concerns into their NEPA procedures. Environmental justice issues are specifically addressed in Chapter 24, "Environmental Justice," of this EIS.

16.2.2 State

Most State and local governments have plans and policies intended to protect and expand local and regional economies affecting the communities and residents within their jurisdictions. Some of these plans and policies also are intended to promote public health and safety while minimizing conflicts between new development projects of all types; their associated traffic, air, and noise impacts; and the social environment within which local residents live and work. State plans and policies also frequently address other social and economic impact topics, including fiscal conditions and related public services that affect local residents' quality of life.

In California, the California Environmental Protection Agency adopted its own environmental justice policy in 2004. Pursuant to Sections 71110–71113 of the California Public Resources Code, the agency has developed this policy (or strategy) to provide guidance to its resource boards, departments, and offices. It is intended to help achieve the State's goal of "achieving fair treatment of people of all races, cultures and incomes with respect to the development, adoption, implementation and enforcement of environmental laws and policies."

16.2.3 Regional and Local

Each of California's counties, including Shasta and Tehama counties, has its own plans, ordinances, and other policies designed to protect and improve a wide range of socioeconomic conditions. Specifically addressed in these plans, ordinances, and policies are housing; employment opportunities for minorities and low-income populations, and others; economic diversification; and business activity in general.

Shasta County

Shasta County General Plan Two primary elements of the Shasta County General Plan (Shasta County 2004) address socioeconomic resources: Housing, and Economic Development. The Housing Element of the Shasta County General Plan (Shasta County 2011) establishes several goals and policies related to ensuring adequate housing provision, especially affordable housing, in the county. Shasta County's housing policies and programs are grouped into six primary categories, each supporting an identified goal. These categories and the goal associated with each are as follows:

- **Housing Supply**
  - **Goal** – To establish and implement policies and programs that will:
    - Contribute to the provision of an adequate supply and diversity of safe, healthy, and affordable housing for all income levels to meet the needs of residents in the unincorporated areas of Shasta County.

  - Satisfy the requirements of the Regional Housing Needs Allocation Plan for Shasta County for the 2004-2009 Housing Element period, specifically to realize the construction of new units as follows: Very Low Income – 300 units; Low Income – 255 units; Moderate Income – 1,035 units; and Above Moderate Income – 810 units.

- **Conserve and Improve Existing Affordable Housing**

  - **Goal** – To conserve, improve, and expand the inventory of existing affordable housing stock in the incorporated areas of the County, specifically to realize the conservation and/or rehabilitation of the following units: Rehabilitation (150): 60 units – Very Low Income; 55 units – Low Income; 25 units – Moderate Income; and 10 units – Above Moderate Income; Conservation (150): 90 units – Very Low Income; 53 units – Low Income; and 7 units – Moderate Income.

- **Housing Development Constraints**

  - **Goal** – To continue to remove all County constraints, as is practical and legal, which have the potential to hinder or impede the development of affordable housing projects.

- **Special Needs**

  - **Goal** – To continue to work collectively with local agencies to enhance and expand the outreach programs designed to provide accessible and affordable housing, including supportive services, for those persons with special needs including the elderly, large families, single mothers, children, developmentally and physically disabled persons, the mentally ill, farmworkers, and the homeless.

- **Energy Conservation**

  - **Goal** – To explore, implement, and promote energy conservation practices in all eligible existing and new housing projects.

- **Fair Housing**

  - **Goal** – To continue to use all feasible means to promote, expand, and ensure equal access to available, safe, decent, affordable housing opportunities in the unincorporated area without bias or prejudice for any reason for all economic segments of the County.

The Economic Development Element of the Shasta County General Plan (Shasta County 2004) establishes the following two overall objectives for economic development:

- **ED-1** – Economic development plans, programs, and policies shall contribute to a stable and healthy economy in Shasta County, which includes provision of a land development pattern, planning process, and regulatory atmosphere conducive to maintaining employment opportunities for County residents and fostering new economic development.

- **ED-2** – Seek economic diversity that increases the variety, type and scale of business, industrial, and manufacturing activities.

To support these objectives, Shasta County has established three primary policies for implementation. These policies emphasize the reuse and revitalization of existing development and full use of existing infrastructure for new business opportunities. To attract business to Shasta County, a number of incentive programs are employed, including community development block grants, economic assistance through a county redevelopment agency, and business development and retention assistance through an economic development corporation. Additionally, a 50-square-mile, State-defined enterprise zone (one of only 39 in California) has been designated in portions of Redding, Shasta Lake, Anderson, and unincorporated Shasta County. Enterprise zones are generally designated in locations characterized by high poverty rates. Businesses locating within these areas may receive State-supported incentives, such as sales and use tax credits, hiring assistance tax credits, and special business expense deductions (Shasta County 2004).

Tehama County

In the Tehama County General Plan, updated in 2009 (Tehama County 2009), Tehama County set out three "fundamental concepts" that relate to population growth and demographic shifts: (1) accommodating growth, but not limiting growth or accepting uncontrolled growth; (2) locating major growth along the Interstate 5 transportation corridor; and (3) organizing growth according to a range of community types. These concepts emphasize where Tehama County expects to locate new growth and how they plan to accommodate it. Specifically, the Interstate 5 corridor plays a significant role for the placement of new development, and Tehama County attempts to provide a range of housing types for the diversity of needs created within the community. This emphasis on housing diversity may become more crucial as aging residents' housing preferences change.

The following housing-related goals in the general plan are relevant to the project:

- **Goal HE-3: Adequate Sites** – Ensure the provision of adequate sites and facilities to support future housing needs.

- **Goal HE-5: Housing Conservation** – Work to improve, maintain and conserve the County's existing housing stock.

- **Goal HE-6: Addressing Constraints** – Address and wherever possible remove, governmental constraints to the maintenance, improvement, or development of housing to meet the needs of County residents.

- **Goal HE-7: Fair Housing/Equal Opportunity** – Promote equal housing opportunities for all persons without discrimination regardless of age, race, sex, marital status, ethnic background, household composition, sources of income, or other arbitrary factors.

Relevant economic development-related goals contained in the draft general plan are as follows:

- **Goal ED-3** – Expand the economic base while maintaining a healthy and diverse local economy that meets the present and future employment, shopping, recreational, public safety, and service needs of Tehama County residents.

- **Goal ED-4** – Work toward providing adequate infrastructure to support commercial, industrial, and recreational development within Tehama County including clean-up of contaminated industrial sites.

- **Goal ED-7** – Protect and enhance environmentally sensitive lands and natural resources while, at the same time, promoting business expansion, retention, and recruitment.

Shasta and Tehama counties function as the primary agencies responsible for implementing policies and programs aimed at addressing employment and labor force issues within the project's primary study area.

16.3 Environmental Consequences and Mitigation Measures

Based on the review of the affected environment provided in Section 16.1 of this chapter, this section describes the potential environmental consequences resulting from each of the proposed alternatives. Direct, indirect, and cumulative effects of the alternatives are discussed below. When potential environmental consequences are identified, specific mitigation measures to offset the potential effects of the alternatives are presented. Potential effects and mitigation measures address topics related to population, demographics, and housing; employment and labor force; business and industry; and government and finance.

16.3.1 Methods and Assumptions

Population, Housing, and Demographics

The analysis of the potential impacts of the project alternatives on population, housing, and demographic characteristics was based on a review of published

material pertaining to the primary and extended study areas. California Department of Finance population and demographics databases and projections, U.S. Census Bureau population and demographics data, the general plans of jurisdictions within the study areas, and other similar source documents were reviewed.

Population effects were evaluated based on changes in the total number of temporary and/or permanent residents likely to result from construction and operations activities that would be performed as part of project implementation. Housing effects were assessed based on estimated short- and long-term housing needs resulting from population changes, expected as a result of the project's construction and operational activities. Effects of the project on local and regional demographic characteristics were assessed quantitatively, when available data allowed. When quantitative analysis of effects was not possible at this broader geographic level, qualitative effects were identified based on the projected makeup (e.g., ethnicity, economic class) of any population changes expected to result from project implementation.

Employment and Labor Force

The determination of potential impacts on employment and the labor force was based on a review of relevant information related to current conditions. Documents such as the California Employment Development Department's employment and labor force databases, the Economic Development and Housing elements of the Shasta County General Plan (2004), and the Tehama County General Plan Update (2009) were reviewed, along with estimates of employment (temporary and permanent jobs created) for each proposed alternative.

To quantify the potential job creation resulting from each proposed alternative, IMPLAN (IMpact analysis for PLANning model, Version 3.0.17.2) modeling was performed. IMPLAN modeling uses a branch of economics known as Input/Output analysis originally developed from the analytical work conducted by Wassily Leontief in the late 1930s. Input/Output models are essentially accounting tables that trace the linkages of interindustry purchases and sales within a specific region, and within a given year. The Input/Output model yields "multipliers" that are used to calculate the total direct, indirect, and induced effects on jobs, income, and output generated per dollar of spending on various types of goods and services in the local economic study area. IMPLAN was originally developed by the USFS and now is maintained and marketed by the Minnesota IMPLAN Group, Inc.

The IMPLAN modeling incorporated project construction-related economic activity in the four-county region surrounding Shasta Lake. The primary set of effects analyzed using the regional model was how project construction would affect output, personal income, and employment within the four-county area containing the dam and reservoir. The project costs and duration over which construction activity would take place were developed for each action

alternative. The costs were organized into categories to assess the required investment that would take place in certain primary sectors of the local economy, namely concrete- and steel-related manufacturing, rock and aggregate, and dam and non-residential construction.

Several specific assumptions were necessary to complete IMPLAN modeling of the project. The following assumptions were used:

- IMPLAN modeling was completed for CP1 (which involves raising Shasta Dam by 6.5 feet); CP2 (which involves raising the dam by 12.5 feet); and CP3, CP4, CP4A, and CP5 (all of which involve raising the dam by 18.5 feet).

- A construction period of approximately 4.5 years was assumed under CP1, and 5 years under CP2, CP3, CP4, CP4A, and CP5.

- The "local economic study area" was defined as the four-county area of Shasta, Siskiyou, Tehama, and Trinity counties.

- A total labor force of 300 construction workers would be needed for CP1 and CP2; 350 construction workers would be needed for CP3, CP4, and CP4A; and 360 construction workers would be needed for CP5.

- All 300–360 construction workers would be drawn directly from the local economic study area (used in IMPLAN modeling). (High unemployment in the primary study area and the availability of necessary worker skill sets supports this assumption.)

In addition to IMPLAN modeling, the Statewide Agricultural Production (SWAP) model, Version 6, was used to determine the effects of the action alternatives on CVP and SWP agricultural users. The SWAP model is a regional economic model of irrigated agricultural production that simulates the decisions of agricultural producers (farmers) in the Central Valley of California. The model included 27 crop production regions in the Central Valley and 20 categories of crops. Based on the changes in water availability expected with each alternative, the SWAP model predicted cropping patterns, land use, and water use in the Central Valley. These predictions then were used to calculate expected changes in net income resulting from each alternative during dry, wet, and average water years.[1] Although the model's income-related projections were generally used to determine effects on business and industrial activity, the overall change in business net income (or profits) is a good indicator for potential changes in employment opportunities in affected sectors.

[1] Throughout this document, water year types are defined according to the Sacramento Valley Index Water Year Hydrologic Classification unless specified otherwise.

Additional information on methods and assumptions for the IMPLAN and SWAP models is provided in the Modeling Appendix.

Business and Industry

The discussion of potential impacts on business and industry is based on a review of relevant information on current conditions, specifically California Employment Development Department documents, the Economic Development Element of the Shasta County General Plan (2004), the Tehama County General Plan Update (2009), and estimates of business and industry effects for each action alternative.

To quantify the potential effect on job creation and personal incomes resulting from each action alternative, IMPLAN modeling was completed by Reclamation economists. A description of IMPLAN modeling, generally, and the specific assumptions used, related to the project, are provided in the previous section.

Government and Finance

The determination and discussion of potential impacts on government and finance was based on a review of relevant information on existing conditions, specifically the Economic Development Element of the Shasta County General Plan (2004), the Tehama County General Plan Update (2009), and estimates of local government and finance effects for each dam-raise alternative.

Because no quantitative analysis of the effect of the action alternatives on local government and finance has been completed yet, this analysis depends heavily on a qualitative discussion of potential impacts. Areas of potential impacts were identified by comparing existing conditions and probable future conditions. In many cases, the estimates completed as part of the IMPLAN and SWAP modeling served as the basis for impact estimates. These two models determine expected trends in employment, personal incomes, business incomes, agricultural production, and other data types to quantifiably estimate the impacts of the proposed alternatives. Because these local characteristics directly influence activities at the local level, they represent critical considerations in the analysis and conclusions presented in this section.

16.3.2 Criteria for Determining Significance of Effects

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by, or result from, the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. An environmental document prepared to comply with CEQA must identify the potentially significant environmental effects of a proposed project. A "[s]ignificant effect on the environment means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially

reduce significant environmental effects (State CEQA Guidelines, Section 15126.4(a)).

The following significance criteria were developed based on guidance provided by the State CEQA Guidelines, and consider the context and intensity of the environmental effects as required under NEPA. Impacts of an alternative on socioeconomics, population, and housing would be significant if project implementation would do any of the following:

- Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)
- Displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere
- Produce a substantial burden on the existing housing stock within the local community because of an increased housing demand created by nonlocal project employees
- Require sizeable numbers of new workers in a particular industrial sector from outside the local area during construction or operation for effective implementation
- Substantially increase the risk of housing or other property damage caused by flooding
- Cause a substantial decrease in the number of opportunities for temporary or long-term direct employment within the primary study area or the extended study area (within Shasta County, Tehama County, or nearby cities and towns, specifically Redding, Anderson, Shasta Lake, and Red Bluff)
- Compete with established industries for workers within the labor force or associated resources to the extent that a shortage of workers available to related businesses would exist
- Cause a substantial decrease in the number of opportunities for temporary or long-term increases in personal and/or disposable incomes within the primary or extended study area (within Shasta County, Tehama County, or nearby cities and towns, specifically Redding, Anderson, Shasta Lake, and Red Bluff)
- Considerably decrease the sales and/or incomes of businesses in the primary or extended study areas

Significance statements are relative to both existing conditions (2005) and future conditions (2030), unless stated otherwise.

16.3.3 Topics Eliminated from Further Discussion

In contrast to the primary study area and the lower Sacramento River and Delta portion of the extended study area, additional flood control capacity provided by the action alternatives is not expected to substantially affect the CVP and SWP service areas beyond the lower Sacramento River and Delta. Dam operations (i.e., storage and release scenarios) in the CVP and SWP service areas are expected to continue, according to management plans similar to those currently in place. Therefore, no flood-related impact on population and housing would occur in the CVP and SWP service areas. This topic is not discussed further under CP1–CP5.

16.3.4 Direct and Indirect Effects

Similar to the approach used in Section 16.1, "Affected Environment," the following discussion of environmental consequences in the primary study area does not separate Shasta Lake and vicinity from the upper Sacramento River (Shasta Dam to Red Bluff) because of the regional interdependence of their socioeconomic characteristics. Instead, environmental consequences are discussed for the entire primary study area and the two counties that encompass it, Shasta and Tehama counties.

No-Action Alternative

Under the No-Action Alternative, no additional Federal action would be taken to address water reliability issues or increase anadromous fish survival. Therefore, Shasta Dam and Shasta Lake would continue to operate as they currently do, with some modifications (currently not known) expected in the future. With the No-Action Alternative, water reliability is expected to become an increasing issue as demand for water increases to meet the needs of California's growing population. Over time, water conservation and reuse efforts would increase, and water provision is expected to shift from such areas as agricultural production to urban uses. Environmental restoration, flood control, and hydropower generation are expected to continue similar to existing conditions. Like water demand, electricity demand in California is expected to increase substantially in the future. This increased demand is expected to create localized shortages in energy availability over time.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) Under the No-Action Alternative, population, demographics, and housing conditions are expected to continue following the current growth trends described in Section 16.1, "Affected Environment." The projected employment and labor force characteristics summarized in Section 16.1 also would continue. The relatively large number of new construction-related jobs that would be created by all of the action alternatives would not be created. Therefore, this alternative would have no impact on population and housing or on employment and the labor force.

In addition, the business and industrial activity in the primary study area would continue, as summarized in Section 16.1, "Affected Environment." The relatively large and temporary increase in business activity that would occur during project construction would not occur. Therefore, the No-Action Alternative would have no impact on business and industrial activity.

Furthermore, the local government and finance conditions and trends, projected in Section 16.1, "Affected Environment," would continue because new facilities would not be constructed and existing facilities would not be altered, expanded, or demolished. The positive fiscal effects associated with the increase in sales and income tax revenue from construction-related spending would not occur. Therefore, the No-Action Alternative would have no impact on government and finance.

Lower Sacramento River and Delta Under the No-Action Alternative, the projected population, demographics, and housing conditions as well as development conditions, described in Section 16.1, "Affected Environment," would remain unchanged. No impact on population, demographics, or housing would occur.

In addition, the local government and finance conditions, described in Section 16.1, "Affected Environment," would continue because no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. The positive fiscal effects associated with the increase in sales and income tax revenue resulting from project construction-related spending would not occur. Therefore, the No-Action Alternative would have no impact on government and finance.

The impacts of the No-Action Alternative on employment and the labor force and on business and industrial activity in the lower Sacramento River and Delta area are described below.

Impact Socio-1 (No-Action): Potential for Reduced Employment Opportunities for Lower Sacramento River and Delta Area Residents The No-Action Alternative has the potential to result in periodic water and power supply disruptions from increasing demand on the existing supply caused by population growth. These disruptions could result in adverse economic effects on the lower Sacramento River and Delta portion of the extended study area. This impact would be potentially significant.

Under the No-Action Alternative, the risk of CVP and SWP water supply disruptions as well as Western Area Power Administration and DWR power supply disruptions in the lower Sacramento River and Delta area would be higher than the risk of such disruptions in the long term under the action alternatives. Although the likelihood of such disruptions is difficult to predict, the CalSim-II Version) modeling performed to simulate future water and power supply conditions under 2030 No-Action Alternative conditions, and 2030

conditions under each of the action alternatives, indicates that all of the action alternatives would enhance CVP and SWP water and power supply conditions relative to 2030 No-Action Alternative conditions. (CalSim-II modeling of power supply conditions for the 2030 No-Action Alternative currently is not available.)

An increase in the risk of water and power supply disruptions could, in turn, increase the likelihood that temporary and adverse socioeconomic effects would take place during related reductions in economic activity, including reductions in employment opportunities. Adverse economic effects during times of drought, blackouts, or other types of water or power supply disruptions also could include delays in hiring employees or layoffs, if businesses experience water and/or power rate increases as a result of water and power purveyors seeking other, more expensive replacement sources. This impact would be potentially significant. Mitigation is not required for the No-Action Alternative.

Impact Socio-2 (No-Action): Potential for Temporary Disruptions in Business and Industrial Activity in the Lower Sacramento River and Delta Area If water or power supply disruptions were to occur, they could cause temporary reductions in business and industrial activity, especially where water- and power-intensive industries and businesses are found. This impact would be potentially significant.

As discussed under Impact Socio-1 (No-Action) above, an increase in the risk of water or power supply disruptions could occur in the lower Sacramento River and Delta portion of the extended study area under the No-Action Alternative. If such disruptions were to occur, they could cause temporary reductions in business and industrial activity, especially in areas where water- and power-intensive industries and businesses are found. Because the No-Action Alternative could have adverse effects on businesses and industrial activity in the case of drought, blackouts, or other types of water or power supply disruptions, this impact would be potentially significant. Mitigation is not required for the No-Action Alternative.

CVP/SWP Service Areas Under the No-Action Alternative, the projected population, demographic, and housing conditions as well as development conditions, described in Section 16.1, “Affected Environment,” would remain unchanged. No impact would occur. Therefore, potential effects of the No-Action Alternative on population, demographics, or housing in this geographic region are not discussed further.

In addition, the local government and finance conditions in the CVP and SWP service areas described in Section 16.1, “Affected Environment,” would continue. The positive fiscal effects associated with the increase in sales and income tax revenue resulting from construction-related spending would not occur. Therefore, no impact would occur under the No-Action Alternative.

Potential effects of this alternative on government and finance in this geographic region are not discussed further.

The impacts of the No-Action Alternative on employment and the labor force and on business and industrial activity in the CVP and SWP service areas are described below.

Impact Socio-3 (No-Action): Potential for Reduced Employment Opportunities for Residents within the CVP and SWP Service Areas The No-Action Alternative has the potential to result in periodic water and power supply disruptions from increasing demand on the existing supply, caused by population growth. These disruptions could result in variability in economic activity, which could reduce or delay employment opportunities in the CVP and SWP service areas. This impact would be potentially significant.

Under the No-Action Alternative, the risk of CVP and SWP water supply disruptions as well as Western Area Power Administration and DWR power supply disruptions would be higher than the risk of such disruptions in the long term under each of the action alternatives. The likelihood of such disruptions is difficult to predict; however, the CalSim-II modeling performed to simulate future water and power supply conditions under 2030 No-Action Alternative conditions, and 2030 conditions under each of the action alternatives, indicates that all of the action alternatives would enhance CVP and SWP water and power supply conditions relative to 2030 No-Action Alternative conditions. (CalSim-II modeling of power supply conditions for the 2030 No-Action Alternative currently is not available.)

An increase in the risk of water and power supply disruptions, including drought, blackouts, or other types of water or power disruptions, could in turn increase the likelihood of temporary and adverse socioeconomic effects. Adverse economic effects during times of these disruptions could reduce economic activity and also result in delays in hiring employees or layoffs if businesses were to experience water and/or power rate increases as a result of water and power purveyors seeking other, more expensive replacement sources. This impact would be potentially significant. Mitigation is not required for the No-Action Alternative.

Impact Socio-4 (No-Action): Potential for Temporary Disruptions in Business and Industrial Activity in the CVP and SWP Service Areas If water or power supply disruptions were to occur, they could cause temporary reductions in business and industrial activity, especially where water- and power-intensive industries and businesses are found. This impact would be potentially significant.

As discussed under Impact Socio-3 (No-Action) above, an increase in the risk of water or power supply disruptions could occur in the CVP and SWP service areas under the No-Action Alternative. If such disruptions were to occur, they

could cause temporary reductions in some business and industrial activity, especially in areas where water- and power-intensive industries and businesses are found. Because the No-Action Alternative could have adverse effects on businesses and industrial activity in the case of drought, blackouts, or other types of water or power supply disruptions, this impact would be potentially significant. Mitigation is not required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

CP1 focuses on increasing water supply reliability and increasing anadromous fish survival. This plan primarily consists of raising Shasta Dam by 6.5 feet, which, in combination with spillway modifications, would increase the height of the reservoir's full pool by 8.5 feet and enlarge the total storage capacity in the reservoir by 256,000 acre-feet to 4.81 million acre-feet (MAF). CP1 would increase the maximum surface area of the pool to 30,800 acres. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 70,000 acre-feet and 35,000 acre-feet, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing municipal and industrial (M&I) deliveries.

Implementing CP1 is expected to result in the replacement or modification of 8 bridges and relocation of approximately 45 existing structures. The total construction cost associated with CP1 would be approximately $990 million.

CP1 would help reduce estimated future agricultural and M&I water shortages and would increase water supply reliability in the CVP/SWP service areas by increasing water supplies for agricultural and M&I deliveries, by at least 47,300 acre-feet per year in dry and critical years, and increasing average annual deliveries by about 31,000 acre-feet per year. The majority of the increased dry and critical year water supplies (i.e., 42,700 acre-feet) would be for south-of-Delta agricultural and M&I deliveries. In addition, CP1 would provide hydropower benefits by increasing hydropower generation, by approximately 54 gigawatt-hours (GWh) per year. In addition, the increased depth and volume of the cold-water pool in Shasta Reservoir would contribute to improving seasonal water temperatures for anadromous fish in the upper Sacramento River.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Socio-1 (CP1): Short-Term Increase in Population and Housing Demand in the Primary Study Area Resulting from Construction-Related Activities According to Reclamation estimates, approximately 300 direct jobs would be created as a result of construction activities associated with CP1. All 300 construction workers are expected to come from the local labor force; therefore, a temporary population increase is not expected. This impact would be less than significant.

Approximately 300 construction workers would be needed over the 4.5-year construction period to support the construction activities related to the 6.5-foot raise of Shasta Dam. Because of the availability, experience, and expertise of the existing labor force within the primary study area, the necessary workers are expected to be available in the surrounding two counties (Shasta and Tehama counties). Therefore, no construction workers are expected to be sourced from outside the primary study area, and no employees (or very few) would need to relocate to the project area during the construction period. Even if a relatively small number of workers were to come from outside the local area, sufficient housing capacity (e.g., rental housing, motel, and apartment vacancies) exists in the area. Thus, effects on population and housing in the primary and extended study areas are not expected; if they were to occur, they would be very minor. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-2 (CP1): Short-Term Increases in Direct, Indirect, and Induced Employment in the Primary Study Area Related to Construction Activities
Construction activities associated with CP1 would generate approximately 300 construction jobs, 400 indirect jobs in various construction-related support industries, and 610 induced jobs because of increased household spending in the primary study area. Individuals to fill these jobs are expected to be drawn from the local community. These new jobs are expected to provide important but temporary employment opportunities to many unemployed construction workers in the primary study area. This impact would be beneficial.

Concrete workers, workers with large-scale construction experience, general laborers, and others would be drawn from the existing local construction industry. These jobs would represent a relatively small increase (less than 0.3 percent) in the total labor force in the two counties (109,960 employees) of the primary study area, but would represent a substantial increase in employment for many of the cities surrounding the project site, where employment has consistently been below countywide and statewide averages (EDD 2010a, 2010b).

Although the increase in employment would represent a small percentage increase for the two-county area, the employment opportunities created by CP1 would represent a substantial contribution in counties that have consistently registered high unemployment rates. Unemployment rates steadily increased in both Shasta and Tehama counties, from around 7 percent in 2007 to over 15 percent in 2010 (EDD 2010a). Similarly, unemployment rates in the cities of Anderson, Shasta Lake, and Red Bluff steadily increased between 2007 and 2010, with Anderson and Shasta Lake exceeding those recorded at both county levels (EDD 2010b). Within Trinity and Siskiyou counties (i.e., the remaining two counties in the local economic study area, the area used in IMPLAN modeling), the 2010 unemployment rates exceeded 16 percent and 18 percent, respectively (EDD 2010c).

As stated above, IMPLAN modeling calculates "direct" employment generated by individual alternatives as well as "indirect and induced" positions that are created by construction-related and operational activities. Indirect employment may be to support hiring in businesses that provide materials to the construction effort; in service-related industries that provide food, beverages, and other goods to construction workers; or in more technical industries, such as consulting firms and other businesses. Induced employment is jobs that are created in the region because of increased household spending and not limited to construction-related activities.

In addition to the 300 direct, construction-related jobs to be created from CP1, an additional 400 indirect jobs are expected to be created from construction support industries, and 610 induced jobs from increased household spending near the project area. The generation of 1,320 new positions (direct, indirect, and induced) would represent a 1.0 percent increase from the total 2010 labor force of the four counties in the local economic study area used in the IMPLAN modeling (Shasta, Tehama, Trinity, and Siskiyou counties), which totaled approximately 135,100 employees (EDD 2010c). A 1.0 percent increase in employment would represent a substantial increase in total employment, especially for an area experiencing unemployment rates like those observed in the primary study area.

Because CP1 would create direct, indirect, and induced jobs in an area with high unemployment rates, this impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-3 (CP1): Potential for Temporary Reduction in the Labor Force of Related Industrial Sectors in the Primary Study Area as a Result of Direct Construction-Related Employment With the creation of 300 construction jobs resulting from CP1, the potential would exist for workers from other industries to move to jobs related to construction at Shasta Dam. Because of the size of the construction industry in the primary study area, and the high unemployment rate in the area, this impact would be less than significant.

As the 300 positions created under CP1 are filled, the potential would exist for the positions to be filled by individuals currently working in related industries within the local community. This transfer of workers from related industries to the Shasta project could create a labor shortage in the related industry, if particularly skilled workers are required. In 2010, Shasta County registered 4,700 employees in the construction industry, while construction industry workers in Tehama County equaled only 1,600 individuals, for a total of 6,300 construction workers in the area (U.S. Census Bureau 2011a). Based on total employment levels and current unemployment trends in the primary study area, the 300 new construction-related jobs are not expected to substantially affect the local labor force. If a high number of workers were to be sourced from Tehama County, a limited effect could be observed because of the small number of workers in the construction industry in that county. Overall, however, this

impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-4 (CP1): Short-Term Increases in Direct, Indirect, and Induced Personal Income Paid to Employees in the Primary Study Area Hired for Construction-Related Activities Based on calculations completed as a part of the IMPLAN socioeconomic model process, more than $85.9 million in personal income is expected to be directly paid to employees in the primary study area each year of construction under CP1. In addition, more than $48.3 million in personal income is expected to be generated from various indirect and induced construction-related and other industries in the primary study area each year of construction under CP1. The combined $134.2 million in personal income to be generated would represent an approximately 92 percent increase in all annual personal income in the local economic study area. This impact would be beneficial.

Based on the results of modeling that was performed using the IMPLAN model, an estimated $85.9 million would be directly paid each year to the approximately 300 construction workers required to complete work for CP1during the proposed 4.5-year construction period. The positions expected from implementation of project construction are anticipated to be union positions, and workers would be paid according to union wage and benefit standards.

Based on the generation of 1,010 indirect and induced jobs resulting from implementation of CP1, $48.3 million in personal income is expected to be available for residents of the local economic study area each year during the proposed 4.5-year construction period. This personal income would be generated in industries that would support the construction efforts at Shasta Dam.

Personal income in the four counties of the local economic study area has substantially decreased, from $8.9 billion in 2007 to $9.8 million in 2010 (EDD 2010d). Most of this decline can be attributed to high unemployment rates and other recessionary factors. With more than $6.2 million in personal income in 2010, Shasta County contributed more than 60 percent of personal income in the four counties.

The combined direct, indirect, and induced personal income resulting from CP1 is expected to exceed $134.2 million per year of construction activities within the local economic study area. This increase in personal income would represent an approximately 92 percent increase in all annual personal income in the local economic study area. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-5 (CP1): Short-Term Increases in Sales and Profits for Businesses in the Primary Study Area that Support the Construction Industry Most of the

construction materials used for CP1 are expected to be purchased within the primary study area. These purchases would provide the local economy with increased sales and profits over the 4.5-year construction period. This impact would be beneficial.

A large amount of construction material would be needed to raise Shasta Dam by 6.5 feet, as prescribed in CP1. These purchases may include raw or refined materials, infrastructure-related products, and/or equipment required for the construction process. Most of this material likely would be sourced from businesses within the primary study area. As a result of the large quantity of purchases expected, local businesses would experience temporary increases in sales and profits over the 4.5-year construction period. During the construction period, implementation of CP1 is expected to generate more than $349.8 million per year in sales and profits for construction-related and service-oriented businesses that support the construction industry, with approximately $220.0 million in direct income and $129.8 in indirect and induced income. Increased sales and profits could be reinvested into existing businesses, invested in new ventures or diversification, translated into increased salaries and wages for employees, or used in other ways. Therefore, this impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-6 (CP1): Short-Term Increase in State and Local Sales Tax Revenues in the Primary Study Area from Construction-Related Personal Income and Purchases As stated above, implementation of CP1 is expected to result in a substantial increase in total personal income (direct, indirect, and induced) during the construction period. This additional income, in combination with the construction-related purchases in the primary study area, would result in a substantial increase in local sales tax revenues from increased consumer spending in nearby cities and counties. Construction-related activities under CP1 likely also would result in a temporary increase in State sales and income tax revenues received from businesses and residents of the primary study area. The exact amount of State and local sales tax revenue increases would be speculative; however, this impact would be beneficial.

Based on the results of modeling performed using the IMPLAN model, implementation of CP1 is expected to generate more than $603.8 million in total personal income, with approximately $386.5 million in direct income and $217.4 million in indirect and induced income during the proposed 4.5-year construction period (see Impact Socio-4 (CP1), above). In addition to this increase in personal income, most of the construction materials would be purchased within the primary study area, generating a substantial amount of revenue and profits for local businesses (see Impact Socio-5 (CP1), above).

In combination, increased personal income and construction-related spending are expected to substantially increase the total sales tax revenues of local jurisdictions within the primary study area. Larger amounts of local sales tax revenue then could be used to establish new programs and initiatives or bolster

existing ones through additional funding. New and improved programs and initiatives would provide benefits to local residents.

As a result of the increased employment and personal income anticipated from implementation of CP1, a temporary increase in State sales and income tax would be likely to occur. During the construction period, more than $603.8 million in personal income is expected to be generated by direct, indirect, and induced employment, produced by the project. The increase in personal income would increase spending at local businesses within the primary study area. The exact amount of State and local sales tax revenue increases would be speculative; however, this additional spending would result in sizeable State sales tax revenues. This increased revenue source would be likely to return to the primary study area via statewide programs and policies.

For the reasons described above, this impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-7 (CP1): Long-Term Reduction in the Adverse Economic Effects of Flooding in the Primary Study Area As a result of the added reservoir capacity created by CP1, the overall risk of flooding below Shasta Dam and its related consequences to the primary study area are expected to be reduced. Although heavy rain events would continue to occur in the region and locally, the project is intended to provide greater flexibility in flood control downstream because of the increased capacity of the reservoir. As a result, less damage to existing structures and a smaller loss of potential future development would occur; this, in turn, would reduce salary and wage losses for residents of the primary study area, as well as business and personal income losses from such damage. Therefore, this impact would be beneficial.

In Reclamation's Initial Alternatives Information Report (2004), flood control was identified as a secondary objective of the project. Increased flood control is to be emphasized when the two primary objectives of the project, increased anadromous fish survival and increased water supply reliability, can be met. Periodic flood events in the Sacramento Valley frequently cause substantial damage to properties adjacent to the valley's many waterways. Currently, Shasta Dam provides substantial protection from such flooding damage for downstream residents.

CP1 would increase the storage capacity of Shasta Lake by 256,000 acre-feet. This added capacity would provide greater flexibility in Reclamation's ability to use the reservoir for flood control purposes, thereby increasing the threshold at which seasonal heavy rain events produce flood conditions downstream from the dam. The benefits of this increase in capacity and related flood control options would be most evident along the upper Sacramento River within the primary study area. Structures and inhabitants in this floodplain experience the most direct effects from storage releases during flood events. CP1 would reduce

the frequency, magnitude, and duration of future flood events that have affected structures and their residents in this part of the primary study area in the past.

The loss of jobs and adverse effects on economic well-being and livelihoods is an often overlooked consequence of catastrophic flood events. Avoiding a larger number of these events, and possibly decreasing the magnitude and duration of flooding under certain high-flow events, is expected to reduce the overall economic hardships faced by residents of the primary study area under CP1.

Structures and businesses located on the river and inhabitants of the floodplain experience the most direct effects from flood releases downstream. However, flood events also could affect those not living on the river or in the floodplain but working downstream from the dam at businesses subject to flood damage. The reduced risk of flood events associated with CP1 also is expected to reduce the business and personal income losses resulting from substantial damage to structures and businesses located adjacent to downstream waterways in the primary study area.

Implementation of CP1 would reduce damage to structures, loss of business and personal income, loss of jobs, and other adverse effects on economic well-being in the primary study area. Therefore, this impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-8 (CP1): Long-Term Increases in Direct Employment in the Primary Study Area Related to Project Operations In the long term, implementation of CP1 is expected to create at least two new maintenance-related positions at the Shasta Dam facilities. These two positions are expected to be permanent and would continue once the 4.5-year construction period is completed. This impact would be minor but beneficial.

Reclamation estimates that with the 6.5-foot increase of Shasta Dam proposed in CP1, at least two new permanent maintenance positions would be required to ensure efficient operation of dam facilities. These two positions are expected to be union positions, and consequently would provide union-level wages and benefits. Both positions would be filled after completion of the construction activities associated with CP1 and would continue for the foreseeable future. This impact, though small, would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta

Impact Socio-9 (CP1): Potential Temporary Increase in Indirect Employment in Construction-Related Businesses of the Lower Sacramento River and Delta
Construction activities associated with CP1 have the potential to result in a temporary increase in indirect employment within the lower Sacramento River and Delta portion of the extended study area. Depending on the location of construction materials sourced outside of the primary study area, indirect

increases in employment within construction-related businesses may result in the lower Sacramento River and Delta area. This impact would be minor but beneficial.

As a result of construction activities that would be completed during implementation of CP1, temporary increases in indirect employment would be expected in the lower Sacramento River and Delta portion of the extended study area. A small amount of the construction materials necessary for CP1 would be obtained outside the primary study area. During the construction period, businesses that provide construction materials are expected to increase employment to meet project demand. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-10 (CP1): Short-Term Increases in Sales and Profits for Businesses in the Lower Sacramento River and Delta Area that Support the Construction Industry A small amount of the construction materials used for CP1 would be purchased within the extended study area. These purchases are predicted to increase sales and profits of businesses within the lower Sacramento River and Delta area during the construction period. This impact would be beneficial.

A significant amount of construction materials would be needed to raise Shasta Dam by 6.5 feet, as prescribed in CP1. Of these materials, a small amount would be purchased from construction-related businesses in the extended study area, including the lower Sacramento River and Delta area. These purchases may include raw or refined materials, infrastructure-related products, and/or equipment required for the construction process. As a result of the purchases expected, businesses in the lower Sacramento River and Delta portion of the extended study area are expected to experience a temporary increase in sales and profits during the construction period. Similar to businesses within the primary study area, increased sales and profits could be reinvested into the existing businesses, invested in new ventures or diversification, translated into increased salaries and wages for employees, or used in other ways. The exact scale of the increase in business sales and profits within the lower Sacramento River and Delta area would be speculative, but this amount likely would be substantial. Therefore, this impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-11 (CP1): Short-Term Increase in State Sales and Income Tax Revenues in the Lower Sacramento River and Delta Area from Construction-Related Personal Income and Purchases In addition to local tax revenues, CP1 is expected to increase short-term, construction-related State sales and income tax revenues received from businesses and residents of the lower Sacramento River and Delta portion of the extended study area. These additional revenues are expected to be cycled back to local government coffers through statewide programs and policies. This impact would be minor but beneficial.

As a result of the increased employment and personal income anticipated as a part of implementation of CP1, a short-term increase in State sales and income tax revenues also is expected to occur. In the construction period, more than $603.8million in personal income would be generated by direct, indirect, and induced employment, generated by the project. This large amount of income would direct substantial income tax revenues to the State via State income tax requirements. These additional revenues would contribute substantially to the State budget and would be distributed to jurisdictions within the lower Sacramento River and Delta portion of the extended study area via statewide programs and policies. This impact would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-12 (CP1): Long-Term Reduction in the Adverse Economic Effects of Flooding in the Lower Sacramento River and Delta Area As a result of the added reservoir capacity under CP1, the overall risk of flooding and its related consequences below Shasta Dam is expected to be reduced. Although heavy rain events would continue to occur in the region, CP1 is intended to provide greater flexibility in flood control in the lower Sacramento River and Delta area because of the increased capacity of the reservoir. As a result, less damage to existing structures and a smaller loss of potential future development would be expected; this, in turn, would reduce salary and wage losses for residents in and near the lower Sacramento River floodplain and the Delta resulting from these catastrophic events, as well as business and personal income losses from such damage. Therefore, this impact would be beneficial.

Residents of the lower Sacramento River and Delta portion of the extended study area would benefit from the additional flexibility and flood control operations during flood events that would occur as a result of CP1. With the additional capacity provided by this alternative, the effects of large rain events would be reduced as a result of the improved management of systemwide flood control operations. Hydroelectric facilities within the lower Sacramento River and Delta area would be likely to experience flood events of somewhat less duration and magnitude, thus reducing the potential effects on vulnerable houses and property within the floodplain.

The loss of jobs and adverse effects on economic well-being and livelihoods often is an overlooked consequence of catastrophic flood events. Avoiding a larger number of these events and possibly decreasing the magnitude and duration of floods under certain high-flow events are expected to reduce the overall economic hardships faced by residents of the lower Sacramento River and Delta areas. The effects of heavy rain events would be better managed and the risk of flood-related effects could be reduced as far downstream as Sacramento.

In addition, fewer flooding events would result in less damage to businesses located adjacent to waterways during some flood events. This reduction in damage would reduce the amount of time employees would be without pay

because of flood conditions and damage. This reduction in flood damage would reduce residents' salary and wage losses from these catastrophic events.

Implementation of CP1 would reduce damage to structures, loss of business and personal income, loss of jobs, and other adverse effects on economic well-being in the lower Sacramento River and Delta areas. Therefore, this impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

CVP/SWP Service Areas

Impact Socio-13 (CP1): Short-Term Increases in Sales and Profits for Businesses in the CVP and SWP Service Areas that Support the Construction Industry A small amount of the construction materials used during construction under CP1 would be purchased within the extended study area, including the CVP and SWP service areas. These purchases would result in a minor increase in sales and profits for a few businesses within the CVP and SWP service areas during the construction period of CP1. This impact would be minor but beneficial.

A small amount of the construction materials used during construction under CP1 is expected to be purchased from some construction-related businesses in the extended study area, including the CVP and SWP service areas. These purchases may include raw or refined materials, infrastructure-related products, and/or equipment required for the construction process. As a result of the purchases expected, a few businesses in the CVP and SWP service areas are expected to experience a short-term increase in sales and profits over the construction period. The exact scale of the increase in business sales and profits within the CVP and SWP service areas would be speculative, but would be minor given the large geographic area of the service areas. Therefore, this impact would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-14 (CP1): Potential Temporary Reduction in Shasta Project Water or Hydropower Supplied to the CVP and SWP Service Areas during Construction Implementation of CP1 may require temporarily reducing the reservoir level at critical times during the construction period. This reduction in the reservoir level could temporarily reduce the amount of water or hydropower available from the dam and related hydropower infrastructure. Should this occur, sources of replacement water or hydropower would need to be secured. If these replacement resources were substantially more expensive, a minor negative effect on water or power customers may result. This impact would be potentially significant.

Construction activities implemented as part of CP1 would require adding large quantities of concrete to Shasta Dam. To complete this effort, it may be necessary to reduce the reservoir's water table to accommodate construction. A reduced water table may be needed at critical points in the construction process. Regardless of the approach needed, a reduced water table would limit the

amount of water and/or hydropower that would be available from the dam for use in the CVP and SWP service areas. As a result, periods could occur in which water or hydropower availability within the CVP and SWP service areas may be more limited, especially during dry periods.

To address potential temporary shortages in water or hydropower caused by reduced availability at Shasta Dam, replacement water or hydropower supplies would need to be sourced elsewhere to maintain existing service needs. Depending on the conditions of the water or energy markets at the time of need, these replacement resources could be more expensive than water or hydropower obtained from Shasta Dam. The additional expense of obtaining water or hydropower resources could produce a minor negative effect on water and power customers if replacing these resources would be substantially more expensive. This impact would be potentially significant. Mitigation for this impact is proposed in Section 16.3.5, "Mitigation Measures."

Impact Socio-15 (CP1): Short-Term Increase in State Sales and Income Tax Revenues in the CVP and SWP Service Areas from Construction-Related Personal Income and Purchases CP1 is expected to increase short-term, construction-related, State sales and income tax revenues received from businesses and residents of the CVP and SWP service areas. These additional revenues are expected to be cycled back to local government coffers through statewide programs and policies. This impact would be beneficial.

As a result of the increased employment and personal income anticipated as a part of implementation of CP1, a short-term increase in State sales and income tax revenues would be likely to occur. During the construction period for CP1, more than $603.8 million in personal income would be generated by direct, indirect, and induced employment produced by the project. This large amount of income would direct substantial income tax revenues to the State, to meet State income tax requirements. These additional revenues would contribute substantially to the State budget and would be distributed to jurisdictions within the CVP and SWP service areas via statewide programs and policies. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-16 (CP1): Long-Term Increase in Agricultural Income and Jobs in the CVP and SWP Service Areas as a Result of Improved Water Availability and Reliability Based on SWAP modeling, improved water availability and reliability expected to result from implementation of CP1 would substantially increase agricultural net income in the CVP and SWP service areas and would increase the number of agricultural positions in these areas. This increase in production and jobs would contribute substantially to the continuation of this already strong industry in California. This impact would be beneficial.

Among CVP and SWP's water consumers, agricultural users benefit the most from increased water availability and reliability because of more consistent

irrigation opportunities throughout the year. Based on the outputs of SWAP modeling, CP1 would improve long-term water availability and reliability within the CVP and SWP service areas by adding to water storage capacity. Long-term improvements to the availability and reliability of water are expected to allow farmers within the CVP and SWP service areas to substantially increase agricultural production, especially in dry years. It was estimated that CP1 would increase the net agricultural income within the 27 SWAP regions by more than $1.27 million in a normal year and up to $1.50 million during dry years. In wet years, net income is projected to increase to $1.89 million.

To support the increased agricultural production expected during the implementation of CP1, more agricultural workers would be needed. SWAP does not estimate the number of additional agricultural positions that would be created as a result of improved irrigation, but the resulting increase in water reliability and availability would have the potential to strengthen and extend the existing growing season in the CVP and SWP service areas. This would enable existing employees to work for longer periods in the fields and also would increase the number of workers needed during the growing season. These additional agricultural workers are expected to be distributed across the CVP and SWP service areas. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-17 (CP1): Reduction in Risk of Potential Water and Power Shortages (and Related Economic Activity) in the CVP and SWP Service Areas as a Result of Long-Term Improvements to Water and Power Supply Reliability
Implementation of CP1 would substantially increase Shasta Dam's storage capacity. As stated in Impact Socio-16 (CP1), this additional storage capacity would improve the long-term availability and reliability of water in the CVP and SWP service areas. Beyond increasing agricultural production, this improved availability and reliability would reduce the long-term risk of urban water and power shortages, and their related adverse economic consequences. This impact would be beneficial.

In addition to improving agricultural production, implementation of CP1 would increase water availability and reliability for industrial and urban users within the CVP and SWP service areas. For these users, the additional 265,000 acre-feet of storage capacity proposed by CP1 is expected to substantially reduce the long-term risk of water and power shortages from periodic flow constraints. As a result, water and power users would be likely to experience fewer water and power shortages caused by reduced reservoir levels, such as those experienced in dry years. This reduction in water and power shortages, along with avoidance of the related loss of economic production, would represent a substantial benefit for users in the CVP and SWP service areas. This benefit would be most pronounced for water- and power-intensive industries that are heavily dependent on consistent water and power availability. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

As with CP1, CP2 focuses on increasing water supply reliability and increasing anadromous fish survival. CP2 primarily consists of raising Shasta Dam by 12.5 feet, which, in combination with spillway modifications, would increase the height of the reservoir's full pool by 14.5 feet and enlarge the total storage capacity in the reservoir by 443,000 acre-feet to 5.0 MAF. CP2 would increase the maximum surface area of the pool of the reservoir to 31,600 acres. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 120,000 acre-feet and 60,000 acre-feet, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing M&I deliveries.

Implementing CP2 would result in the replacement or modification of 8 bridges and relocation of approximately 100 existing structures. The total construction cost associated with CP2 would be approximately $1,089 million.

CP2 would help reduce estimated future agricultural and M&I water shortages and would increase water supply reliability in the CVP/SWP service areas, by increasing water supplies for agricultural and M&I deliveries by at least 77,800 acre-feet per year in dry and critical years and increasing average annual deliveries by about 51,300 acre-feet per year. The majority of the increased dry and critical year water supplies (i.e., 67,100 acre-feet) would be for south-of-Delta agricultural and M&I deliveries. In addition, CP2 would provide hydropower benefits by increasing hydropower generation by approximately 90 GWh per year. In addition, the increased depth and volume of the cold-water pool in Shasta Reservoir would contribute to improving seasonal water temperatures for anadromous fish in the upper Sacramento River.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Socio-1 (CP2): Short-Term Increase in Population and Housing Demand in the Primary Study Area Resulting from Construction-Related Activities According to Reclamation estimates, approximately 300 new direct jobs would be created as a result of construction activities associated with CP2. All 300 construction workers are expected to come from the local labor force; therefore, a short-term population increase is not expected. This impact would be less than significant.

This impact would be similar to Impact Socio-1 (CP1). Approximately 5 years of work (compared to the 4.5 years proposed under CP1) would be required to complete the construction activities proposed under CP2. As described above under Impact Socio-1 (CP1), a short-term population increase is not expected with implementation of CP2. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-2 (CP2): Short-Term Increases in Direct, Indirect, and Induced Employment in the Primary Study Area Related to Construction Activities Construction activities associated with CP2 are expected to generate approximately 300 new direct construction jobs, 600 indirect jobs in various construction-related support industries, and 600 induced jobs because of increased household spending in the primary study area. Individuals to fill these jobs would be drawn from the local community. These new jobs would provide important but temporary employment opportunities to many unemployed construction workers in the primary study area. This impact would be beneficial.

This impact would be the same as Impact Socio-2 (CP1) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-3 (CP2): Potential for Temporary Reduction in the Labor Force of Related Industrial Sectors in the Primary Study Area as a Result of Direct Construction-Related Employment With the creation of 300 new construction jobs resulting from CP2, the potential would exist for workers from other industries to move to jobs related to construction at Shasta Dam. Because of the size of the construction industry in the primary study area and the high unemployment rate in the area, this impact would be less than significant.

This impact would be the same as Impact Socio-3 (CP1) and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-4 (CP2): Short-Term Increases in Direct, Indirect, and Induced Personal Income Paid to Employees in the Primary Study Area Hired for Construction-Related Activities Based on calculations completed as a part of the IMPLAN socioeconomic model process, more than $85.1 million in personal income would be directly paid to employees in the primary study area each year of the 5-year construction period under CP2. The combined $132.8 million in personal income that would be generated would represent an approximately 92percent increase in all annual personal income in the local economic study area. In addition, approximately $47.8 million in indirect and induced income is expected to be generated in various construction-related and other industries in the primary study area each year of construction under CP2. This impact would be beneficial.

This impact would be the same as Impact Socio-4 (CP1) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-5 (CP2): Short-Term Increases in Sales and Profits for Businesses in the Primary Study Area that Support the Construction Industry Most of the construction materials used for CP2 are expected to be purchased within the primary study area. These purchases would provide the local economy with increased sales and profits over the 5-year construction period. This impact would be beneficial.

This impact would be similar to but more beneficial than Impact Socio-5 (CP1). Because of the longer project duration and larger dam raise proposed under CP2, short-term increases in sales and profits for businesses that support the construction industry in the primary study area would be larger than those under CP1. During the construction period, implementation of CP2 is expected to generate more than $346.3 million per year in sales and profits for construction-related and service-oriented businesses that support the construction industry, with approximately $217.8 million in direct income and $128.5 indirect and induced income. The direct income would be $2.2 million less than under CP1; and, the induced income would be $600,000 less than under CP1. The additional time and materials required to implement CP2 over 5 years would generate more in sales and profits than CP1 for construction-related and service-oriented businesses. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-6 (CP2): Short-Term Increase in State and Local Sales Tax Revenues in the Primary Study Area from Construction-Related Personal Income and Purchases As stated above, implementation of CP2 is expected to result in a substantial increase in total personal income (direct, indirect, and induced) over the 5-year construction period. This additional income, in combination with construction-related purchases in the primary study area, would result in a substantial increase in local sales tax revenues from increased consumer spending in nearby cities and counties. Construction-related activities under CP2 also would be likely to result in a temporary increase in State sales and income tax revenues received from businesses and residents of the primary study area. The exact amount of State and local sales tax revenue increases would be speculative; however, this impact would be beneficial.

This impact would be similar to but would be more beneficial than Impact Socio-6 (CP1). Because of the larger total personal income (direct, indirect, and induced) and larger sales and profits for businesses over the construction period expected to result from implementation of CP2, the short-term increase in local sales tax revenues generated by CP2 would be greater than that from CP1 (see Impacts Socio-4 (CP2) and Socio-5 (CP2), above). Construction-related activities under CP2 also are expected to result in a temporary increase in State sales and income tax revenues received from businesses and residents of the primary study area. These additional revenues would likely be cycled back to local government coffers through statewide programs and policies. The increases in State sales and income taxes are expected to be larger under CP2 than under CP1. All of these increases would be beneficial for the relevant local jurisdictions. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-7 (CP2): Long-Term Reduction in the Adverse Economic Effects of Flooding in the Primary Study Area As a result of the added reservoir capacity created by CP2, the overall risk of flooding below Shasta Dam and its related consequences to the primary study area would be reduced. Although

heavy rain events would continue to occur in the region and locally, the project is intended to provide greater flexibility in flood control downstream because of the increased capacity of the reservoir. As a result, less damage to existing structures and a smaller loss of potential future development would occur; this, in turn, would reduce salary and wage losses for residents of the primary study area, as well as business and personal income losses from such damage. Therefore, this impact would be beneficial.

This impact would be similar to but would be more beneficial than Impact Socio-7 (CP1). CP2 would increase the total storage capacity of Shasta Lake by 443,000 acre-feet. Therefore, CP2 would provide approximately 187,000 acre-feet more storage capacity in the reservoir than CP1. This additional capacity provided with the 12.5-foot dam raise would increase the flood control capabilities compared to both existing conditions and CP1, by further reducing the risk of flooding downstream from Shasta Dam. Therefore, the overall risk of flooding and its associated adverse effects on property, housing, and businesses downstream from Shasta Dam and residents throughout the primary study area would be further reduced.

The increased storage capacity proposed as a part of CP2 also would reduce the risk of job loss from flooding and its related effects to a greater extent than the capacity increase proposed under CP1. The increased storage capacity would further reduce the risk of flood-level conditions downstream from the dam. Related effects from flooding on the economic livelihood of residents of the primary study area would be similarly reduced.

Fewer flooding events would occur and less damage would be inflicted on property adjacent to downstream waterways during some flood events. This reduction in flood damage also would reduce residents' salary and wage losses resulting from these catastrophic events.

For the reasons described above, this impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-8 (CP2): Long-Term Increases in Direct Employment in the Primary Study Area Related to Project Operations In the long term, implementation of CP2 is expected to create at least two new maintenance-related positions at the Shasta Dam facilities. These two positions would be permanent and would continue after the 5-year construction period is completed. This impact would be minor but beneficial.

This impact would be the same as Impact Socio-8 (CP1) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta

Impact Socio-9 (CP2): Potential Temporary Increase in Indirect Employment in Construction-Related Businesses of the Lower Sacramento River and Delta
Construction activities associated with CP2 would have the potential to result in a short-term increase in indirect employment within the lower Sacramento River and Delta portion of the extended study area. Depending on the location of construction material sourced outside of the primary study area, indirect increases in employment within construction-related businesses may result in the lower Sacramento River and Delta area. This impact would be beneficial.

This impact would be similar to but would be more beneficial than Impact Socio-9 (CP1). A larger potential temporary increase in indirect employment in construction-related businesses of the lower Sacramento River and Delta area would be expected under CP2 than under CP1. Estimated total construction costs for CP2 are approximately 9.5 percent higher than costs for CP1. Therefore, more income would be allocated to indirect positions in construction-related businesses under CP2. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-10 (CP2): Short-Term Increases in Sales and Profits for Businesses in the Lower Sacramento River and Delta Area that Support the Construction Industry A small amount of the construction materials used for CP2 would be purchased within the extended study area. These purchases are predicted to increase sales and profits of businesses within the lower Sacramento River and Delta area over the 5-year construction period of CP1. This impact would be beneficial.

This impact would be similar to but would be more beneficial than Impact Socio-10 (CP1). Because of the longer project duration and larger dam raise proposed under CP2, short-term increases in sales and profits for construction-related businesses in the lower Sacramento River and Delta area would be larger than those under CP1. The exact scale of the increase in business sales and profits within the lower Sacramento River and Delta area would be speculative, but because additional time and materials would be required, implementing CP2 would likely generate more sales and profits for construction-related and service-oriented businesses. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-11 (CP2): Short-Term Increase in State Sales and Income Tax Revenues in the Lower Sacramento River and Delta Area from Construction-Related Personal Income and Purchases In addition to local tax revenues, CP2 would increase short-term construction-related State sales and income tax revenues received from businesses and residents of the lower Sacramento River and Delta portion of the extended study area. These additional revenues would be cycled back to local government coffers through statewide programs and policies. This impact would be minor but beneficial.

This impact would be similar to but would be more beneficial than Impact Socio-11 (CP1) because the construction period would be longer and more construction materials would be needed. The increased employment and personal incomes anticipated as a part of implementation of CP2 would cause an increase in short-term construction-related State sales and income tax revenues received from businesses and residents of the lower Sacramento River and Delta portion of the extended study area. These additional revenues would be likely to be cycled back to local government coffers through statewide programs and policies. This impact would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-12 (CP2): Long-Term Reduction in the Adverse Economic Effects of Flooding in the Lower Sacramento River and Delta Area As a result of the added reservoir capacity under CP2, the overall risk of flooding and its related consequences below Shasta Dam would be reduced. Although heavy rain events would continue to occur in the region, CP2 would provide greater flexibility in flood control in the lower Sacramento River and Delta area because of the increased capacity of the reservoir. As a result, less damage to existing structures and a smaller loss of potential future development would occur; this, in turn, would reduce salary and wage losses for residents in or near the lower Sacramento River floodplain and the Delta resulting from these catastrophic events, as well as would reduce business and personal income losses from such damage. Therefore, this impact would be beneficial.

This impact would be similar to but would be more beneficial than Impact Socio-12 (CP1). CP2 would provide approximately 187,000 acre-feet more storage capacity in the reservoir than CP1. This additional capacity would increase the flood control capabilities beyond the existing capabilities at Shasta Dam and the capabilities proposed under CP1, and would further reduce the risk of flooding downstream from the dam. The overall risk of flooding and its associated adverse effects on property, housing, businesses, and residents of the lower Sacramento River and Delta area would be reduced with implementation of CP2. Flood risk reduction effects identified earlier for CP1 would apply to CP2, but the positive effects would be greater because of the direct relationship between the proposed dam heights, corresponding capacity of the reservoir, and associated increase in flood control operations and management flexibility.

Increased storage capacity proposed as a part of CP2 also would reduce the risk of job loss from flooding and its related effects in the lower Sacramento River and Delta area, when compared to CP1. A reduction in the risk of flood-level conditions downstream from the dam would strengthen the economic livelihood of downstream residents in the lower Sacramento River and Delta area.

Fewer flooding events would occur and less damage would be inflicted on businesses located adjacent to downstream waterways during some flood events. This reduction in flood damage would reduce residents' salary and wage losses resulting from these catastrophic events.

For the reasons described above, this impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

CVP/SWP Service Areas

Impact Socio-13 (CP2): Short-Term Increases in Sales and Profits for Businesses in the CVP and SWP Service Areas that Support the Construction Industry A small amount of the construction materials used during construction under CP2 would be purchased within the extended study area, including the CVP and SWP service areas. These purchases would result in a minor increase in sales and profits for a few businesses within the CVP and SWP service areas over the 5-year construction period of CP2. This impact would be minor but beneficial.

This impact would be similar to but would be more beneficial than Impact Socio-13 (CP1). Because of the longer project duration and larger dam raise proposed under CP2, short-term increases in sales and profits for some construction-related businesses in the extended study area, including the CVP and SWP service areas, would be larger than those for CP1. These increases have not been quantified, but the additional time and materials required to implement CP2 would be expected to generate more sales and profits for some construction-related and service-oriented businesses. This impact would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-14 (CP2): Potential Temporary Reduction in Shasta Project Water or Hydropower Supplied to the CVP and SWP Service Areas during Construction Implementation of CP2 may require temporarily reducing the reservoir level at critical times during the construction period. This reduction in the reservoir level could temporarily reduce the amount of water or hydropower available from the dam and related hydropower infrastructure. Should this occur, sources of replacement water or hydropower would need to be secured. If these replacement resources were substantially more expensive, a minor negative effect on water or power customers may result. This impact would be potentially significant.

This impact would be similar to Impact Socio-14 (CP1), except that the project construction period would be longer and reductions in reservoir levels could last longer under CP2. This impact would be potentially significant. Mitigation for this impact is proposed in Section 16.3.5, “Mitigation Measures.”

Impact Socio-15 (CP2): Short-Term Increase in State Sales and Income Tax Revenues in the CVP and SWP Service Areas from Construction-Related Personal Income and Purchases In addition to local tax revenue, CP2 would increase short-term construction-related State sales and income tax revenues received from businesses and residents of the CVP and SWP service areas. These additional revenues are expected to be cycled back to local government

coffers through statewide programs and policies. This impact would be beneficial.

This impact would be similar to but would be more beneficial than Impact Socio-15 (CP1). Short-term increases in State sales and income taxes would be larger under CP2 than under CP1. All of these increases are expected to be more beneficial for the relevant local jurisdictions. This impact would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-16 (CP2): Long-Term Increase in Agricultural Income and Jobs in the CVP and SWP Service Areas as a Result of Improved Water Availability and Reliability Based on SWAP modeling, improved water availability and reliability expected to result from implementation of CP2 would substantially increase agricultural net income in the CVP and SWP service areas and increase the number of agricultural positions in these areas. This increase in production and jobs would contribute substantially to the continuation of this already strong industry in California. This impact would be beneficial.

This impact would be similar to but would be more beneficial than Impact Socio-16 (CP1). Water supply reliability in the CVP/SWP service areas would be greater under CP2 than under CP1. Because of the increase in the availability and reliability of water associated with implementation of CP2, the long-term increase in indirect employment within the agricultural sector would be larger than under CP1. Based on the outputs of SWAP modeling, CP2 is expected to generate an additional $1.3 million in net income during normal years and up to $2.7 million during dry years, when compared to existing conditions. In wet years, net income under CP2 is projected to increase to $2.9 million. This overall increase in net income is expected to stimulate more employment opportunities in the agricultural sector to support the higher crop production that likely would be the result of additional irrigation deliveries under CP2 (compared to CP1). This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-17 (CP2): Reduction in Risk of Potential Water and Power Shortages (and Related Economic Activity) in the CVP and SWP Service Areas as a Result of Long-Term Improvements to Water and Power Supply Reliability Implementation of CP2 would substantially increase Shasta Dam's storage capacity. As stated in Impact Socio-16 (CP2), this additional storage capacity would improve the long-term availability and reliability of water in the CVP and SWP service areas. Beyond increasing agricultural production, this improved availability and reliability would reduce the long-term risk of urban water and power shortages, and their related adverse economic consequences. This impact would be beneficial.

This impact would be similar to but would be more beneficial than Impact Socio-17 (CP1). Mitigation for this impact is not needed, and thus not proposed.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

CP3 focuses on increasing agricultural water supply reliability while also increasing anadromous fish survival. This plan primarily consists of raising Shasta Dam by 18.5 feet, which, in combination with spillway modifications, would increase the height of the reservoir's full pool by 20.5 feet and enlarge the total storage capacity in the reservoir by 634,000 acre-feet to 5.19 MAF. CP3 would increase the maximum surface area of the pool to 32,300 acres. Because CP3 focuses on increasing agricultural water supply reliability, none of the increased storage capacity in Shasta Reservoir would be reserved for increasing M&I deliveries. Operations for water supply, hydropower, and environmental and other regulatory requirements would be similar to existing operations, with the additional storage retained for water supply reliability and to expand the cold-water pool for downstream anadromous fisheries.

Implementing CP3 would result in the replacement or modification of 8 bridges and relocation of approximately 130 existing structures. The total construction cost associated with CP3 would be approximately $1,257 million.

CP3 would help reduce estimated future agricultural water shortages and would increase water supply reliability in the CVP service area by increasing water supplies for agricultural deliveries, by at least 63,100 acre-feet per year in dry and critical years and increasing average annual deliveries by about 61,700 acre-feet per year. Almost half of the increased dry and critical year water supplies (i.e., 28,000 acre-feet) would be for south-of-Delta agricultural deliveries, with the remainder for north-of-Delta agricultural deliveries. In addition, CP3 would provide hydropower benefits by increasing hydropower generation, by approximately 90 GWh per year.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Socio-1 (CP3): Short-Term Increase in Population and Housing Demand in the Primary Study Area Resulting from Construction-Related Activities According to Reclamation estimates, approximately 350 direct jobs would be created as a result of construction activities associated with CP3. All 350 construction workers are expected to come from the local labor force; therefore, a short-term population increase is not expected. This impact would be less than significant.

This impact would be similar to Impacts Socio-1 (CP1) and Socio-1 (CP2). CP3 would add 191,000 acre-feet of storage capacity beyond the capacity anticipated in CP2, for a total increase of 634,000 acre-feet. Approximately 350 construction workers would be needed to complete the 18.5-foot raise proposed for CP3, compared to 300 new construction workers required for CP1 and CP2. Approximately 5 years of work (compared to the 4.5 years proposed under CP1) would be required to complete the construction activities proposed under CP3. Workers for this effort also would come from the local labor pool. This impact

would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-2 (CP3): Short-Term Increases in Direct, Indirect, and Induced Employment in the Primary Study Area Related to Construction Activities Construction activities associated with CP3 are expected to generate approximately 350 direct construction jobs, 450 indirect jobs in various construction-related support industries, and 700 induced jobs because of increased household spending in the primary study area. Individuals to fill these jobs are expected to be drawn from the local community. These jobs are expected to provide important but temporary employment opportunities to many unemployed construction workers in the primary study area. This impact would be beneficial.

This impact would be similar to Impact Socio-2 (CP1) and Socio-2 (CP2). Under CP3, approximately 350 short-term, direct construction jobs would be created, in addition to 450 indirect jobs expected to be created in various construction-related support industries, and 700 induced jobs created because of increased household spending near the project area. Total direct, indirect, and induced employment under CP3 would be greater than CP1 and CP2, and these positions would last approximately 5 years under CP3, compared to 4.5 years under CP1. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-3 (CP3): Potential for Temporary Reduction in the Labor Force of Related Industrial Sectors in the Primary Study Area as a Result of Direct Construction-Related Employment With the creation of 350 construction jobs resulting from CP3, the potential would exist for workers from other industries to move to jobs related to construction at Shasta Dam. Because of the size of the construction industry in the primary study area and the high unemployment rate in the area, this impact would be less than significant.

This impact would be similar to Impacts Socio-3 (CP1) and Socio-3 (CP2). CP3 would require 50 more construction workers than required for CP1 and CP2. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-4 (CP3): Short-Term Increases in Direct, Indirect, and Induced Personal Income Paid to Employees in the Primary Study Area Hired for Construction-Related Activities Based on calculations completed as a part of the IMPLAN socioeconomic model process, more than $98.2 million in personal income would be directly paid to employees in the primary study area each year of the 5-year construction period under CP3. In addition, more than $55.2 million in indirect and induced income is expected to be generated in various construction-related and other industries in the primary study area each year of construction under CP3. The combined $153.3 million in personal income to be generated would represent an approximately 93 percent increase in

all annual personal income in the local economic study area. This impact would be beneficial.

This impact would be similar to but would be more beneficial than Impacts Socio-4 (CP1) and Socio-4 (CP2). CP3 would generate $98.2 million in direct personal income each year of construction, from the 350 direct construction-related jobs that would be created. In addition, indirect and induced personal income totaling $55.2 million per year of construction would be generated in various construction-related and other industries in the primary study area that would support construction under CP3. The combined direct, indirect, and induced personal income resulting from CP3 would be approximately $153.3 million per year of construction within the local economic study area. This increase in personal income would represent an approximately 93 percent increase in all annual personal income in the local economic study area.

Direct, indirect, and induced annual personal income under CP3 would be greater than CP1 and CP2. Overall, a total income of $766.6 million would be generated under CP3 over the 5-year construction period, compared to a total of $603.8 million for CP1 and to a total of $664.1 million for CP2. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-5 (CP3): Short-Term Increases in Sales and Profits for Businesses in the Primary Study Area that Support the Construction Industry Most of the construction materials used for CP3 are expected to be purchased within the primary study area. These purchases would provide the local economy with increased sales and profits over the 5-year construction period. This impact would be beneficial.

This impact would be similar to but would be more beneficial than Impacts Socio-5 (CP1) and Socio-5 (CP2). CP3 would require the largest dam height increase and, therefore, the greatest construction expenditures over the total construction period. As a result, CP3 would generate more business sales and profits than CP1 and CP2 in construction-related and service-oriented businesses in the primary study area. During the construction period, implementation of CP3 is expected to generate more than $399.7 million per year in sales and profits for businesses that support the construction industry, with approximately $251.4 million in direct income and $148.3 in direct and induced income. CP3 would generate an overall total of $424.5 million and $267.1 million more in sales and profits than CP1 and CP2, respectively, for construction-related and service-oriented businesses. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-6 (CP3): Short-Term Increase in State and Local Sales Tax Revenues in the Primary Study Area from Construction-Related Personal Income and Purchases As stated above, implementation of CP3 is expected to result in a substantial increase in total personal income (direct, indirect, and

induced) over the 5-year construction period. This additional income, in combination with the construction-related purchases in the primary study area, would result in a substantial increase in local sales tax revenues from increased consumer spending in nearby cities and counties. Construction-related activities under CP3 would be likely also to result in a temporary increase in State sales and income tax revenues received from businesses and residents of the primary study area. The exact amount of State and local sales tax revenue increases would be speculative: however, this impact would be beneficial.

This impact would be similar to but would be more beneficial than Impacts Socio-6 (CP1) and Socio-6 (CP2). CP3 would generate more direct, indirect, and induced personal income and more sales and profits for businesses over the construction period than CP1 and CP2 (see Impacts Socio-4 (CP3) and Socio-5 (CP3), above). This larger amount of personal income generated is expected to result in more local sales tax revenues in the primary study area than under the other two alternatives. Construction-related activities under CP3 also are expected to result in a temporary increase in State sales and income tax revenues received from businesses and residents of the primary study area. These additional revenues would be likely to be cycled back to local government coffers through statewide programs and policies. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-7 (CP3): Long-Term Reduction in the Adverse Economic Effects of Flooding in the Primary Study Area As a result of the added reservoir capacity created by CP3, the overall risk of flooding and its related consequences below Shasta Dam are expected to be reduced. Although heavy rain events would continue to occur in the region and locally, and potentially increase with global climate change, the project is intended to provide greater flexibility in flood control downstream because of the increased capacity of the reservoir. As a result, less damage to existing structures and a smaller loss of potential future development would occur; this, in turn, would reduce salary and wage losses for residents of the primary study area, as well as business and personal income losses from such damage. Therefore, this impact would be beneficial.

This impact would be similar to but would be more beneficial than Impacts Socio-7 (CP1) and Socio-7 (CP2). CP3 would create 634,000 acre-feet more storage capacity than current capacity, more than 40 percent more than would be provided by CP2. CP3 would, therefore, provide substantially more flood protection than either CP1 or CP2. As a result, CP3 would result in a greater reduction than CP1 and CP2 in the risk of damage to property and structures from flooding along the upper Sacramento River.

The increased storage capacity proposed as a part of CP3 would result in a larger decrease in the risk of job loss from flooding and its related effects than would occur under CP1 or CP2. CP3 would increase storage space in Shasta

Lake and would provide approximately 191,000 more acre-feet of storage than either of the two previous alternatives. The increased storage capacity would create a greater reduction in the risk of flood-level conditions downstream from the dam. Related effects from flooding on the economic livelihood of residents of the primary study area would similarly be reduced. In addition, the reduction in flood damage would reduce residents' salary and wage losses resulting from these catastrophic events.

For the reasons described above, this impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-8 (CP3): Long-Term Increases in Direct Employment in the Primary Study Area Related to Project Operations In the long term, implementation of CP3 would create at least two new maintenance-related positions at the Shasta Dam facilities. These two positions are expected to be permanent and would continue once the 5-year construction period is completed. This impact would be minor but beneficial.

This impact would be the same as Impacts Socio-8 (CP1) and Socio-8 (CP2) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta

Impact Socio-9 (CP3): Potential Temporary Increase in Indirect Employment in Construction-Related Businesses of the Lower Sacramento River and Delta
Construction activities associated with CP3 would have the potential to result in a short-term increase in indirect employment within the lower Sacramento River and Delta portion of the extended study area. Depending on the location of construction materials sourced outside of the primary study area, indirect increases in employment within some construction-related businesses may result in the lower Sacramento River and Delta area. This impact would be minor but beneficial.

This impact would be similar to but would be more beneficial than Impacts Socio-9 (CP1) and Socio-9 (CP2). A larger potential temporary increase in indirect employment in construction-related businesses of the lower Sacramento River and Delta area would be expected under CP3. Estimated total construction costs for CP3 are approximately 22.3 percent higher than costs for CP1 and 14.2 percent higher than costs for CP2. Therefore, more income would be allocated to indirect positions in construction-related businesses than would be expected under CP1 and CP2. This impact would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-10 (CP3): Short-Term Increases in Sales and Profits for Businesses in the Lower Sacramento River and Delta Area that Support the Construction Industry A small amount of the construction materials used for CP3 would be purchased within the extended study area. These purchases are

predicted to increase sales and profits of businesses within the lower Sacramento River and Delta area over the 5-year construction period of CP3. This impact would be beneficial.

This impact would be similar to but would be more beneficial than Impacts Socio-10 (CP1) and Socio-1 (CP2). Because of the longer project duration and greater construction expenditures associated with the larger dam raise proposed under CP3, short-term increases in sales and profits for construction-related businesses in the lower Sacramento River and Delta area would be larger than those for CP1 and CP2. These increases have not yet been quantified, but because additional time and materials would be required, implementing CP3 would generate more sales and profits for construction-related and service-oriented businesses. This impact would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-11 (CP3): Short-Term Increase in State Sales and Income Tax Revenues in the Lower Sacramento River and Delta Area from Construction-Relate Personal Income and Purchases In addition to local tax revenues, CP3 is expected to increase short-term, construction-related, State sales and income tax revenues received from businesses and residents of the lower Sacramento River and Delta portion of the extended study area. These additional revenues are expected to be cycled back to local government coffers through statewide programs and policies. This impact would be minor but beneficial.

This impact would be similar to but would be more beneficial than Impacts Socio-11 (CP1) and Socio-11 (CP2) because the construction period would be longer and more construction materials would be needed. The increased employment and personal incomes anticipated as a part of implementation of CP3 would cause an increase in short-term, construction-related, State sales and income tax revenues received from some businesses and residents of the lower Sacramento River and Delta portion of the extended study area. These additional revenues likely would be cycled back to local government coffers through statewide programs and policies. This impact would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-12 (CP3): Long-Term Reduction in the Adverse Economic Effects of Flooding in the Lower Sacramento River and Delta Area As a result of the added reservoir capacity under CP3, the overall risk of flooding and its related consequences below Shasta Dam would be reduced. Although heavy rain events would continue to occur in the region, as well as potentially increase with global climate change, CP3 is intended to provide greater flexibility in flood control in the lower Sacramento River and Delta area because of the increased capacity of the reservoir. As a result, less damage to existing structures and a smaller loss of potential future development would occur; this, in turn, would reduce salary and wage losses for residents in and near the lower Sacramento River floodplain and the Delta resulting from these catastrophic events, as well as would reduce

business and personal income losses from such damage. Therefore, this impact would be beneficial.

This impact would be similar to but would be more beneficial than Impacts Socio-12 (CP1) and Socio-12 (CP2). CP3 would provide approximately 191,000 acre-feet more storage capacity in the reservoir than either of the two previous alternatives. This additional capacity would increase the flood control capabilities beyond the existing capabilities at Shasta Dam and the capabilities proposed under CP1 and CP2, and would further reduce the risk of flooding downstream from the dam. The overall risk of flooding and its associated adverse effects on property, housing, businesses, and residents of the lower Sacramento River and Delta area would be reduced with implementation of CP3. Flood risk reduction effects identified for CP1 and CP2 would apply to CP3, but the positive effects would be greater because of the direct relationship between the proposed dam heights, corresponding capacity of the reservoir, and associated increase in flood control operations and management flexibility.

Increased storage capacity proposed as a part of CP3 also would reduce the risk of job loss from flooding and its related effects in the lower Sacramento River and Delta area. A reduction in the risk of flood-level conditions downstream from the dam would strengthen the economic livelihood of downstream residents in the lower Sacramento River and Delta portion of the extended study area. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

CVP/SWP Service Areas

Impact Socio-13 (CP3): Short-Term Increases in Sales and Profits for Businesses in the CVP and SWP Service Areas that Support the Construction Industry A small amount of the construction materials used during construction under CP3 would be purchased within the extended study area. These purchases are predicted to increase sales and profits of some businesses within the CVP and SWP service areas over the 5-year construction period of CP3. This impact would be minor but beneficial.

This impact would be similar to but would be more beneficial than Impact Socio-13 (CP1) because the construction period would be longer and more construction materials would be needed. This impact would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-14 (CP3): Potential Temporary Reduction in Shasta Project Water or Hydropower Supplied to the CVP and SWP Service Areas during Construction Implementation of CP3 may require temporarily reducing the reservoir level at critical times during the construction period. This reduction in the reservoir level could temporarily reduce the amount of water or hydropower available from the dam and related hydropower infrastructure. Should this occur, sources of replacement water or hydropower would need to be secured. If these replacement resources were substantially more expensive, a minor

negative effect on water or power customers may result. This impact would be potentially significant.

This impact would be similar to Impact Socio-14 (CP1), except that the project construction period would be longer. This impact would be potentially significant. Mitigation for this impact is proposed in Section 16.3.5, "Mitigation Measures."

Impact Socio-15 (CP3): Short-Term Increase in State Sales and Income Tax Revenues in the CVP and SWP Service Areas from Construction-Related Personal Income and Purchases In addition to local tax revenue, CP3 is expected to increase short-term, construction-related, State sales and income tax revenues received from businesses and residents of the CVP and SWP service areas. These additional revenues are expected to be cycled back to local government coffers through statewide programs and policies. This impact would be beneficial.

This impact would be similar to but would be more beneficial than Impacts Socio-15 (CP1) and Socio-15 (CP2). Short-term increases in State sales and income taxes are expected to be larger under CP3 than under CP1 and CP2. All of these increases are expected to be more beneficial for the relevant local jurisdictions. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-16 (CP3): Long-Term Increase in Agricultural Income and Jobs in the CVP and SWP Service Areas as a Result of Improved Water Availability and Reliability Based on SWAP modeling, improved water availability and reliability expected to result from implementation of CP3 would substantially increase agricultural net income in the CVP and SWP service areas and increase the number of agricultural positions in these areas. This increase in production and jobs would contribute substantially to the continuation of this already strong industry in California. This impact would be beneficial.

This impact would be similar to but would be more beneficial than Impacts Socio-16 (CP1) and Socio-16 (CP2). CP3 would increase water supply reliability by increasing dry and critical year water supplies for CVP irrigation deliveries. Because of the increase in the availability and reliability of water associated with implementation of CP3, the long-term increase in indirect employment within the agricultural sector is expected to be larger than under CP1 and CP2. Based on the outputs of SWAP modeling, CP3 would generate an additional $5.1 million in net income during normal years and $8.5 million during dry years, when compared to existing conditions. In wet years, net income under CP3 is projected to decrease to $4.4 million. Overall, CP3 is projected to result in a greater increase in net income during average, dry, and wet years, when compared to net income projected for CP1 and CP2. The projected increase in net income under CP3 is expected to stimulate a greater number of employment opportunities in the agricultural sector than under CP1

and CP2, because higher crop production would be likely. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-17 (CP3): Reduction in Risk of Potential Water and Power Shortages (and Related Economic Activity) in the CVP and SWP Service Areas as a Result of Long-Term Improvements to Water and Power Supply Reliability
Implementation of CP3 would substantially increase Shasta Dam's storage capacity. As stated in Impact Socio-16 (CP3), this additional storage capacity would improve long-term water availability and reliability in the CVP and SWP service areas. Beyond increasing agricultural production, this improved availability and reliability would reduce the long-term risk of urban water and power shortages, and their related adverse economic consequences. This impact would be beneficial.

This impact would be the similar to CP1 and CP2 and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

CP4 and CP4A focus on increasing anadromous fish survival while also increasing water supply reliability. By raising Shasta Dam 18.5 feet, in combination with spillway modifications, CP4 or CP4A would increase the height of the reservoir full pool by 20.5 feet. This increase in full pool height would add approximately 634,000 acre-feet of storage to the reservoir's capacity. Accordingly, storage in the overall full pool would be increased from 4.55 MAF to 5.19 MAF. CP4 or CP4A would involve augmenting spawning gravel and restoring riparian, floodplain, and side-channel habitat at up to six potential locations in the upper Sacramento River.

CP4A is identical to CP4 with the exception of Shasta Dam and Reservoir operations. CP4 and CP4A have similar reservoir operations in that they each dedicate a portion of the new storage in Shasta Lake for fisheries purposes; however, the portion of this dedicated storage varies. Approximately 378,000 acre-feet of the increased reservoir storage space of CP4 would be dedicated to increasing the supply of cold water for anadromous fish survival purposes. For CP4, operations for the remaining portion of increased storage (approximately 256,000 acre-feet) would be the same as in CP1, with 70,000 acre-feet reserved in dry years and 35,000 acre-feet reserved in critical years to specifically focus on increasing M&I deliveries.

Similarly, approximately 191,000 acre-feet of the increased reservoir storage space of CP4A would be dedicated to increasing the supply of cold water for anadromous fish survival purposes. For CP4A, operations for the remaining portion of increased storage (approximately 443,000 acre-feet) would be the same as in CP2, with 120,000 acre-feet reserved in dry years and 60,000 acre-feet reserved in critical years to specifically focus on increasing M&I deliveries. Implementing CP4 or CP4A would result in the replacement or modification of

8 bridges and relocation of approximately 130 existing structures. The total construction cost associated with CP4 or CP4A would be approximately $1,265 million and $1,266 million, respectively.

CP4 would help reduce estimated future agricultural and M&I water shortages and would increase water supply reliability in the CVP/SWP service areas by increasing water supplies for agricultural and M&I deliveries by at least 47,300 acre-feet per year in dry and critical years and increasing average annual deliveries by about 31,000 acre-feet per year. The majority of the increased dry and critical year water supplies (i.e., 42,700 acre-feet) would be for south-of-Delta agricultural and M&I deliveries. In addition, CP4 would provide hydropower benefits by increasing hydropower generation by approximately 133 GWh per year. Water supply reliability under CP4A would the same as under CP2. Implementing CP4A would help reduce estimated future agricultural water shortages in the CVP/SWP service areas by increasing water supplies for agricultural deliveries by at least 37,600 acre-feet per year in dry and critical years and increasing average annual deliveries by about 31,400 acre-feet per year. CP4A would provide hydropower benefits by increasing hydropower generation by approximately 130 GWh per year.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Socio-1 (CP4 and CP4A): Short-Term Increase in Population and Housing Demand in the Primary Study Area Resulting from Construction-Related Activities According to Reclamation estimates, approximately 350 direct jobs would be created as a result of construction activities associated with CP4 or CP4A. All 350 construction workers are expected to come from the local labor force; therefore, a short-term population increase is not expected. This impact would be less than significant for CP4 or CP4A.

This impact would be the same as Impact Socio-1 (CP3) and would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be the same as Impact Socio-1 (CP3) and would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-2 (CP4 and CP4A): Short-Term Increases in Direct, Indirect, and Induced Employment in the Primary Study Area Related to Construction Activities Construction activities associated with CP4 or CP4A are expected to generate approximately 350 construction jobs, 450 indirect jobs in various construction-related support industries, and 700 induced jobs because of increased household spending in the primary study area. Individuals to fill these jobs are expected to be drawn from the local community. These new jobs would provide important but temporary employment opportunities to many

unemployed construction workers in the primary study area. This impact would be beneficial for CP4 or CP4A.

This impact would be the same as Impact Socio-2 (CP3) and would be beneficial for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be the same as Impact Socio-2 (CP3) and would be beneficial for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-3 (CP4 and CP4A): Potential for Temporary Reduction in the Labor Force of Related Industrial Sectors in the Primary Study Area as a Result of Direct Construction-Related Employment With the creation of 350 construction jobs resulting from CP4 or CP4A, the potential would exist for workers from other industries to move to jobs related to construction at Shasta Dam. Because of the size of the construction industry in the primary study area and the high unemployment rate in the area, this impact would be less than significant for CP4 or CP4A.

This impact would be the same as Impact Socio-3 (CP3) and would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be the same as Impact Socio-3 (CP3) and would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-4 (CP4 and CP4A): Short-Term Increases in Direct, Indirect, and Induced Personal Income Paid to Employees in the Primary Study Area Hired for Construction-Related Activities Construction activities for CP4 or CP4A would last 5-years, compared to 4.5 years for CP1. Additional construction activities would be required for augmenting spawning gravel and restoring riparian, floodplain, and side-channel habitat. Based on calculations completed as a part of the IMPLAN socioeconomic model process, more than $98.7 million and $98.8 million in personal income would be directly paid to employees in the primary study area each year of construction for CP4 and CP4A, respectively. In addition, more than $55.4 million in indirect and induced income would be generated in various construction-related and other industries in the primary study area each year of construction under CP4 or CP4A. The combined $154.2 million and 154.3 million for CP4 and CP4A, respectively, in personal income generated would represent an approximately 93 percent increase in all annual personal income in the local economic study area. This impact would be beneficial for CP4 or CP4A.

This impact for CP4 or CP4A would be similar to Impact Socio-4 (CP3). CP3 is estimated to generate $98.2 million in direct personal income each year of

construction from the 350 direct construction-related jobs that would be created. In addition, indirect and induced personal income totaling $55.2 million per year of construction would be generated in various construction-related and other industries in the primary study area that would support construction under CP3. In combination, direct, indirect, and induced personal income resulting from CP3 would be approximately $153.3 million per year of construction within the local economic study area. This increase in personal income would represent an approximately 93 percent increase in all annual personal income in the local economic study area.

Additional construction activities associated with augmenting spawning gravel and restoring riparian, floodplain, and side-channel habitat would occur under CP4 or CP4A. During the 5-year construction period, more than $770.9 million and $771.4 million in personal income would be generated by direct, indirect, and induced employment produced with CP4 and CP4A, respectively, and this would be $4.3 million and $4.8 million more personal income than generated under CP3, respectively.

This impact would be beneficial for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be beneficial for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-5 (CP4 and CP4A): Short-Term Increases in Sales and Profits for Businesses in the Primary Study Area that Support the Construction Industry
Most of the construction materials used for CP4 or CP4A would be purchased within the primary study area. These purchases would provide the local economy with increased sales and profits over the 5-year construction period. This impact would be beneficial for CP4 or CP4A.

This impact for CP4 or CP4A would be similar to but more beneficial than Impact Socio-5 (CP3). During the construction period, implementation of CP4 or CP4A would generate more than $401.9 million and $402.2 million, respectively, per year in sales and profits for construction-related and service-oriented businesses that support the construction industry, with approximately $252.8 million and $253.0 million in direct income, respectively, and $149.1 million and $149.3 million in indirect and induced income, respectively. CP4 or CP4A would generate an overall total of $2.2 million and $2.5 million more per year, respectively, in sales and profits than CP3 for construction-related and service-oriented businesses.

This impact would be beneficial for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be beneficial for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-6 (CP4 and CP4A): Short-Term Increase in State and Local Sales Tax Revenues in the Primary Study Area from Construction-Related Personal Income and Purchases As stated above, implementation of CP4 or CP4A is expected to result in a substantial increase in total personal income (direct, indirect, and induced) over the 5-year construction period. This additional income, in combination with the construction-related purchases in the primary study area, would result in a substantial increase in local sales tax revenues from increased consumer spending in nearby cities and counties. Construction-related activities under CP4 or CP4A would likely result in a temporary increase in State sales and income tax revenues received from businesses and residents of the primary study area. The exact amount of State and local sales tax revenue increases would be speculative; however, this impact would be beneficial for CP4 or CP4A.

This impact for CP4 or CP4A would be similar but more beneficial than Impact Socio-6 (CP3). CP4 or CP4A would generate more direct, indirect, and induced personal income and more sales and profits for businesses over the construction period than CP3 (see Impacts Socio-4 (CP4 and CP4A) and Socio-5 (CP4 and CP4A), above).

This impact would be beneficial for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be beneficial for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-7 (CP4 and CP4A): Long-Term Reduction in the Adverse Economic Effects of Flooding in the Primary Study Area As a result of the added reservoir capacity created by CP4 or CP4A, the overall risk of flooding and its related consequences below Shasta Dam would be reduced. Although heavy rain events would continue to occur in the region and locally, and potentially increase with global climate change, the project is intended to provide greater flexibility in flood control downstream because of the increased capacity of the reservoir. As a result, less damage to existing structures and a smaller loss of potential future development would occur; this, in turn, would reduce salary and wage losses for residents of the primary study area, as well as would reduce business and personal income losses from such damage. Therefore, this impact would be beneficial for CP4 or CP4A.

This impact for CP4 would be the same as Impact Socio-7 (CP3) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

This impact for CP4A would be the same as Impact Socio-7 (CP3) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-8 (CP4 and CP4A): Long-Term Increases in Direct Employment in the Primary Study Area Related to Project Operations In the long term,

implementation of CP4 or CP4A would create at least two new maintenance-related positions at the Shasta Dam facilities. These two positions would be permanent and would continue once the 5-year construction period is completed. This impact would be minor but beneficial for CP4 or CP4A.

This impact for CP4 would be the same as Impact Socio-8 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

This impact for CP4A would be the same as Impact Socio-8 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta

Impact Socio-9 (CP4 and CP4A): Potential Temporary Increase in Indirect Employment in Construction-Related Businesses of the Lower Sacramento River and Delta Construction activities associated with CP4 or CP4A have the potential to result in a short-term increase in indirect employment within the lower Sacramento River and Delta portion of the extended study area. Depending on the location of construction material sourced outside of the primary study area, indirect increases in employment within construction-related businesses may result in the lower Sacramento River and Delta area. This impact would be minor but beneficial for CP4 or CP4A.

This impact for CP4 would be similar to Impact Socio-9 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

This impact for CP4A would be similar to Impact Socio-9 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-10 (CP4 and CP4A): Short-Term Increases in Sales and Profits for Businesses in the Lower Sacramento River and Delta Area that Support the Construction Industry A small amount of the construction materials used for CP4 or CP4A would be purchased within the extended study area. These purchases are predicted to increase sales and profits of some businesses within the lower Sacramento River and Delta area over the 5-year construction period of CP4 or CP4A. This impact would be minor but beneficial for CP4 or CP4A.

This impact for CP4 would be similar to Impact Socio-10 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

This impact for CP4A would be similar to Impact Socio-10 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-11 (CP4 and CP4A): Short-Term Increase in State Sales and Income Tax Revenues in the Lower Sacramento River and Delta Area from Construction-Related Personal Income and Purchases In addition to local tax revenues, CP4 or CP4A is expected to increase short-term, construction-related, State sales and income tax revenues received from businesses and residents of the lower Sacramento River and Delta portion of the extended study area. These additional revenues are expected to be cycled back to local government coffers through statewide programs and policies. This impact would be minor but beneficial for CP4 or CP4A.

This impact for CP4 would be similar to Impact Socio-11 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

This impact for CP4A would be similar to Impact Socio-11 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-12 (CP4 and CP4A): Long-Term Reduction in the Adverse Economic Effects of Flooding in the Lower Sacramento River and Delta Area As a result of the added reservoir capacity under CP4 or CP4A, the overall risk of flooding and its related consequences below Shasta Dam would be reduced. Although heavy rain events would continue to occur in the region, and potentially increase with global climate change, CP4 and CP4A are intended to provide greater flexibility in flood control in the lower Sacramento River and Delta area because of the increased capacity of the reservoir. As a result, less damage to existing structures and a smaller loss of potential future development would occur; this, in turn, would reduce salary and wage losses for residents in and near the lower Sacramento River floodplain and the Delta resulting from these catastrophic events, as well as would reduce business and personal income losses from such damage. Therefore, this impact would be beneficial for CP4 or CP4A.

This impact for CP4 would be the same as Impact Socio-12 (CP3) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

This impact for CP4A would be the same as Impact Socio-12 (CP3) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

CVP/SWP Service Areas

Impact Socio-13 (CP4 and CP4A): Short-Term Increases in Sales and Profits for Businesses in the CVP and SWP Service Areas that Support the Construction Industry A small amount of the construction materials used during construction under CP4 or CP4A would be purchased within the extended study area. These purchases are predicted to increase sales and profits of some businesses within the CVP and SWP service areas over the 5-year

construction period of CP4 or CP4A. This impact would be minor but beneficial for CP4 or CP4A.

This impact for CP4 would be similar to Impact Socio-13 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

This impact for CP4A would be similar to Impact Socio-13 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-14 (CP4 and CP4A): Potential Temporary Reduction in Shasta Project Water or Hydropower Supplied to the CVP and SWP Service Areas during Construction Implementation of CP4 or CP4A may require temporarily reducing the reservoir level at critical times during the construction period. This reduction in the reservoir level could temporarily reduce the amount of water or hydropower available from the dam and related hydropower infrastructure. Should this occur, sources of replacement water or hydropower would need to be secured. If these replacement resources were substantially more expensive, a minor negative effect on water or power customers may result. This impact would be potentially significant for CP4 or CP4A.

This impact for CP4 would be the same as Impact Socio-14 (CP3) and would be potentially significant. Mitigation for this impact is proposed in Section 16.3.5, "Mitigation Measures."

This impact for CP4A would be the same as Impact Socio-14 (CP3) and would be potentially significant. Mitigation for this impact is proposed in Section 16.3.5, "Mitigation Measures."

Impact Socio-15 (CP4 and CP4A): Short-Term Increase in State Sales and Income Tax Revenues in the CVP and SWP Service Areas from Construction-Related Personal Income and Purchases In addition to local tax revenue, CP4 or CP4A is expected to increase short-term, construction-related, State sales and income tax revenues received from some businesses and residents of the CVP and SWP service areas. These additional revenues are expected to be cycled back to local government coffers through statewide programs and policies. This impact would be minor but beneficial.

This impact for CP4 would be similar to Impact Socio-15 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

This impact for CP4A would be similar to Impact Socio-15 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-16 (CP4 and CP4A): Long-Term Increase in Agricultural Income and Jobs within the CVP and SWP Service Areas as a Result of Improved Water Availability and Reliability Based on SWAP modeling, improved water availability and reliability expected to result from implementation of CP4 or CP4A would substantially increase agricultural net income in the CVP and SWP service areas. This increase in production would contribute substantially to the continuation of this already strong industry in California. This impact would be beneficial for CP4 or CP4A.

This impact for CP4 would be the same as Impact Socio-16 (CP1) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

This impact for CP4A would be similar to, but more beneficial than Impact Socio-16 (CP1) because water supply reliability in the CVP/SWP service areas would be greater under CP2 than under CP1. Because of the increase in the availability and reliability of water associated with implementation of CP4A, the long-term increase in indirect employment within the agricultural sector would be larger than under CP1. Therefore, the impact for CP4A would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-17 (CP4 or CP4A): Reduction in Risk of Potential Water and Power Shortages (and Related Economic Activity) in the CVP and SWP Service Areas as a Result of Long-Term Improvements to Water and Power Supply Reliability Implementation of CP4 or CP4A would substantially increase Shasta Dam's storage capacity. As stated in Impact Socio-16 (CP4 and CP4A), this additional storage capacity would improve long-term water availability and reliability in the CVP and SWP service areas. Beyond increasing agricultural production, this improved availability and reliability would reduce the long-term risk of urban water and power shortages, and their related adverse economic consequences. This impact would be beneficial for CP4 or CP4A.

This impact for CP4 would be the similar to Impact Socio-17 (CP1, CP2, and CP3) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

This impact for CP4A would be the similar to Impact Socio-17 (CP1, CP2, and CP3) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

CP5 – 18.5-Foot Dam Raise, Combination Plan

CP5 primarily focuses on increasing water supply reliability, anadromous fish survival, Shasta Lake area environmental resources, and recreation opportunities. By raising Shasta Dam 18.5 feet, in combination with spillway modifications, CP5 would increase the height of the reservoir full pool by 20.5 feet and enlarge the total storage capacity in the reservoir by 634,000 acre-feet to 5.19 MAF. CP5 would increase the maximum surface area of the pool to 32,300 acres. The existing temperature control device would be extended to

achieve efficient use of the expanded cold-water pool. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 150,000 acre-feet and 75,000 acre-feet, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing M&I deliveries.

CP5 also would involve augmenting spawning gravel and restoring riparian, floodplain, and side-channel habitat at up to six potential locations in the upper Sacramento River. CP5 would involve constructing additional fish habitat in and along the shoreline of Shasta Lake and along the lower reaches of its tributaries, increasing recreation opportunities at Shasta Lake.

Implementing CP5 would result in the replacement or modification of 8 bridges and relocation of approximately 130 existing structures. The total construction cost associated with CP5 would be approximately $1,284 million.

CP5 would help reduce estimated future agricultural and M&I water shortages and would increase water supply reliability in the CVP/SWP service areas by increasing water supplies for agricultural and M&I deliveries by at least 113,500 acre-feet per year in dry and critical years and increasing average annual deliveries by about 75,900 acre-feet per year. The majority of the increased dry and critical year water supplies (i.e., 88,300 acre-feet) would be for south-of-Delta agricultural and M&I deliveries. In addition, CP5 would provide hydropower benefits by increasing hydropower generation by approximately 117 GWh per year.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Socio-1 (CP5): Short-Term Increase in Population and Housing Demand in the Primary Study Area Resulting from Construction-Related Activities According to Reclamation estimates, approximately 360 direct jobs would be created as a result of construction activities associated with CP5. All 360 construction workers are expected to come from the local labor force; therefore, a short-term population increase is not expected. This impact would be less than significant.

This impact would be the similar to Impact Socio-1 (CP3) and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-2 (CP5): Short-Term Increases in Direct, Indirect, and Induced Employment in the Primary Study Area Related to Construction Activities Construction activities associated with CP5 are expected to generate approximately 360 direct construction jobs, 470 indirect jobs in various construction-related support industries, and 710 induced jobs because of increased household spending in the primary study area. Individuals to fill these jobs are expected to be drawn from the local community. These new jobs would provide important but temporary employment opportunities to many

unemployed construction workers in the primary study area. This impact would be beneficial.

This impact would be very similar to Impact Socio-2 (CP3), varying only with 10 more construction workers. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-3 (CP5): Potential for Temporary Reduction in the Labor Force of Related Industrial Sectors in the Primary Study Area as a Result of Direct Construction-Related Employment With the creation of 360 construction jobs resulting from CP5, the potential would exist for workers from other industries to move to jobs related to construction at Shasta Dam. Because of the size of the construction industry in the primary study area and the high unemployment rate in the area, this impact would be less than significant.

This impact would be similar to Impact Socio-3 (CP3). CP5 would only require 10 more construction workers than required for CP3, and the impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-4 (CP5): Short-Term Increases in Direct, Indirect, and Induced Personal Income Paid to Employees in the Primary Study Area Hired for Construction-Related Activities Construction activities for CP5 would last 5 years, compared to 4.5 years for CP1. Additional construction activities would be required for augmenting spawning gravel; restoring riparian, floodplain, and side-channel habitat; and creating fish habitat in and along the shoreline of Shasta Lake and along the lower reaches of its tributaries. Based on calculations completed as a part of the IMPLAN socioeconomic model process, more than $100.2 million in personal income would be directly paid to employees in the primary study area each year of construction. In addition, more than $56.3 million in indirect and induced income is expected to be generated in various construction-related and other industries in the primary study area each year of construction under CP5. The combined $156.5 million in personal income generated would represent an approximately 94 percent increase in all annual personal income in the local economic study area. This impact would be beneficial.

This impact would be similar to Impact Socio-4 (CP3). Under CP5, more than $100.2 million in personal income would be directly paid to employees in the primary study area each year of construction. In addition, more than $56.3 million in indirect and induced income is expected to be generated in various construction-related and other industries in the primary study area each year of construction. The combined $156.5 million in personal income generated would represent an approximately 94 percent increase in all annual personal income in the local economic study area.

Additional construction activities would be required for augmenting spawning gravel; restoring riparian, floodplain, and side-channel habitat; and creating fish habitat in and along the shoreline of Shasta Lake and along the lower reaches of its tributaries. During the 5-year construction period, more than $782.5 million in personal income is expected to be generated by direct, indirect, and induced employment produced by CP5, and this would be $15.9 million more personal income than generated under CP3. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-5 (CP5): Short-Term Increases in Sales and Profits for Businesses in the Primary Study Area that Support the Construction Industry Most of the construction materials used for CP5 are expected to be purchased within the primary study area. These purchases would provide the local economy with increased sales and profits over the 5-year construction period. This impact would be beneficial.

This impact would be similar to Impact Socio-5 (CP3). During the construction period, implementation of CP5 is expected to generate more than $408.0 million per year in sales and profits for construction-related and service-oriented businesses that support the construction industry, with approximately $256.6 million in direct income and $151.3 in direct and induced income. CP5 would generate an overall total of $8.3 million more per year in sales and profits than CP3 for construction-related and service-oriented businesses. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-6 (CP5): Short-Term Increase in State and Local Sales Tax Revenues in the Primary Study Area from Construction-Related Personal Income and Purchases As stated above, implementation of CP5 is expected to result in a substantial increase in total personal income (direct, indirect, and induced) over the 5-year construction period. This additional income, in combination with construction-related purchases in the primary study area, would result in a substantial increase in local sales tax revenues from increased consumer spending in nearby cities and counties. Construction-related activities under CP5 also would be likely to result in a temporary increase in State sales and income tax revenues received from businesses and residents of the primary study area. The exact amount of State and local sales tax revenue increases would be speculative; however, this impact would be beneficial.

This impact would be similar to but more beneficial than Impact Socio-6 (CP3). CP5 would generate more direct, indirect, and induced personal income and more sales and profits for businesses over the construction period than CP3 (see Impacts Socio-4 (CP5) and Socio-5 (CP5), above). This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-7 (CP5): Long-Term Reduction in the Adverse Economic Effects of Flooding in the Primary Study Area As a result of the added reservoir

capacity created by CP5, the overall risk of flooding and its related consequences below Shasta Dam would be reduced. Although heavy rain events would continue to occur in the region and locally, and potentially increase with global climate change, the project is intended to provide greater flexibility in flood control downstream because of the increased capacity of the reservoir. As a result, less damage to existing structures and a smaller loss of potential future development would occur; this, in turn, would reduce salary and wage losses for residents of the primary study area, as well as would reduce business and personal income losses from such damage. Therefore, this impact would be beneficial.

This impact would be the same as Impact Socio-7 (CP3) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-8 (CP5): Long-Term Increases in Direct Employment in the Primary Study Area Related to Project Operations In the long term, implementation of CP5 would create at least two new maintenance-related positions at the Shasta Dam facilities. These two positions would be permanent and would continue once the 5-year construction period is completed. This impact would be minor but beneficial.

This impact would be the same as Impact Socio-8 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta

Impact Socio-9 (CP5): Potential Temporary Increase in Indirect Employment in Construction-Related Businesses of the Lower Sacramento River and Delta
Construction activities associated with CP5 would have the potential to result in a short-term increase in indirect employment within the lower Sacramento River and Delta portion of the extended study area. Depending on the location of construction materials sourced outside of the primary study area, indirect increases in employment within construction-related businesses may result in the lower Sacramento River and Delta area. This impact would be minor but beneficial.

This impact would be similar to Impact Socio-9 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-10 (CP5): Short-Term Increases in Sales and Profits for Businesses in the Lower Sacramento River and Delta Area that Support the Construction Industry A small amount of the construction materials used for CP5 would be purchased within the extended study area. These purchases are predicted to increase sales and profits of some businesses within the lower Sacramento River and Delta area over the 5-year construction period of CP5. This impact would be minor but beneficial.

This impact would be similar to Impact Socio-10 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-11 (CP5): Short-Term Increase in State Sales and Income Tax Revenues in the Lower Sacramento River and Delta Area from Construction-Related Personal Income and Purchases In addition to local tax revenues, CP5 is expected to increase short-term construction-related State sales and income tax revenues received from businesses and residents of the lower Sacramento River and Delta portion of the extended study area. These additional revenues are expected to be cycled back to local government coffers through statewide programs and policies. This impact would be minor but beneficial.

This impact would be similar to Impact Socio-11 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-12 (CP5): Long-Term Reduction in the Adverse Economic Effects of Flooding in the Lower Sacramento River and Delta Area As a result of the added reservoir capacity under CP5, the overall risk of flooding and its related consequences below Shasta Dam would be reduced. Although heavy rain events would continue to occur in the region, and potentially increase with global climate change, CP5 is intended to provide greater flexibility in flood control in the lower Sacramento River and Delta area because of the increased capacity of the reservoir. As a result, less damage to existing structures and a smaller loss of potential future development would occur; this, in turn, would reduce salary and wage losses for residents in and near the lower Sacramento River floodplain and the Delta resulting from these catastrophic events, as well as would reduce business and personal income losses from such damage. Therefore, this impact would be beneficial.

This impact would be similar to Impact Socio-12 (CP3) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

CVP/SWP Service Areas

Impact Socio-13 (CP5): Short-Term Increases in Sales and Profits for Businesses in the CVP and SWP Service Areas that Support the Construction Industry A small amount of the construction materials used during construction under CP5 would be purchased within the extended study area, including the CVP and SWP service areas. These purchases are predicted to increase sales and profits of some businesses within the CVP and SWP service areas over the 5-year construction period of CP5. This impact would be minor but beneficial.

This impact would be similar to Impact Socio-13 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-14 (CP5): Potential Temporary Reduction in Shasta Project Water or Hydropower Supplied to the CVP and SWP Service Areas During

Construction Implementation of CP5 may require temporarily reducing the reservoir level at critical times during the construction period. This reduction in the reservoir level could temporarily reduce the amount of water or hydropower available from the dam and related hydropower infrastructure. Should this occur, sources of replacement water or hydropower would need to be secured. If these replacement resources were substantially more expensive, a minor negative effect on water or power customers may result. This impact would be potentially significant.

This impact would be similar to Impact Socio-14 (CP3) and would be potentially significant. Mitigation for this impact is proposed in Section 16.3.5, "Mitigation Measures."

Impact Socio-15 (CP5): Short-Term Increase in State Sales and Income Tax Revenues in the CVP and SWP Service Areas from Construction-Related Personal Income and Purchases In addition to local tax revenue, CP5 is expected to increase short-term construction-related State sales and income tax revenues received from some businesses and residents of the CVP and SWP service areas. These additional revenues are expected to be cycled back to local government coffers through statewide programs and policies. This impact would be minor but beneficial.

This impact would be similar to Impact Socio-15 (CP3) and would be minor but beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-16 (CP5): Long-Term Increase in Agricultural Income and Jobs in the CVP and SWP Service Areas as a Result of Improved Water Availability and Reliability Based on SWAP modeling, improved water availability and reliability expected to result from implementation of CP5 would substantially increase agricultural net income in the CVP and SWP service areas. This increase in production would contribute substantially to the continuation of this already strong industry in California. This impact would be beneficial.

This impact would be similar to Impact Socio-16 (CP3). The increase in the availability and reliability of water associated with implementation of CP5 would result in the long-term increase in indirect employment within the agricultural sector; however, this indirect increase is expected to be slightly less than under CP3. Based on the outputs of SWAP modeling, CP5 would generate an additional $2.6 million in net income during normal years and up to $5.7 million during dry years, when compared to existing conditions. In wet years, net income under CP5 is projected to increase to $3.4 million. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Socio-17 (CP5): Reduction in Risk of Potential Water and Power Shortages (and Related Economic Activity) in the CVP and SWP Service Areas as a Result of Long-Term Improvements to Water and Power Supply Reliability

Implementation of CP5 would substantially increase Shasta Dam's storage capacity. As stated in Impact Socio-16 (CP5), this additional storage capacity would improve long-term water availability and reliability in the CVP and SWP service areas. Beyond increasing agricultural production, this improved availability and reliability would reduce the long-term risk of urban water and power shortages, and their related adverse economic consequences. This impact would be beneficial.

This impact would be the similar to the other CPs and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

16.3.5 Mitigation Measures

Table 16-1 presents a summary of mitigation measures for socioeconomics, population, and housing.

Table 16-1. Summary of Mitigation Measures for Socioeconomics, Population, and Housing

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact Socio-1 (No-Action): Potential for Reduced Employment Opportunities for Lower Sacramento River and Delta Area Residents	LOS before Mitigation	PS	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
Impact Socio-1 (CP1–CP5): Short-Term Increase in Population and Housing Demand in the Primary Study Area Resulting from Construction-Related Activities	LOS after Mitigation	PS	LTS	LTS	LTS	LTS	LTS
Impact Socio-2 (No-Action): Potential for Temporary Disruptions in Business and Industrial Activity in the Lower Sacramento River and Delta Area	LOS before Mitigation	PS	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
Impact Socio-2 (CP1–CP5): Short-Term Increases in Direct, Indirect, and Induced Employment in the Primary Study Area Related to Construction Activities	LOS after Mitigation	PS	B	B	B	B	B
Impact Socio-3 (No-Action): Potential for Reduced Employment Opportunities for Residents Within the CVP and SWP Service Areas	LOS before Mitigation	PS	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
Impact Socio-3 (CP1–CP5): Potential for Temporary Reduction in the Labor Force of Related Industrial Sectors in the Primary Study Area as a Result of Direct Construction-Related Employment	LOS after Mitigation	PS	LTS	LTS	LTS	LTS	LTS
Impact Socio-4 (No-Action): Potential for Temporary Disruptions in Business and Industrial Activity in the CVP and SWP Service Areas	LOS before Mitigation	PS	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
Impact Socio-4 (CP1–CP5): Short-Term Increases in Direct, Indirect, and Induced Personal Income Paid to Employees in the Primary Study Area Hired for Construction-Related Activities	LOS after Mitigation	PS	B	B	B	B	B

Table 16-1. Summary of Mitigation Measures for Socioeconomics, Population, and Housing (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/CVP 4A	CP5
Impact Socio-5: Short-Term Increases in Sales and Profits for Businesses in the Primary Study Area that Support the Construction Industry	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B
Impact Socio-6: Short-Term Increase in State and Local Sales Tax Revenues in the Primary Study Area from Construction-Related Personal Income and Purchases	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B
Impact Socio-7: Long-Term Reduction in the Adverse Economic Effects of Flooding in the Primary Study Area	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B
Impact Socio-8: Long-Term Increases in Direct Employment in the Primary Study Area Related to Project Operations	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B
Impact Socio-9: Potential Temporary Increase in Indirect Employment in Construction-Related Businesses of the Lower Sacramento River and Delta	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B
Impact Socio-10: Short-Term Increases in Sales and Profits for Businesses in the Lower Sacramento River and Delta Area that Support the Construction Industry	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B
Impact Socio-11: Short-Term Increase in State Sales and Income Tax Revenues in the Lower Sacramento River and Delta Area from Construction-Related Personal Income and Purchases	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B
Impact Socio-12: Long-Term Reduction in the Adverse Economic Effects of Flooding in the Lower Sacramento River and Delta Area	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B

Table 16-1. Summary of Mitigation Measures for Socioeconomics, Population, and Housing (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact Socio-13: Short-Term Increases in Sales and Profits for Businesses in the CVP and SWP Service Areas that Support the Construction Industry	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B
Impact Socio-14: Potential Temporary Reduction in Shasta Project Water or Hydropower Supplied to the CVP and SWP Service Areas during Construction	LOS before Mitigation	NA	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Socio-14: Secure Replacement Water or Hydropower During Project Construction.				
	LOS after Mitigation	NA	LTS	LTS	LTS	LTS	LTS
Impact Socio-15: Short-Term Increase in State Sales and Income Tax Revenues in the CVP and SWP Service Areas from Construction-Related Personal Income and Purchases	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B
Impact Socio-16: Long-Term Increase in Agricultural Income and Jobs in the CVP and SWP Service Areas as a Result of Improved Water Availability and Reliability	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B
Impact Socio-17: Reduction in Risk of Potential Water and Power Shortages (and Related Economic Activity) in the CVP and SWP Service Areas as a Result of Long-Term Improvements to Water and Power Supply Reliability	LOS before Mitigation	NA	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NA	B	B	B	B	B

Key:
B = beneficial
CP = Comprehensive Plan
CVP = Central Valley Project
LOS = level of significance
LTS = less than significant
NA = not applicable
PS = potentially significant
SWP = State Water Project

No-Action Alternative

No mitigation measures are needed for this alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is needed for Impacts Socio-1 (CP1) through Socio-13 (CP1) and Impacts Socio-15 (CP1) through Socio-17 (CP1). Mitigation is provided below for the other impact of CP1.

Mitigation Measure Socio-14 (CP1): Secure Replacement Water or Hydropower During Project Construction To address potential temporary shortages in water or hydropower caused by reduced availability at Shasta Dam during construction, replacement water or hydropower supplies would need to be sourced elsewhere to maintain current service needs. Depending on the conditions of the water or energy markets at the time of need, these replacement resources could be more expensive than water or hydropower obtained from Shasta Dam. The additional expense of obtaining water or hydropower resources could potentially produce a minor negative effect on water and power customers, if replacement of these resources is substantially more expensive.

To eliminate the potential impact of project construction on water and/or hydropower purchases, Reclamation will identify the need for replacement water or hydropower early in project implementation and will secure such resources at the lowest cost possible. Replacement water or hydropower would be available from a number of sources within or external to the CVP. Reclamation will provide these replacement resources to business and industry in the CVP and SWP service areas at costs comparable to water or hydropower obtained from Shasta Dam. Reclamation will provide replacement water or hydropower at levels equal to the loss of water or hydropower caused by project construction.

Implementation of this mitigation measure would reduce Impact Socio-14 (CP1) to a less-than-significant level.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is needed for Impacts Socio-1 (CP2) through Socio-13 (CP2) and Impacts Socio-15 (CP2) through Socio-17 (CP2). Mitigation is provided below for the other impact of CP2.

Mitigation Measure Socio-14 (CP2): Secure Replacement Water or Hydropower during Project Construction This mitigation measure is identical to Mitigation Measure Socio-14 (CP1). Implementation of this mitigation measure would reduce Impact Socio-14 (CP2) to a less-than-significant level.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

No mitigation is needed for Impacts Socio-1 (CP3) through Socio-13 (CP3) and Impacts Socio-15 (CP3) through Socio-17 (CP3). Mitigation is provided below for the other impact of CP3.

Mitigation Measure Socio-14 (CP3): Secure Replacement Water or Hydropower During Project Construction This mitigation measure is identical to Mitigation Measure Socio-14 (CP1). Implementation of this mitigation measure would reduce Impact Socio-14 (CP3) to a less-than-significant level.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

No mitigation is needed for Impacts Socio-1 (CP4 and CP4A) through Socio-13 (CP4 and CP4A) and Impacts Socio-15 (CP4 and CP4A) through Socio-17 (CP4 and CP4A). Mitigation is provided below for the other impact of CP4 or CP4A.

Mitigation Measure Socio-14 (CP4 and CP4A): Secure Replacement Water or Hydropower During Project Construction This mitigation measure is identical to Mitigation Measure Socio-14 (CP1). Implementation of this mitigation measure would reduce Impact Socio-14 (CP4 and CP4A) to a less-than-significant level.

CP5 – 18.5-Foot Dam Raise, Combination Plan

No mitigation is needed for Impacts Socio-1 (CP5) through Socio-13 (CP5) and Impacts Socio-15 (CP5) through Socio-17 (CP5). Mitigation is provided below for the other impact of CP5.

Mitigation Measure Socio-14 (CP5): Secure Replacement Water or Hydropower During Project Construction This mitigation measure is identical to Mitigation Measure Socio-14 (CP1). Implementation of this mitigation measure would reduce Impact Socio-14 (CP5) to a less-than-significant level.

16.3.6 Cumulative Effects

Chapter 3, “Considerations for Describing the Affected Environment and Environmental Consequences,” gives an overview of the cumulative effects analysis, including the relationship to the CALFED Bay-Delta Program Programmatic EIS/EIR cumulative impacts analysis, qualitative and quantitative assessment, past and future actions in the study area, and significance criteria. Table 3-1, “Present and Reasonably Foreseeable Future Actions Included in the Analysis of Cumulative Impacts, by Resource Area,” in Chapter 3, lists the present and reasonably foreseeable future projects considered quantitatively and qualitatively within the cumulative impacts analysis. This cumulative impacts analysis accounts for potential project impacts combined with the impacts of

existing facilities, conditions, land uses, and reasonably foreseeable actions expected to occur in the study area on a qualitative and quantitative level. Projects listed in Table 3-1 that could contribute to cumulative impacts on socioeconomics, population and housing in the primary and extended study area include, but are not limited to, projects listed under Quantitative Analysis and those projects under Qualitative Analysis that include Los Vaqueros Reservoir Expansion, Bay-Delta Conservation Plan, Upper San Joaquin River Basin Storage Investigation, and Mountain Gate at Shasta Mixed Use Area Plan.

Water reliability and electrical demand are expected to become increasingly important issues as demand for water and electricity increases to meet the needs of California's growing population. Over time, water conservation and reuse efforts will increase and water provision is expected to shift from such areas as agricultural production to urban uses. Environmental restoration, flood control, and hydropower generation are expected to continue in a manner similar to existing conditions.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Primary Study Area In the primary study area, effects related to increases in population and housing during construction under CP1 would be less than significant. In combination with past, present, and reasonably foreseeable future projects, this incremental contribution to overall increases in population and housing demand would not be significant or cumulatively considerable. The combined effect of these projects and the SLWRI would not induce substantial growth in population, produce a substantial burden on the existing housing stock within the local community, or require sizeable numbers of workers from outside the local area. Implementing CP1 would result in beneficial effects on employment and the labor force, business and industrial activity, and government and finance. Thus, the project would not result in a cumulatively considerable incremental contribution to significant cumulative impacts on socioeconomic resources.

Extended Study Area Without mitigation, CP1 could cause a potentially significant adverse effect on business and industrial activity in the CVP and SWP service areas. This adverse effect would be a potential temporary reduction in Shasta project water or hydropower supplied to CVP and SWP service areas during construction. With implementation of Mitigation Measure Socio-14 (CP1), adverse effects from CP1 would be fully mitigated because Reclamation would secure replacement water or hydropower during project construction. Therefore, the project would not make a cumulatively considerable incremental contribution to a significant cumulative impact related to the temporary construction-related reduction in water or hydropower supplies to the CVP and SWP service areas.

Implementing CP1 also would result in beneficial effects on employment and the labor force, business and industrial activity, and government and finance.

Thus, the project would not result in a cumulatively considerable incremental contribution to significant cumulative impacts on socioeconomic resources.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Primary Study Area In the primary study area, effects related to increases in population and housing during construction under CP2 would be less than significant. In combination with past, present, and reasonably foreseeable future projects, this incremental contribution to overall increases in population and housing demand would not be significant or cumulatively considerable. The combined effect of these projects and the SLWRI would not induce substantial growth in population, produce a substantial burden on the existing housing stock within the local community, or require sizeable numbers of workers from outside the local area. Implementing CP2 would cause beneficial effects on employment and the labor force, business and industrial activity, and government and finance. Overall, the beneficial effects of CP2 in the primary study area would be greater than those of CP1. Thus, the project would not result in a cumulatively considerable incremental contribution to significant cumulative impacts on socioeconomic resources.

Extended Study Area The adverse effects of CP2 would be the same as those of CP1. With implementation of Mitigation Measure Socio-14 (CP2), adverse effects from CP2 would be fully mitigated because Reclamation would secure replacement water or hydropower during project construction. Therefore, the project would not make a cumulatively considerable incremental contribution to significant cumulative impacts related to the temporary reduction in water or hydropower supplies to the CVP and SWP service areas.

Implementing CP2 would result in less-than-significant impacts on population and housing and also would have beneficial impacts on employment and the labor force, business and industrial activity, and government and finance. Overall, the beneficial effects of CP2 in the extended study area would be greater than those of CP1. Thus, the project would not result in a cumulatively considerable incremental contribution to significant cumulative impacts on socioeconomic resources.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

Primary Study Area In the primary study area, effects related to increases in population and housing during construction under CP3 would be less than significant. In combination with past, present, and reasonably foreseeable future projects, this incremental contribution to increases in population and housing demand would not be significant or cumulatively considerable. The combined effect of these projects and the SLWRI would not induce substantial growth in population, produce a substantial burden on the existing housing stock within the local community, or require sizeable numbers of workers from outside the local area. CP3 would have beneficial impacts on employment and the labor

force, business and industrial activity, and government and finance. Overall, the beneficial effects of CP3 in the primary study area would be greater than those of CP1 and CP2. Thus, the project would not result in a cumulatively considerable incremental contribution to significant cumulative impacts on socioeconomic resources.

Extended Study Area The adverse effects of CP3 would be the same as those of CP1. With implementation of Mitigation Measure Socio-14 (CP3), adverse impacts from CP3 would be fully mitigated because Reclamation would secure replacement water or hydropower during project construction. Therefore, the project would not make a cumulatively considerable incremental contribution to significant cumulative impacts related to the temporary reduction during construction in water or hydropower supplies to the CVP and SWP service areas.

Implementing CP3 would result in less-than-significant impacts on population and housing and also would have beneficial effects on employment and the labor force, business and industrial activity, and government and finance. Overall, the beneficial effects of CP3 in the extended study area would be greater than those of CP1 and CP2. Thus, the project would not result in a cumulatively considerable incremental contribution to significant cumulative impacts on socioeconomic resources.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

Primary Study Area In the primary study area, effects related to increases in population and housing during the construction of CP4 or CP4A would be less than significant. In combination with past, present, and reasonably foreseeable future projects, this incremental contribution to increases in population and housing demand would not be significant or cumulatively considerable. The combined effect of these projects and the SLWRI would not induce substantial growth in population, produce a substantial burden on the existing housing stock within the local community, or require sizeable numbers of workers from outside the local area. CP4 or CP4A would have beneficial impacts on employment and the labor force, business and industrial activity, and government and finance. Overall, in the primary study area, the beneficial impacts of CP4 or CP4A would be the same as those of CP3. Thus, the project would not result in a cumulatively considerable incremental contribution to cumulative significant impacts on socioeconomic resources.

Extended Study Area The adverse impacts of CP4 would be the same as those of CP1. The adverse impacts of CP4A would be the same as those of CP2.With implementation of Mitigation Measure Socio-14 (CP4 and CP4A), adverse effects from CP4 or CP4A would be fully mitigated because Reclamation would secure replacement water or hydropower during project construction. Therefore, the project would not make a cumulatively considerable incremental contribution to significant cumulative impacts related

to the temporary reduction in water or hydropower supplies to the CVP and SWP service areas.

The implementation of CP4 or CP4A would result in less-than-significant impacts on population and housing and also would have beneficial impacts on employment and the labor force, business and industrial activity, and government and finance. In the extended study area, the beneficial impacts of CP4 or CP4A for population and housing, employment, and the labor force would be the same as those of CP3. For business and industrial activity, CP4 or CP4A would be more beneficial than CP3. Thus, the project would not result in a cumulatively considerable incremental contribution to significant cumulative impacts on socioeconomic resources.

CP5 – 18.5-Foot Dam Raise, Combination Plan

Primary Study Area In the primary study area, effects related to increases in population and housing during construction under CP5 would be less than significant. In combination with past, present, and reasonably foreseeable future projects, this incremental contribution to increases in population and housing demand would not be significant or cumulatively considerable. The combined effects of these projects and the SLWRI would not induce substantial growth in population, produce a substantial burden on the existing housing stock within the local community, or require sizeable numbers of workers from outside the local area. CP5 would cause beneficial impacts on employment and the labor force, business and industrial activity, and government and finance. Overall, in the primary study area, the beneficial effects of CP5 would be the similar to those of CP3. Thus, the project would not result in a cumulatively considerable incremental contribution to significant cumulative impacts on socioeconomic resources.

Extended Study Area The adverse effects of CP5 would be the same as those of CP1. With implementation of Mitigation Measure Socio-14 (CP5), adverse effects from CP5 would be fully mitigated because Reclamation would secure replacement water or hydropower during project construction. Therefore, the project would not make a cumulatively considerable incremental contribution to significant cumulative impacts related to the temporary reduction during construction in water or hydropower supplies to the CVP and SWP service areas.

Implementing CP5 would result in less-than-significant impacts on population and housing and also would have beneficial impacts on employment and the labor force, business and industrial activity, and government and finance. Overall, in the extended study area, the beneficial effects of CP5 would be similar to those of CP3. Thus, the project would not result in a cumulatively considerable incremental contribution to significant cumulative impacts on socioeconomic resources.

Chapter 17
Land Use and Planning

17.1 Affected Environment

This chapter describes the affected environment related to land uses and planning for the dam and reservoir modifications proposed under SLWRI action alternatives.

Because of the potential influence of the proposed modification of Shasta Dam and water deliveries over a large geographic area, the SLWRI includes both a primary study area and an extended study area. The primary study area has been further divided into Shasta Lake and vicinity and the upper Sacramento River (Shasta Dam to Red Bluff). The extended study area has been further divided into the lower Sacramento River and Delta and the CVP/SWP service areas (Figure 1-3).

The setting for land uses and planning in the Shasta Lake and vicinity portion of the primary study area consists of the portion of Shasta County north of Shasta Dam. This area encompasses Shasta Lake, lands surrounding the lake, and parts of the Pit River, Squaw Creek, McCloud River, and Sacramento River watersheds. Land use and planning in this area are influenced by land ownership, the presence of rural lakeside communities, and topography.

The setting for land uses and planning in the upper Sacramento River portion of the primary study area consists of the portion of Shasta County south of Shasta Dam and Tehama County. The incorporated cities of Shasta Lake, Redding, Anderson, and Red Bluff, all located along the Interstate 5 (I-5) corridor, establish urban settings in the otherwise rural upper Sacramento Valley. The upper Sacramento Valley is characterized by rolling hills with mountains to the north, east, and west. Land use and planning in this area are influenced by land ownership, historic land use patterns, topography, and population densities.

The land use and planning setting for the extended study area consists of 24 counties downstream from the Red Bluff Pumping Plant and encompasses all areas served by the CVP and the SWP. Land use and planning in the extended study area are influenced by the same factors identified for the upper Sacramento River study area. The type and focus of land use and planning may vary, however, in the large urban areas located in the extended study area.

17.1.1 Land Use

Shasta Lake and Vicinity

Land uses in the Shasta Lake and vicinity portion of the primary study area consist primarily of open space and other land uses that support recreational activities in the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA). The Shasta-Trinity National Forest (STNF) manages the Shasta Unit of the NRA. Federally managed lands in the NRA total 235,740 acres, including Shasta Lake; lands held in private ownership total 10,347 acres. The U.S. Department of the Interior, Bureau of Land Management (BLM) manages the Shasta-Chappie Off-Highway Vehicle (OHV) area and other public lands immediately west of Shasta Lake; this area extends south towards Keswick Dam on both sides of the Sacramento River. The Federal lands immediately surrounding Shasta Dam and related facilities are managed by Reclamation. In addition, the California Department of Transportation (Caltrans) manages the I-5 corridor and the Union Pacific Railroad (UPRR) manages the rail corridor that crosses the primary study area (Figure 17-1).

The *Shasta-Trinity National Forest Land and Resource Management Plan* (LRMP) (USFS 1995) specifies several land allocations for National Forest System (NFS) lands managed by the Shasta Lake Ranger District within and adjacent to the Shasta Unit of the NRA. NFS lands in the primary study area are allocated as Late-Successional Reserves (LSR), Managed Late-Successional Areas, and other Threatened, Endangered, or Sensitive Species, Riparian Reserves, Administratively Withdrawn Areas, and Matrix.

LSRs and Administratively Withdrawn Areas each account for 20 percent of the land use designations in the NRA. Riparian Reserves, the largest land use designation in the NRA, are located in areas along rivers, streams, lakes, and wetlands, including the area inundated by Shasta Lake. Riparian Reserves were established to provide connectivity between LSRs and the Matrix throughout the NRA.

Approximately 25 percent of the land managed by the STNF within the boundary of the NRA is designated as either Administratively Withdrawn Areas or Matrix. Lands allocated as withdrawn were identified in the STNF LRMP as management emphasis areas where scheduled timber harvest is precluded. The Matrix consists of other Federal lands outside the categories described above that may be managed for timber or other resource purposes and are not subject to certain standards and guidelines.

STNF LRMP direction for the Shasta Unit of the NRA is to: (1) provide public outdoor recreation opportunities; (2) conserve scenic, scientific, historic, and other values that contribute to public enjoyment; and (3) manage, use, and dispose of renewable natural resources, which will promote, but not significantly impair, public recreation or conservation of scenic, scientific, historic or other values contributing to public enjoyment (36CFR292.11).

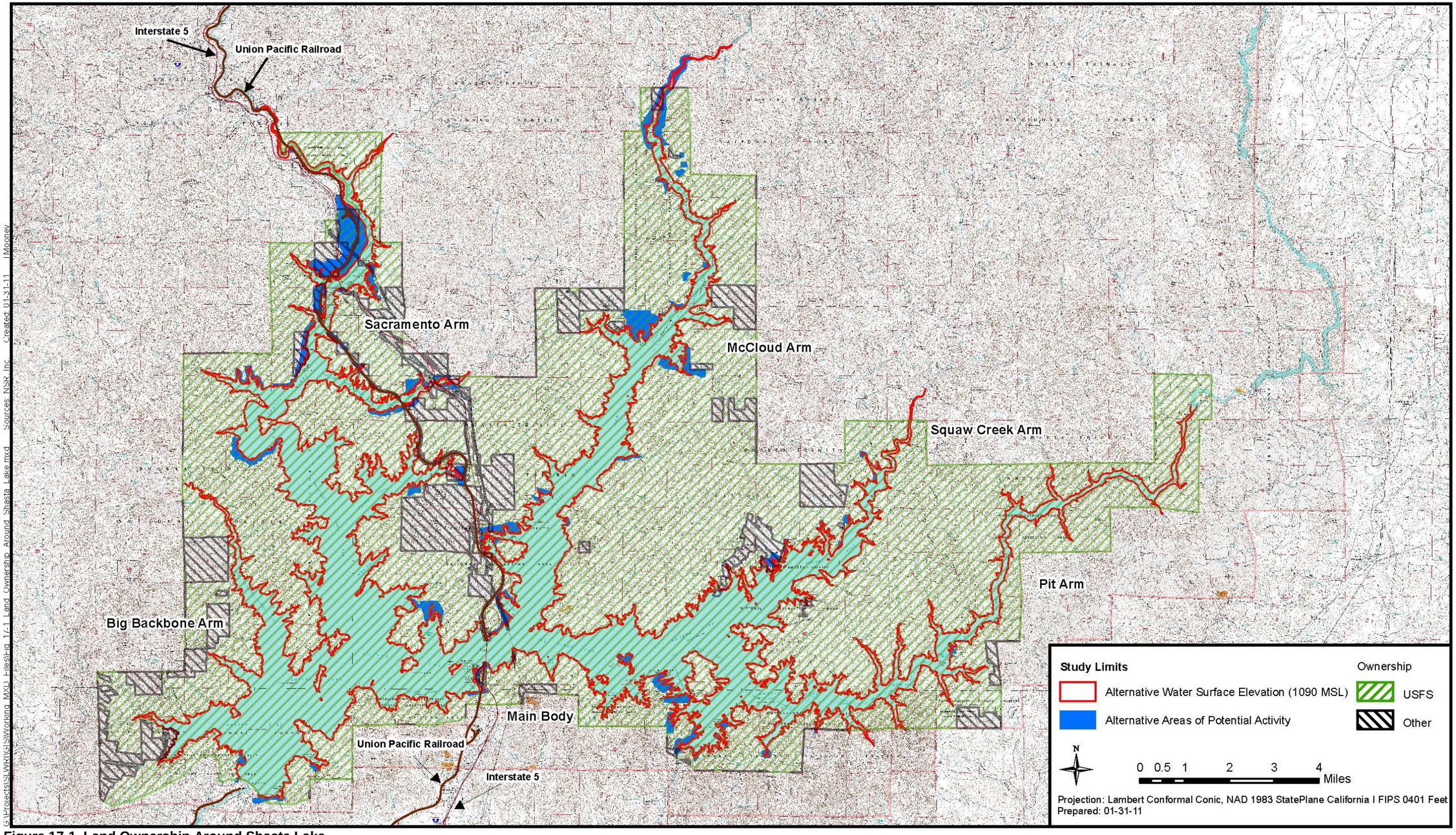

Figure 17-1. Land Ownership Around Shasta Lake

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Developed recreational and commercial land uses occupy 2 percent of the land managed by the STNF within the Shasta Unit of the NRA. Recreational use in the NRA exceeds 2 million visitor days annually. Water-oriented activities, such as boating, fishing, waterskiing, and houseboating, are the main attractions. Marinas that currently operate on Shasta Lake include Antlers, Sugarloaf, Shasta, Holiday Harbor, Packers Bay, Bridge Bay, Silverthorn, Jones Valley, and Digger Bay. Other recreational land uses include hiking, camping, picnicking, and OHV activities. A planning permit was issued by the STNF to decommission Digger Bay and construct a new marina at Turntable Bay, but the permit was not exercised and has since been revoked.

Commercial land uses in the NRA include resorts, marinas, campgrounds, restaurants, motels, grocery stores, and service stations. Resorts are sometimes operated as stand-alone entities, but are more typically operated in conjunction with a marina. Some resorts on Shasta Lake must move their docks substantial distances from their land-based facilities during periods of low water levels.

USFS manages recreation residence tracts at Salt Creek, Silverthorn, Campbell Creek, and Didallis Creek; these tracts combined contain 160 privately owned cabins on NFS lands. USFS policy is to manage these tracts and residences for individual recreational use and to keep the areas as close as possible to their natural state. Only minimal improvements are permitted, and structures must blend into the natural environment.

Mining and grazing do not take place in the NRA. There are no grazing permits authorized for the Shasta Unit of the NRA, primarily because of a lack of suitable range. Federal lands in the NRA, except those with valid existing rights, were withdrawn from mineral entry by the legislation that created the NRA. Reclamation and USFS conducted validity determinations on most of the claims existing at that time and contested the majority of them based on the absence of a valid discovery. There were five claims in the Shasta Unit of the NRA (See Page II-12 of the NRA Guide, STNF 1996) that predate the withdrawal; these claims have not been developed and are considered closed by the USFS. The lands covered by these claims remain open to mineral leasing. Hard rock minerals in the NRA are available for prospecting, exploration, and development under solid mineral leasing regulations (43 Code of Federal Regulations (CFR) Subpart 3583). Authorization for this land use requires permits and leases subject to approval by the Secretary of Agriculture and terms and conditions of the USFS to protect the values of the NRA.

There are two Inventoried Roadless Areas (IRA) that are managed by the STNF within and adjacent to the NRA boundary. Geographic information system (GIS) information provided by the USFS indicates that the boundaries of these IRAs coincide with the current full-pool elevation of Shasta Lake. The Backbone IRA encompasses 11,464 acres and is adjacent to the shoreline of Shasta Lake at two locations; 1.9 miles along the Big Backbone Arm and 5.8 miles along the Sacramento Arm. The Devils Rock IRA encompasses 16,207

acres on the STNF; 12.9 miles of this IRA are adjacent to the Pit Arm of Shasta Lake.

Land uses on privately owned lands in the NRA generally consist of commercial, recreational, and residential land uses associated with the NRA. Approximately 20 percent of the privately held lands in the NRA are developed. Commercial development consists primarily of service industries supporting residents and recreational visitors.

Residential land uses are typically characterized as low density and rural. Established small communities along Shasta Lake include Lamoine, Lakehead, Lakeshore, and Sugarloaf, which are located on the Sacramento Arm of Shasta Lake. Farther south is the residential community of O'Brien, which is located between the Sacramento and McCloud arms near I-5.

The McCloud River, which flows into Shasta Lake in the primary study area, is eligible for listing as wild and scenic under the Federal Wild and Scenic Rivers Act (Federal WSRA). In addition, although it is not State of California (State)-listed as wild and scenic, the McCloud River receives certain protections under the California Public Resources Code (PRC), Section 5093.542, established through enactment of the California Wild and Scenic Rivers Act, as amended (Sections 5093.50–5093.70). The effects of the proposed enlargement of Shasta Lake on the McCloud River are discussed in Chapter 25, "Wild and Scenic River Considerations for McCloud River," of this EIS.

The Sacramento River above Shasta Dam was also identified as eligible for listing as wild and scenic under the Federal WSRA in Appendix E to the Final EIS for the STNF LRMP. The USFS acknowledged this segment was eligible (Recreation) based on the presence of four outstandingly remarkable values (ORV); Cultural/Historical, Fisheries, Geology, Visual Quality/Scenery. The limited amount of land managed by the STNF along this segment (14 percent of the segment corridor) precluded the USFS decision to move the eligibility process forward; the agency determined it did not have the ability to manage these ORVs.

Upper Sacramento River (Shasta Dam to Red Bluff)

Land uses in the upper Sacramento River area consist of urban, residential, municipal and industrial, and agricultural uses. Urban development is located in the valley and is concentrated along the transportation corridors provided by I-5, State Route 273, and the UPRR. Incorporated cities located in the valley along I-5 in the upper Sacramento River study area are the cities of Shasta Lake, Redding, Anderson, and Red Bluff. Cottonwood, an unincorporated community located along the I-5 corridor, also has residential and commercial development.

Small rural communities characterize development patterns between Cottonwood and Lakehead on either side of the I-5 corridor. Many of these communities have their origins in the early settlement of Shasta County and

Tehama County, as evidenced by the agriculture, grazing, and timber operations typical of the upland areas. These communities usually consist of small community centers surrounded by vast tracts of fields and forest that are dotted with home sites (Shasta County 2004).

The northern, western, and eastern portions of Shasta County are relatively uninhabited because the lands in these areas are managed by USFS for timber, wildlife, and wilderness uses. Lands managed by USFS in the western and southeastern portions of Tehama County are also relatively uninhabited.

The National Park Service manages lands in the upper Sacramento River study area, including the Whiskeytown Unit of the NRA, west of Keswick, and Lassen Volcanic National Park, in the northeastern corner of Tehama County. The BLM manages the 12,194-acre Sacramento River Bend Management Area on the east side of the Sacramento River northeast of Red Bluff.

The National Rivers Inventory (NRI) identified three segments of the Sacramento River that are eligible for inclusion in the national Wild and Scenic River System that could be affected by the proposal to raise Shasta Dam. No segments of river have been designated as a wild and scenic river under Federal law in either the Sacramento or McCloud River systems.

Three segments lie on the Sacramento River below the Shasta Dam. These were evaluated in the BLM's Redding Resource Management Plan (RMP: A-16) and are briefly described in Table 17-1.

Table 17-1. Sacramento River – Eligible Segments From NRI and BLM RMP

River	Potentially Affected Eligible Segment	ORVs	Responsible Federal Agency
Sacramento	Below Shasta Dam, Arnold Bend above Colusa to Red Bluff Diversion Dam.	Recreation and Fishing	Bureau of Land Management; US Fish and Wildlife Service (Corning to Colusa)
Sacramento	Below Shasta Dam, Interstate Highway 5 bridge crossing immediately north of Red Bluff to Interstate Highway 5 bridge crossing at Anderson.	Scenery, Recreation, Fishing, Wildlife and Other Values.	Bureau of Land Management
Sacramento	Below Shasta Dam, Balls Ferry Bridge to gaging station below Sevenmile Creek	Scenery, Recreation, Fishing, Heritage	Bureau of Land Management

Key:
BLM = Bureau of Land Management
NRI = National Rivers Inventory
ORV = outstandingly remarkable value
RMP = Resource Management Plan

Lower Sacramento River and Delta

Land uses in the extended study area vary greatly because of differences in population, economy, and environment. Land uses in the Sacramento Valley are principally agricultural and open space, with urban development focused around the State capital in the Sacramento metropolitan area. The primary private land use in the region is agriculture. Urban development has occurred along major highway corridors, primarily in Sacramento, Placer, El Dorado, Yolo, Solano, and Sutter counties, and has caused some agricultural land to be taken out of production. For those lands that remain agricultural, soil conditions allow a wide variation in the types of crops grown.

The American River flows into the Sacramento River downstream from Nimbus Dam; its watershed is included in the lower Sacramento River and Delta portion of the extended study area. Two sections of the American River, the North Fork American River from its source in the Sierra Nevada to the Iowa Hill Bridge near Colfax and the lower American River from Nimbus Dam to the river's confluence with the Sacramento River in the City of Sacramento, are listed as wild and scenic under the Federal WSRA and the State PRC.

The listed segment of the North Fork American River is designated as a wild river under the Federal WSRA and the State PRC. The listed segment is above any regulated reaches and is not under the control of the CVP or SWP. The downstream end of the listed segment is more than 70 river miles and 50 air miles upstream from the confluence with the Sacramento River and is thus too far away to be affected by any hydraulic changes in the Sacramento River.

The lower American River is regulated by Folsom Dam, which is approximately seven miles upstream from Nimbus Dam. Both Shasta Dam and Folsom Dam release water in accordance with their operational requirements, including releases to maintain water quality for fisheries, municipal use, and agricultural use, and for exports to the San Joaquin Valley. Both dams have operational requirements for the sections of the Sacramento and lower American rivers above their confluence, and they also have shared operational requirements for the Sacramento River and Delta below the confluence. Therefore, operational changes at one dam could require operational changes at the other. For example, reduced releases from Shasta Dam could require increased releases from Folsom Dam to meet flow requirements in the lower Sacramento River and Delta.

The lower American River is designated as a recreational river under the Federal WSRA and the PRC. Fishing and boating, including rafting and canoeing, are the primary recreational activities on the river. In addition, much of the lower American River's south shore is part of the American River Parkway. Joggers, bicyclists, walkers, and other users take advantage of the riverside trails and beaches of this extensive park system.

As shown on Table 17-1, one segment of the Sacramento River is listed as eligible for consideration under the Federal WSRA. The USFWS manages several wildlife refuges adjacent to this segment of the river between Corning and Colusa, California.

CVP/SWP Service Areas

The CVP, operated by Reclamation, is the largest water storage and delivery system in California, covering 29 of the State's 58 counties. Most of the CVP service area is in the Central Valley, and about 90 percent of the south-of-Delta contractual delivery is for agricultural uses (Reclamation 2007).

Most of the population of the CVP service area is concentrated within urban areas. The CVP service area includes various municipal and industrial water contractors and water districts that serve portions of the Sacramento and Stockton metropolitan areas and the San Francisco Bay Area. Outside these population centers, most of the CVP service area is rural, with irrigated agriculture the predominant land use and economic driver (Reclamation 2007).

SWP water is delivered to contracting agencies in Northern California, the San Francisco Bay Area, the Central Coast, San Joaquin Valley, and Southern California.

Land uses in the CVP/SWP service areas vary and include agricultural, municipal and industrial, commercial, open space, grazing, and timber production.

17.1.2 Planning

Shasta Lake and Vicinity

Federal Land Use Planning Federal lands are not subject to county or city general plans. Land use planning direction for the NRA is guided by Public Law 89-336 and associated regulations (including 36 CFR Part 292, Subpart B), USFS Directives, and management direction found in the STNF LRMP. As a result of more recent Congressional action, BLM manages all public lands west of the NRA including the Chappie-Shasta OHV Area. BLM also manages public lands along the Sacramento River corridor downstream from Shasta Dam to Red Bluff.

Shasta-Trinity National Forest Land and Resource Management Plan The STNF LRMP is based on three broad management strategies: preservation, biodiversity, and sustainable development for people. The objectives of the STNF LRMP are to:

- describe the desired conditions of NFS lands and resources;
- identify strategies to maintain or achieve those conditions;
- identify land areas as generally suitable or unsuitable for various uses;

- identify the guidelines for projects and activities; and
- identify areas with special or unique characteristics.

Projects and activities must be consistent with the applicable plan components. The STNF LRMP provides management direction at four integrated levels: (1) forest-wide direction, (2) land allocations and standards and guidelines, (3) management prescription direction, and (4) management area direction.

In addition to the land allocations described in the preceding section (LSRs, Riparian Reserves, Administratively Withdrawn Areas, and Matrix), there are a number of goals and associated standards and guidelines applicable to the SLWRI project with respect to NFS lands in the primary study area. Goals and associated standards and guidelines that describe the desired future condition of the STNF include:

- Lands
  - Plan for long-range land ownership adjustments that support resource objectives. Within and adjacent to the NRA, acquire available, undeveloped private lands needed to fulfill the management goals and objectives of the recreation resource program. Acquire those parcels of land that are specifically needed: (a) for public development; (b) to protect major visual resource values; (c) to protect prime wildlife habitat; and (d) to preserve important cultural values and make them available for public enjoyment.
  - Provide for continued use and new development of hydroelectric facilities.
  - During the project planning phase, consider the need for construction of trails, roads, and/or recreational facilities.

Seven land allocations apply to the STNF: Congressionally Reserved Areas (Wilderness Areas), LSRs, Managed Late-Successional Areas Administratively Withdrawn Areas, Riparian Reserves, Matrix, and Adaptive Management Areas (USFS 1995). There are no Congressionally Reserved Areas and Adaptive Management Areas in the primary study area so these allocations are not considered in this analysis.

The STNF LRMP requires each type of land use to be managed in accordance with applicable management prescriptions and the respective standards and guidelines pertaining to both land allocations and unique management areas. Lands allocated as LSRs, for example, have specific management objectives and standards and guidelines for air quality, biological diversity, fire and fuels,

etc. The applicable management prescriptions for the four land allocations in the primary study are discussed below.

- **Late-Successional Reserves, Managed Late-Successional Areas, and other Threatened, Endangered, or Sensitive Species** – LSRs have been established to protect and enhance conditions of late-successional and old-growth forest ecosystems and to ensure the support of related species, including the northern spotted owl. The applicable management prescription is:

  - Provide special management for Late Successional Reserves and Threatened, Endangered and Selected Sensitive Species that are primarily dependent on late seral stage conditions.

- **Administratively Withdrawn Areas** – These areas are identified in the STNF LRMP and include recreation and visual areas, backcountry, and other areas where management emphasis precludes scheduled timber harvesting. The applicable management prescriptions are:

  - **Unroaded Non-Motorized Recreation** – Provide for semi-primitive non-motorized recreation opportunities in unroaded areas outside existing wilderness areas while maintaining predominantly natural-appearing areas with only subtle modifications.

  - **Limited Roaded Motorized Recreation** – Provide for semi-primitive motorized recreation opportunities while maintaining predominantly natural-appearing areas with some modifications.

  - **Roaded, High Density Recreation** – Provide areas that are characterized by a substantially modified natural environment.

  - **Special Area Management** – Provide for protection and management of special interest areas and research natural areas.

  - **Heritage Resource Management** – The primary theme of this prescription is to protect designated cultural resource values, interpret significant archaeological and historical values for the public, and encourage scientific research of these selected properties.

- **Riparian Reserves** – Provide an area along streams, wetlands, ponds, lakes, and unstable and potentially unstable areas where riparian-dependent resources receive primary emphasis. The applicable management prescription is:

  - **Riparian Management** – Maintain or enhance riparian areas, wildlife and fisheries habitat, and water quality by emphasizing streamside and wetland management.

- **Matrix** – Includes Federal lands outside the categories of the designated areas listed above. There are no Matrix lands in the NRA. Matrix lands are where most timber harvest would occur and where standards and guidelines are in place to ensure appropriate conservation of ecosystems as well as provide habitat for rare and lesser known species. The applicable management prescriptions are:

    - **Roaded Recreation** – Provide for an area where there are moderate evidences of the sights and sounds of humans.

    - **Wildlife Habitat Management** – The primary purpose of this prescription is to maintain and enhance big game, small game, upland game bird, and nongame habitat to provide adequate hunting and viewing opportunities.

The STNF LRMP provides another more specific layer of land use planning guidance for the NRA: the *Management Guide: Shasta and Trinity Units of the Whiskeytown-Shasta-Trinity NRA* (USFS 2014). The Land Use and Ownership section of this document provides the following guidance for NRA lands managed by the STNF:

- Those private lands that would enhance outdoor recreation opportunities and/or the conservation of scenic, scientific, historic, and other values contributing to the public enjoyment of the NRA should be acquired as opportunities arise.

- Land exchanges will be pursued in accordance with the Forest Land Adjustment Guide. Lands directly adjacent to the shoreline will have the highest priority.

- Lands with significant known pollution sources arising from a history of mining discharge will not be acquired.

- Coordination will take place with Shasta County to allow those private land developments and resource production proposals that will maintain or enhance NRA values, and to disallow or phase out private land uses that detract from those values.

- Coordination will take place with county, State, and other Federal agencies on development, management, and regulatory oversight of recreation opportunities and facilities to ensure consistency with NRA objectives.

- Planning will take place with owners and managers of travel and utility corridors through the NRA (railroad, highway, and major power lines) to minimize the visual impacts of these corridors on the aesthetic value of the NRA.

On January 12, 2001, the Department of Agriculture adopted the rule that established prohibitions on road construction, reconstruction, and timber harvest in IRAs because they have the greatest likelihood of altering and fragmenting landscapes, resulting in immediate, long-term loss of IRA values and characteristics. Subsequently, the STNF finalized the boundaries of IRAs, including two areas adjacent to the Shasta Unit of the NRA; Backbone and Devils Rock.

The STNF coordinates with Shasta County to ensure that private development in the NRA maintains or enhances NRA values through local zoning regulations.

Mendocino National Forest Land and Resource Management Plan The management direction, objectives, and standards and guidelines of the Mendocino National Forest LRMP are applicable to an isolated 488-acre parcel of land managed by the Mendocino National Forest along the east bank of the Sacramento River in the general vicinity of the decommissioned Red Bluff Diversion Dam. In addition to a developed recreation area (Sycamore Campground), this parcel provides river access, habitat for special-status species and undeveloped open space used by the public for hiking, biking, and other recreational activities.

U.S. Bureau of Land Management Resource Management Plan As a result of Congressional action, BLM manages all public lands west of the NRA including the Chappie-Shasta OHV Area. BLM also manages public lands along the Sacramento River corridor downstream from Shasta Dam to Red Bluff. The primary study area is within the boundary of the Northern California District; the Central California District manages public lands throughout most of the extended study area. The resource management plans (RMP) of three BLM field offices: Redding, Ukiah, and Mother Lode (BLM 2006) are applicable to most of the public lands within both the primary and extended study areas. The purpose of BLM's RMPs is to provide an overall direction for managing and allocating public resources in each planning area. Planning issues addressed in the RMPs include land tenure adjustments, such as land acquisition, exchange, and sale; recreation management; access; and forest management, including harvesting, herbicide use, and special-status species.

BLM's Redding RMP (BLM 1993) provides guidance for the management of cultural resources, fire, grazing, minerals, vegetation, water quality, wildlife and fish habitats, and other resources and issues in Shasta County. The RMP was amended by the 1994 Record of Decision for the *Northwest Forest Plan* (Final Supplemental EIS for Amendments to USFS and BLM Planning Documents within the Range of the Northern Spotted Owl). This amendment required preparation of a Watershed Analysis before initiating BLM activities. Under the respective RMPs, as amended by the *Northwest Forest Plan,* BLM, like USFS, is also required to ensure that projects are consistent with the Aquatic

Conservation Strategy and other management direction specified in the 1994 Record of Decision for the *Northwest Forest Plan*.

The Redding RMP governs land use on BLM lands, including lands in the Sacramento River Management Area. The goal of the lands program of the Redding Field Office is to transform the scattered land base of the Redding Resource Area into consolidated resource management units to meet the needs of public land users. The RMP includes the following management guidance for its land program:

- All lands identified for transfer to another agency or qualified organization are for long-term stewardship by the receiving entity.

- All land acquisitions will be through exchange, purchase, or donation. Acquisitions will be from willing sellers for available unimproved property. In all acquisitions, BLM will strive to gain the local support and understanding for the action.

- All land identified for disposal through exchange, Recreation and Public Purposes Act transfer, or sale meets the criteria set forth in the Federal Land Policy and Management Act of 1976.

- Land use authorizations (rights-of-way, leases, permits) will continue to be issued on a case-by-case basis and in accordance with decisions established in the RMP. Applications for land use authorizations which reduce the marketability of an exchange parcel will not be authorized.

- Rights-of-way will be issued to promote the maximum utilization of existing rights-of-way routes, including joint use whenever possible.

County Land Use Planning Land-use planning on non-Federal land is under the jurisdiction of local governments in California. All cities and counties in California are required by the State to adopt a general plan establishing goals and policies for long-term development, protection from environmental hazards, and conservation of identified natural resources (California Government Code Section 65300). General plans lay out the pattern of future residential, commercial, industrial, agricultural, open-space, and recreational land uses on non-Federal land within a community. To facilitate implementation of planned growth patterns, general plans identify goals and/or policies to establish land use patterns.

Local governments implement general plans by adopting zoning, subdivision, grading, and other ordinances. Zoning ordinances identify specific types of land uses that may be allowed on a given site and establish specific development standards. Zoning regulations vary from jurisdiction to jurisdiction. However, typical standards promulgated in zoning ordinances include the siting of structures relative to parcel boundaries, architectural design (including height

limitations), and the percentage of building coverage allowed relative to the overall square footage of a parcel.

The *Shasta County General Plan* (Shasta County 2004) provides planning guidance for privately owned land in Shasta County. Land use directives are provided in the form of goals, policies, objectives, standards, and guidelines. The following land uses described in the general plan are present in the Shasta Lake and vicinity portion of the primary study area:

- **Rural Residential** – Encompasses areas that receive minimal urban services, usually in or near a rural community center and areas with no urban services that are located in areas of the county characterized by one or more of the following conditions:
    - Severe limitations on septic tank use
    - Uncertain long-term availability of water
    - Proximity to lands categorized as timber, grazing, or crop lands
    - Remoteness from urban, town, and rural community centers
    - Extreme wildland fire hazard
    - Inaccessibility via county-maintained roads
- **Existing Residential** – This designation may be applied to residential areas that existed before 1984 and that do not fit the land use designation or density applied to surrounding properties.
- **Mixed Use** – This category recognizes that in a rural setting the strict segregation of different land use types, which is typically found in urban environments, is neither necessary nor practical. At this scale, conflicts that may result from the intermixing of land uses may be addressed by Shasta County zoning and development standards related to screening setbacks and architectural design.
- **Commercial Recreational** – This designation provides opportunities for the development of privately owned lands characterized by the natural environment for the purpose of providing commercial recreation activities that use and provide for the enjoyment of the natural environment. Examples of commercial recreation include campgrounds, fishing and hunting clubs, dude ranches, boating facilities, and recreational vehicle parks. Other uses such as a restaurant or small grocery store may be permitted when accessory to, supportive of, and compatible with the recreation activity.
- **Natural Resources Protection**

- **Community Parks** – Provides for large-scale community recreation facilities

- **Habitat** – Provides for protection of significant wildlife habitat resources

Shasta County land use actions and decisions on non-Federal land in the NRA are subject to STNF review and approval pursuant to 36 CFR Part 292, Subpart B.

Upper Sacramento River (Shasta Dam to Red Bluff)

Land use planning in the upper Sacramento River area consists of general plans adopted by Shasta and Tehama counties and the cities of Shasta Lake, Redding, Anderson, and Red Bluff. BLM lands in this area are managed in accordance with the Redding RMP, discussed in Section 17.2, "Regulatory Framework."

Local Land Use Planning

Shasta County The *Shasta County General Plan* (2004) designates the following land uses along the Sacramento River from Shasta Dam south to the Tehama County line:

- Rural residential
- Greenway
- Habitat resource
- Natural habitat
- Agricultural – cropland
- Agricultural – small-scale crops, grazing
- Mineral resources

Tehama County The *Tehama County General Plan Update 2009–2029* (2009) designates the following land uses along the Sacramento River from the Shasta County line in the north to Red Bluff:

- Habitat Resources
- Valley Floor Agriculture
- Public Facility
- Rural Residential–Small Lot
- Suburban Residential

City of Shasta Lake The *City of Shasta Lake General Plan* was adopted in 1999. The general plan designates the following land uses along Shasta Dam Boulevard, the primary roadway leading up to Shasta Dam:

- Community park
- 100-year floodplain
- Public facilities
- Commercial
- Mixed use
- Rural residential (1 unit/2 acres, 1 unit/5 acres)
- Suburban residential (3 units/acre)
- Urban residential (10 units/acre)
- Urban residential – High (20 units/acre)

City of Redding The City of Redding adopted an updated general plan in 2000 (City of Redding 2000). The general plan designates the following land uses along the Sacramento River within the city limits and sphere of influence:

- Greenway
- Park, Park-Golf
- Public Facility; Public Facility-School
- Recreational
- General Office
- General Commercial
- Neighborhood Commercial
- Residential (2–3.5, 3.5–6, 6–10 units/acre)
- Critical Mineral Resource Overlay
- Mixed Use Neighborhood Overlay

City of Anderson The City of Anderson released its updated general plan in May 2007 (City of Anderson 2007). The general plan designates the following land uses along the Sacramento River within the city limits and sphere of influence:

- Commercial
- Industrial
- Public/Quasi-Public
- Medium-Density Residential
- Rural Residential/Rural Estate

City of Red Bluff The City of Red Bluff most recently amended its General Plan Land Use Element in 1993; the city is currently updating this plan. The general plan designates the following land uses along the Sacramento River within the city limits and sphere of influence:

- Primary Floodplain
- Exclusive Agriculture
- General Commercial
- Central Business Districts
- Single-Family Residential
- General and Neighborhood Apartment Districts
- General Industrial
- Public Agency District
- Park

Lower Sacramento River and Delta

The lower Sacramento River and Delta are within the planning jurisdiction of Butte, Colusa, Contra Costa, Glenn, Sacramento, Solano, Sutter, Yolo, and Yuba counties. The largest cities in this region are Antioch, Chico, Davis, Fairfield, Martinez, Marysville, Pittsburg, Sacramento, Vacaville, Vallejo, West Sacramento, and Woodland. Each of these entities currently has adopted general plans and zoning ordinances. Land use planning documents are adopted by Federal agencies for federally managed lands in the lower Sacramento River and Delta areas.

CVP/SWP Service Areas

The CVP extends from the Cascade Range near Redding in the north to the Tehachapi Mountains near Bakersfield in the south. The CVP serves farms, homes, and industry in California's Central Valley as well as major urban centers in the San Francisco Bay Area. SWP contractors are in the southern San Joaquin Valley, Central Coastal area, and Southern California. The CVP and SWP service areas include portions of the primary and extended study areas. CVP water irrigates more than 3 million acres of farmland and provides drinking water to nearly 2 million consumers. SWP deliveries are 70 percent urban and 30 percent agriculture, serving 20 million Californians and more than 600,000 irrigated acres, respectively. Each of the counties and incorporated cities in the CVP and SWP service areas has adopted general plans and zoning ordinances. Federally managed lands in the service areas are managed in accordance with land use and planning documents similar to the STNF LRMP and BLM's RMP, and military installations located in the service areas have their own planning processes.

17.2 Regulatory Framework

17.2.1 Federal

Federal land use policies apply only to actions on, or affecting the uses of, Federal lands. Federal lands in the primary study area consist of the following:

- National Forest lands managed by STNF around Shasta Lake
- Lands along the Sacramento River just south of Shasta Dam managed by Reclamation
- Lands managed by BLM along the Sacramento River south of Shasta Dam as far downstream as Red Bluff

Entry upon or use of these Federally administered lands would require approval from the appropriate Federal entity(ies).

Federal Land Policy and Management Act

The Federal Land Policy and Management Act was enacted to change the Federal public lands policy from disposal to retention. The act directs Federal agencies to apply land use principles that emphasize conservation; these include the principles of multiple use and sustained yield land management policies. The Federal Land Policy and Management Act consolidated and articulated BLM's management responsibilities and applies primarily to this Federal land management agency. Title V of the Federal Land Policy and Management Act also granted the Secretary of the Interior and the Secretary of Agriculture the authority to issue rights-of-way for various uses, including reservoirs.

Code of Federal Regulations

USFS personnel administer their responsibilities for regulating use and protecting National Forest lands under Title 36 of the CFR and sections of titles 16, 18, and 21. Public services directives from the code are integrated into the STNF LRMP and include the following topics: fire and fuels management, facilities management, law enforcement, and land management.

Shasta-Trinity National Forest Land and Resource Management Plan

The STNF LRMP is a forest-wide land use plan developed to guide resource management on STNF lands. Six broad categories are used to define management strategies. The management strategies (known as land allocations) are implemented through management prescriptions that provide specific standards and guidelines for forest resource management (USFS 1995).

Management Guide for the Shasta and Trinity Units of the Whiskeytown-Shasta-Trinity National Recreation Area

The 2014 NRA *Management Guide: Shasta and Trinity Units of the Whiskeytown-Shasta-Trinity NRA* (USFS 2014) contains management guidance intended to achieve or maintain desired conditions for the NRA. The document

provides specific information about current conditions in the NRA, desired future conditions for the NRA, and management recommendations for the NRA. STNF is responsible for administering the Shasta and Trinity units of the NRA.

Mendocino National Forest Land and Resource Management Plan

The Mendocino LRMP is a forest-wide land use plan developed to guide resource management on NFS lands. Six broad categories are used to define management strategies. The management strategies (known as land allocations) are implemented through management prescriptions that provide specific standards and guidelines for forest resource management (USFS 1995).

U.S. Bureau of Land Management Resource Management Plans

BLM manages a number of public lands adjacent to the Sacramento River corridor downstream from Shasta Dam. The study area falls under two BLM districts (Northern California and Central California) and the RMPs of three BLM field offices: Redding, Ukiah, and Mother Lode (BLM 2006). The purpose of BLM's RMPs is to provide overall direction for managing and allocating public resources in each planning area.

BLM's Redding RMP (BLM 1993) provides guidance for the management of cultural resources, fire, grazing, minerals, vegetation, water quality, wildlife and fish habitats, and other resources and issues in Shasta County. The RMP governs land use on BLM lands, including lands in the Sacramento River Management Area. Planning issues addressed in the RMP include land tenure adjustments, such as land acquisition, exchange, and sale; recreation management; access; and forest management, including harvesting, herbicide use, and special-status species.

The RMP was amended by the 1994 Record of Decision for the *Northwest Forest Plan* (Final Supplemental EIS for Amendments to USFS and BLM Planning Documents within the Range of the Northern Spotted Owl). This amendment required preparation of a Watershed Analysis before initiating BLM activities. As a party to the *Northwest Forest Plan*, BLM, like USFS, is also required to ensure that projects are consistent with the Aquatic Conservation Strategy.

Federal Wild and Scenic Rivers Act

The Federal WSRA, enacted in 1968, established the National Wild and Scenic Rivers System "to preserve rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations." To be eligible for inclusion in the system, a river must be free-flowing and exhibit ORVs. Free-flowing means "existing or flowing in a natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway" (16 USC Section 1286). ORVs are scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values (16 USC Section 1271). Depending on the specific attributes of a river, it may be designated as "wild," "scenic," or "recreation." Different segments of a

single river can receive different designations; in other words, some segments can be designated wild, some scenic, and some recreation or combinations of these designations. Recreation rivers are defined as "rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past" (16 USC Section 1286).

State-designated rivers may be added to the Federal system upon the request of the state's governor and the approval of the Secretary of the Interior (16 USC Section 1286). Two sections of the American River were added to the Federal system in 1981 under this method. These sections are the lower American River from Nimbus Dam to the river's confluence with the Sacramento River and the North Fork American River from its source to the Iowa Hill Bridge. The North Fork section is located above Nimbus, Folsom, and Lake Clementine dams many miles upstream from the confluence with Sacramento River. The North Fork is not regulated by Folsom Dam and would not be affected by hydraulic changes in the Sacramento River. The lower American River is designated as a recreational river.

Adding state rivers to the Federal system under (16 USC Section 1286) does not require the approval of the Legislature or Congress. State rivers added to the Federal system under this section are to be managed by the state.

17.2.2 State

California Public Resources Code, Division 6

PRC Division 6 grants the State Lands Commission (SLC) jurisdiction over 4.5 million acres of land held in trust for Californians. SLC's jurisdiction includes a 3-mile-wide section of tidal and submerged land adjacent to the coast and offshore islands, including bays, estuaries, and lagoons. It also includes the waters and beds of more than 120 rivers, lakes, streams, and sloughs. The State holds these lands for the public trust purposes of water-related commerce, navigation, fisheries, recreation, and open space. SLC may grant dredging permits and issue land use leases for activities within its jurisdiction. SLC does not have a comprehensive use plan for these lands but manages them according to State and Federal laws and regulations. In the primary study area, SLC's jurisdiction includes areas along the Sacramento River north of Red Bluff.

California Fire Plan

The *California Fire Plan* was prepared by the State Board of Forestry and the California Department of Forestry and Fire Protection to provide a comprehensive strategy for wildland fire protection and prevention in California. The plan provides recommendations for fire-safe land use planning. Preventive measures include using fire-resistant building materials, maintaining a defensible space around structures, vegetation management, and infrastructure planning.

Water Quality Control Plan

The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins* provides water quality objectives to protect beneficial uses of designated rivers and streams. *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins* objectives are incorporated into county and city general plans, zoning ordinances, and subdivision ordinances.

California Public Resources Code, Sections 5093.50–5093.70

PRC Sections 5093.50–5093.70 were established through 1972 enactment of the State Wild and Scenic Rivers Act, which was subsequently amended on several occasions, to preserve certain rivers that possess extraordinary scenic, recreational, fishery, or wildlife values in their free-flowing state. The PRC identifies, classifies, and provides protection for specific rivers or river segments, as approved by the Legislature. Rivers or river segments that are specifically identified and classified in the PRC compose the State Wild and Scenic Rivers System. As described in PRC Section 5093.50, rivers or river segments included in the State system must possess "extraordinary scenic, recreational, fishery, or wildlife values"; however, the PRC does not define what constitutes "extraordinary."

Depending on the specific conditions of a river, it may be designated as "wild," "scenic," or "recreation." Different segments of a single river can receive different designations; in other words, some segments can be designated wild, some scenic, and some recreation or combinations of these designations. Recreation river segments are readily accessible by road or railroad, may have some development along their shorelines, and may have been impounded or diverted in the past (PRC Section 5093.53).

With its initial passage, the State system protected segments of eight rivers, including two sections of the American River. These sections include the lower American from Nimbus Dam to its confluence with the Sacramento River and the North Fork from its source to the Iowa Hill Bridge. The North Fork section is located above Nimbus, Folsom, and Lake Clementine dams many miles upstream from the confluence with Sacramento River. The North Fork is not regulated by Folsom Dam and would not be affected by hydraulic changes in the Sacramento River. The lower American is designated as a recreational river.

17.2.3 Regional and Local

Shasta County General Plan

The *Shasta County General Plan* (2004) guides land use planning on non-Federal land for Shasta County through 2025. The Community Organization and Development Pattern element of the *Shasta County General Plan* establishes policies related to the organization and relationships of the community types present in Shasta County, the living environments these communities offer, and the locations of development in relation to these communities. These policies were developed to maintain and enhance the

quality of their environments. The Community Organization and Development Pattern element includes several objectives that influence land use decisions in the project study area:

- To promote a development pattern that will accommodate, consistent with the other objectives of the plan, the growth that will be experienced by Shasta County

- To guide development in a pattern that will provide opportunities for present and future county residents to enjoy the variety of living environments that currently exist within the county

- To guide development in a pattern that will respect the natural resource values of county lands and their contributions to the county's economic base

- To guide development in a pattern that will minimize land use conflicts between adjacent land users

- To recognize that the major economic resources for achieving the development pattern will come from the private sector, rather than government, and that the general plan, as the expression of community values, will guide the use of these resources

Tehama County General Plan

The *Tehama County General Plan Update 2009–2029* is used to guide future development in unincorporated areas of the county. The Land Use element of the General Plan Update establishes the goals, policies, and implementation measures that will help guide the growth and development of Tehama County for the next 20 years. This element also contains the General Plan Land Use Map, which delineates those areas of the county where future residential development of varying densities and nonresidential growth is anticipated or will be directed (Tehama County 2009).

City of Shasta Lake General Plan

The planning boundaries for the *City of Shasta Lake General Plan* are within the Shasta Lake and vicinity study area, north of Keswick Dam, east of the Sacramento River, and west of I-5. This general plan was adopted in 1999 and is intended to guide land use planning within the city through the Year 2020 (City of Shasta Lake 1999). The following statement from the Land Use element of the general plan identifies some of the concerns surrounding land use decisions within the City of Shasta Lake:

> *The Land Use Element and the Land Use and Circulation Map constitute the physical framework for the general plan, which designates the proposed location, distribution, and extent of land uses. Land use was a specific area of concern identified as*

> *being key to the development of the City of Shasta Lake. Some of the major issues identified included an evaluation and establishment of urban, rural, and urban reserve boundaries. This was accomplished by identifying areas that currently lack infrastructure that would be required to develop in an orderly manner through the development of Area Plans.*

City of Redding General Plan

The planning boundaries for the *City of Redding General Plan* encompass areas within the city limits and the urban growth boundary. This plan was adopted in 2000 and is intended to guide land use planning through the year 2020 (City of Redding 2000). The Community Development and Design element of the general plan states the following about the role and effects of land use policies:

> *Land use policies and the General Plan Diagram affect every property in the City. They determine how people can use/develop their land and what they can reasonably expect to develop next door, down the street, or across town. They provide for overall consistency and compatibility between land uses and can be a determining factor in quality of life. The policies … also have a direct bearing on traffic, the feasibility of public transportation, and the quality of the air.*

City of Anderson General Plan

The planning boundaries of the *City of Anderson General Pla*n encompass areas within the city limits and the urban growth boundary. The City of Anderson released its updated general plan in May 2007 (City of Anderson 2007). The general plan is intended to guide land use planning within the city through the Year 2027. The following statement from the Land Use element of the general plan identifies some of the concerns surrounding land use decisions within the City of Anderson:

> *The Land Use Element describes the pattern of land development within the City of Anderson and the proposed expansion area and provides direction for the future development envisioned for the City. Also included in this Element are descriptions of geographic areas that are anticipated to be developed over the term of this General Plan and goals and policies to guide the City's decision makers in their review of development proposals. This Element also defines land use categories and provides supporting detail for the uses depicted upon the Anderson General Plan Land Use Diagram.*

Red Bluff General Plan

The planning boundaries for the *City of Red Bluff General Plan* encompass areas within the city limits and the urban growth boundary. The adopted

General Plan elements are as follows: Circulation element (1991), Housing element (2004), and Land Use, Natural Environment, Noise, and Safety elements (1993). The following statement from the Land Use element summarizes concerns relative to land use decisions in Red Bluff (City of Red Bluff 1993):

> *The land use element identifies the spatial arrangement of existing and proposed uses of land including public lands and facilities. It lays out the distribution of classes of land use, the intensity of those uses, and proposes a strategy of goals, objectives, policies and implementation measures to promote a wise use of land to promote the welfare of the community.*

17.3 Environmental Consequences and Mitigation Measures

17.3.1 Methods and Assumptions

To characterize existing land uses in the primary study area, pertinent planning documents were reviewed to identify objectives for the level, type, location, density, and intensity of development and to determine whether the alternatives would be in conflict with current plans and policies. Planning documents that were reviewed include the STNF LRMP (USFS 1995), the Management Guide for the NRA, the BLM RMPs and the general plans for the cities of Shasta Lake, Redding, Anderson, and Red Bluff and Shasta and Tehama counties. Land use maps and zoning maps were consulted to identify planned land uses. The analysis also included a review of aerial photography to determine existing land uses in the primary study area.

The impacts of each alternative are analyzed separately, starting with the analysis of the No-Action Alternative, followed by each of the action alternatives. The impact analysis includes a discussion of both direct and indirect impacts associated with each alternative.

17.3.2 Criteria for Determining Significance of Effects

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by, or result from, the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. An environmental document prepared to comply with CEQA must identify the potentially significant environmental effects of a proposed project. A "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental effects (State CEQA Guidelines, Section 15126.4(a)).

The following significance criteria were developed based on guidance provided by the State CEQA Guidelines and consider the context and intensity of the environmental effects as required under NEPA. Impacts of an alternative related to land use and planning would be significant if project implementation would do any of the following:

- Create land uses that are incompatible with existing and planned land uses adjacent to actions described as part of the project
- Introduce substantial nuisance effects on sensitive land uses that would disrupt use over an extended time period
- Conflict with any applicable land use plan, policy, ordinance, or regulation of an agency with jurisdiction over the project (including general plans, specific plans, and zoning ordinances) adopted for the purpose of avoiding or mitigating an environmental effect
- Disrupt or divide the physical arrangement of an established community
- Conflict with any applicable habitat conservation or natural community conservation plan

17.3.3 Topics Eliminated from Further Consideration

Effects of the proposed enlargement of Shasta Lake on the listed segments of the American River have been eliminated from further consideration in this EIS. The listed segment of the North Fork American River has been eliminated because it is above any regulated reaches and is many miles from the confluence of the American and Sacramento rivers. The lower American River has been eliminated because none of the alternatives would adversely affect its designation as a recreational river under the Federal WSRA or the PRC. Under each of the action alternatives, releases from Shasta Dam would increase from late spring through early autumn. Increased releases from Shasta Dam during this period would reduce the volume of water released from Folsom Dam during the primary recreation season on the lower American River (late spring through early autumn). Flow volumes and water levels within the lower American River would, however, remain substantially similar to existing conditions and would remain within the river's typical range of variation during the primary recreation season. During the secondary recreation season (autumn through spring), precipitation is greater, flows in the Sacramento River and Delta are higher, and releases from Shasta Dam would be reduced to increase storage in Shasta Lake. Reclamation may need to occasionally increase releases from Folsom Dam to accommodate demand and offset decreased releases from Shasta Dam. Flow volumes and water levels in the lower American River would, however, remain substantially similar to existing conditions and within the river's typical range of variation during the secondary recreation season.

The effects of the proposed enlargement on two IRAs, Backbone and Devils Rock, have been eliminated from further consideration in this EIS. Under the 18.5 foot increase, 0.3 percent of the Backbone IRA (39.2 acres) would be subject to inundation; Big Backbone Arm – 16.9 acres, Sacramento Arm – 22.3 acres. There would be no new road construction or timber harvest. There would be some vegetation removed in conjunction with the relocation of the Gooseneck Campground (boat-in), as well as removal of hazard trees at select locations identified by the STNF at coves known for high houseboat use. Under the 18.5 foot increase, 0.3 percent of the Devils Rock IRA would be subject to inundation; Pit Arm – 41.9 acres, Sacramento Arm – 22.3 acres. There would be no new road construction or timber harvest. There would be some vegetation removed in conjunction with removal of hazard trees at select locations identified by the STNF at high use houseboat coves. Collectively, approximately 20.6 miles of shoreline within the boundaries of these IRAs will be subject to effects similar to those described elsewhere in this EIS under the No-Action alternative, none of which are precluded in the 2001 Roadless Rule.

17.3.4 Direct and Indirect Effects

No-Action Alternative

Shasta Lake and Vicinity, Upper Sacramento River (Shasta Dam to Red Bluff), Lower Sacramento River and Delta, and CVP/SWP Service Areas
The impact discussion for the No-Action Alternative addresses all of both the primary and extended study areas together, because this alternative would not affect land use in either the primary or extended study area.

Impact LU-1 (No-Action): Disruption of Existing Land Uses No new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, no impact would occur. Mitigation is not required for the No-Action Alternative.

Impact LU-2 (No-Action): Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions No new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, no impact would occur. Mitigation is not required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP1 addresses the Shasta Lake and vicinity and upper Sacramento River portions of the primary study area together, because impacts from construction activities would affect both areas.

Impact LU-1 (CP1): Disruption of Existing Land Uses Project construction activities associated with enlarging Shasta Dam and relocating utilities, infrastructure, and public service and recreational facilities could result in short-term and long-term disruptions to land uses by interfering with the ability to use

certain lands and interfering with access to certain lands. Construction activities that could disrupt land uses include the transport of project materials to and from project construction sites and the demolition and relocation of some utilities. This impact would be potentially significant.

It is anticipated that construction activities would be limited to the Shasta Lake and Vicinity portion of the primary study area; therefore, no impacts associated with disruption of existing land uses would be expected to occur downstream from Shasta Dam.

Construction activities specific to enlarging Shasta Dam would be limited to the existing footprint of the Shasta Dam facilities and areas immediately adjacent. The project construction site would be accessed by existing roadways (I-5, Shasta Dam Boulevard, and Lake Boulevard). The access roads allow commercial truck use and are capable of supporting project-generated traffic. Road modifications would be necessary to accommodate project traffic en route to the construction sites and access restrictions would occur. Noise, air quality, and traffic impacts along these local roadways are evaluated in separate sections of the EIS. Equipment staging areas would be sited to avoid affecting or conflicting with existing land uses.

Project construction activities associated with relocating utilities, infrastructure, and public service and recreational facilities could result in temporary and localized disruptions of existing land uses. Lake inundation resulting from future dam operations could result in long-term disruptions of land uses in the primary study area. The Utilities and Miscellaneous Minor Infrastructure Technical Memorandum provides descriptions and detailed maps of the utilities and infrastructure (e.g., roads, bridges, campgrounds, boat ramps) that would be demolished or relocated in the ancillary areas near Shasta Lake (Reclamation 2007). Chapter 18, “Recreation and Public Access,” evaluates the project’s impacts on recreational use, including short-term disruption of recreational use and/or change in the type and location of recreational use. Chapter 21, “Utilities and Service Systems,” of this EIS evaluates the project’s impacts on utilities and service systems, and the environmental impacts of utilities demolition and relocation are evaluated in the pertinent technical chapters of the EIS (e.g., Water Quality, Air Quality and Climate, and Noise and Vibration).

Construction activities would affect major features around Shasta Lake and vicinity and would require demolition, relocation, modification, or reconstruction to prevent inundation of the features caused by an increased reservoir elevation. The major features affected would include:

- Major roads and road segments (Lakeshore Drive realignment)
- Vehicle bridges (Charlie Creek, Doney Creek, McCloud River, Didallas Creek, and Second Creek)

- Railroad bridge
- Utilities and service systems infrastructure
- Campgrounds and picnic areas
- Boat ramps and associated parking areas
- Buildings (resort/marina, residential, USFS facilities)

The communities of Lakeshore and Sugarloaf would be affected the most by transportation infrastructure relocation activities. Seventy-five small road segments (both paved and unpaved) would need to be modified. CP1 would result in the inundation of Lakeshore Drive at numerous locations south of Charlie Creek Bridge and in two locations between the Charlie Creek and Doney Creek bridges. Relocation of Lakeshore Drive and the UPRR would occur near existing residences and businesses. Road construction activity could result in temporary and localized increases in dust, noise, and construction truck traffic and potential disruption of access.

Seven bridges would need to be replaced. Construction activities associated with bridge modifications and relocations, particularly in areas with existing development such as Bridge Bay Marina and the communities of Lakeshore and Sugarloaf, could result in short-term disruptions of nearby residential, commercial, and industrial land uses. Bridge construction activity could result in temporary and localized increases in dust, noise, and construction truck traffic and potential disruption of access.

Approximately 67,000 feet of power and telecommunications lines would need to be demolished and reconstructed at a number of locations, including powerlines that cross Shasta Lake. Utilities infrastructure relocation activities could result in short-term disruptions of land uses in communities and recreation areas around Shasta Lake. Relocation activities could require partial or full road closures and other access restrictions to ensure public safety. Utilities relocation activities could also result in temporary and localized increases in dust, noise, heavy equipment traffic, and other project traffic.

An estimated 50 buildings would be affected under a 6.5-foot dam raise. The buildings have been categorized as residential (cottages, homes, etc.), commercial (resorts, marinas, stores, etc.), and USFS sites (work stations, campground buildings, recreation site restrooms, etc.). Buildings within the inundation area would be removed, and some would be relocated. Utilities associated with the removed buildings (water systems, septic systems, telecommunications and power facilities) would also require demolition or abandonment. Construction activity related to removal and/or relocation of buildings would result in temporary and localized increases in dust, noise, and construction truck traffic and potential disruption of access. Some existing

marinas would need to be modified or relocated, which would disrupt existing commercial and recreational land uses. See the Engineering Summary Appendix for additional details.

Reservoir dikes would be required in the areas of Antlers/Lakeshore and railroad embankments would be required at the UPRR track at the south end of Bridge Bay for protection of existing infrastructure from increased full pool elevations. Additional sites for dike and embankment construction could be added in the future. Dike and embankment construction could serve to lessen long-term land use impacts resulting from the project by eliminating the need to remove and relocate a number of structures. Construction activities associated with dike and embankment construction would result in temporary and localized increases in dust, noise, and construction truck traffic and potential disruption of access.

Project implementation could result in short-term disruptions of land uses of parcels around Shasta Lake and vicinity during construction and relocation activities; long-term disruptions of land use could also result from project operations. This impact would be potentially significant. Mitigation for this impact is proposed in Section 17.3.5, “Mitigation Measures.”

Impact LU-2 (CP1): Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions Project implementation would result in inundating land around Shasta Lake, which could conflict with land use goals and policies of affected jurisdictions. Relocation of utilities and service systems resulting from project implementation could also conflict with existing land use goals and policies. This impact would be potentially significant.

It is anticipated that construction activities would be limited to the Shasta Lake and vicinity portion of the primary study area; therefore, no conflicts with existing land use goals and policies would be expected to occur in planning jurisdictions downstream from Shasta Dam.

Project implementation would result in an increase in reservoir pool elevation during extreme storm events, which could result in the flooding of approximately 1,110 acres in the lower elevations around Shasta Lake. To prevent utilities and infrastructure damage, Reclamation would relocate roads, utilities and service systems, marinas, and other structures and would modify a number of bridges. Relocation plans are based on broad assumptions regarding optimum construction, operation, and environmental conditions. Areas planned for relocation activities could have land use designations that conflict with the land use proposed by the project. It is anticipated that some relocation activities would conflict with land use designations. Although refinements have been made to a number of relocation sites subsequent to the DEIS, additional engineering information will be required for some sites before a detailed analysis can be made. Once relocation sites are finalized, the proposed land use would be compared to the existing land uses and land use designations to

determine consistency with the STNF LRMP, BLM RMP, the Shasta County General Plan, and the Shasta County Zoning Ordinance as applicable.

Areas that would be most affected by project implementation are located on the Sacramento Arm of Shasta Lake and include the communities of Sugarloaf and Lakeshore. A number of existing residential land uses would be inundated by a higher full pool elevation in Shasta Lake.

Most recreation facilities that could be inundated by project implementation would be relocated; some recreation facilities would be relocated adjacent to existing recreation facilities. Sites proposed for the relocation of recreational facilities could be inconsistent with the current land use designations. Reclamation would cooperate with USFS and/or BLM to find the most suitable relocation sites that would be consistent with the STNF LRMP, the NRA Management Guide, and the BLM RMP.

The proposed use of Turntable Bay as a developed recreation area would require an amendment to the USFS STNF LRMP (USFS 1995) to change the land management prescription from Roaded Recreation (Prescription III) to Roaded, High Density Recreation (Prescription IV). Under the USFS Planning Regulations, this would be considered a nonsignificant amendment to the STNF LRMP.

Open space lands would be inundated. STNF LRMP land allocations that would be inundated include Riparian Reserve allocations. Loss of the use of NRA lands would be inconsistent with STNF LRMP and NRA goals and policies. Reclamation would coordinate mitigation measures with USFS to minimize the impacts from losing the ability to use lands around Shasta Lake.

The STNF LRMP identified several segments of the Sacramento River upstream from the NRA boundary as eligible for consideration under the Federal WSRA. One of these segments extends from the NRA boundary upstream to Box Canyon Dam. Only 6.7 miles of this 37 mile segment is on NFS lands managed by the STNF; none of these lands are within the segment affected by CP1. Under CP1, approximately 1,100 feet of this segment would be inundated.

Vegetation clearing required for the relocation of structures, marinas, recreation facilities, and utilities could be inconsistent with the STNF LRMP, BLM RMP, the *Shasta County General Plan*, and the Shasta County Zoning Ordinance. Many relocation activities would require vegetation clearing before construction. Specific clearing sites would be dependent on the sites chosen for utilities, building, and infrastructure relocation. The sites have not been determined at this time. Once specific relocation sites are known and the areas requiring vegetation clearance are determined, an analysis would be performed to determine whether the proposed action would be inconsistent with the STNF LRMP, the NRA Management Guide, the *Shasta County General Plan*, and the

Shasta County Zoning Ordinance. Reclamation would obtain authorization and/or use permits, or other suitable instruments, from USFS for actions within the jurisdiction of USFS; Reclamation would also obtain authorization and/or use permits from Shasta County and the California Department of Forestry and Fire Protection for vegetation clearing activities within the jurisdiction of Shasta County.

The overall project actions, as authorized by Congress, may not be consistent with the STNF LRMP (USFS 1995) as amended. Project-specific STNF LRMP amendment(s) may be required for standards and guidelines pertaining to the following LRMP elements: caves, visual quality, late successional reserves, riparian reserves, survey and manage species, and special-status species (e.g., Shasta snow-wreath). Scoping efforts to date indicate that amendments to the STNF LRMP are likely to be nonsignificant. The USFS decision would include a project-specific exception to these standards.

The STNF LRMP includes several resource-specific goals and objectives that enable the USFS to balance resource conflicts that could occur as a result of project authorization. One example is the goal to "provide for continued use and new development of hydroelectric facilities." The USFS understands that Congressional authorization may result in amendments or exemptions to land allocations and/or specific LRMP standards and guidelines in a manner that would enable an authorized project to be consistent with the STNF LRMP. If required, Reclamation would cooperate with USFS in support of any efforts to amend the STNF LRMP; this could require additional effort to fully comply with the National Forest Management Act and NEPA.

Site-specific information is needed for all infrastructure, building, and utilities relocation plans to review completely for consistency with existing land use planning documents, primarily the STNF LRMP and the *Shasta County General Plan*. Given the magnitude of facilities that might be relocated, including existing marinas and utilities, it is anticipated that there would be some inconsistencies with existing planning policies. This impact would be potentially significant. Mitigation for this impact is proposed in Section 17.3.5, "Mitigation Measures."

Lower Sacramento River and Delta and CVP/SWP Service Areas
Impact LU-3 (CP1): Disruption of Existing Land Uses Construction activities would be limited to the primary study area; therefore, there would be no disruption of existing land uses in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact LU-4 (CP1): Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions Construction activities would be limited to the primary study area; therefore, no conflicts with existing land use goals and policies would occur in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP2 addresses the Shasta Lake and vicinity and upper Sacramento River portions of the primary study area together, because impacts from construction activities would affect both areas.

Impact LU-1 (CP2): Disruption of Existing Land Uses Project construction activities associated with enlarging Shasta Dam and relocating utilities, infrastructure, and public service and recreational facilities could result in short-term and long-term disruptions to land uses by interfering with the ability to use certain lands and interfering with access to certain lands. Construction activities that could disrupt land uses include the transport of project materials to and from project construction sites. Limitations on site use associated with construction at a particular site or facility would also occur. This impact would be potentially significant.

This impact would be similar to Impact LU-1 (CP1). A dam raise of 12.5 feet would result in a larger area of inundation than under CP1, which would, in turn, result in additional relocation of existing structures, infrastructure, and utilities and a longer duration for the impact. Reclamation estimates the construction of CP2 would take 5 years, which would be 6 months longer than for CP1. CP2 would, therefore, result in longer-term disruptions of land use than would CP1. Approximately 500 additional acres would be inundated by CP2, totaling 1,750 acres of land that would be inundated by Shasta Dam operations. Specific information regarding the location and number of structures that would be permanently lost will be incorporated into the land use impact analysis.

Project implementation could result in short-term and long-term disruptions of existing land uses. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 17.3.5, “Mitigation Measures.”

Impact LU-2 (CP2): Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions Project implementation could result in a permanent loss of inundated land around Shasta Lake, which could conflict with land use goals and policies of affected jurisdictions. Relocation of utilities and service systems resulting from project implementation could also conflict with existing land use goals and policies. This impact would be potentially significant.

This impact would be similar to Impact LU-2 (CP1). A dam raise of 12.5 feet would create a larger area of inundation than under CP1, which, compared to CP1, would result in additional relocation of structures and infrastructure that would be subject to USFS and Shasta County land use goals and policies.

Under CP2, approximately 1,800 feet of the eligible segment of the Sacramento River would be inundated. The portion of this segment subject to inundation is on private lands, not subject to the STNF LRMP.

A site-specific analysis would be conducted to determine where relocation activities and permanent land base losses resulting from project implementation would be inconsistent with the STNF LRMP, the NRA Management Guide, the *Shasta County General Plan*, and the Shasta County Zoning Ordinance.

Project implementation could result in short-term and long-term impacts that could conflict with existing land use goals and policies. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 17.3.5, "Mitigation Measures."

Lower Sacramento River and Delta and CVP/SWP Service Areas
Impact LU-3 (CP2): Disruption of Existing Land Uses Construction activities would be limited to the primary study area; therefore, there would be no disruption of existing land uses in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact LU-4 (CP2): Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions Construction activities would be limited to the primary study area; therefore, no conflicts with existing land use goals and policies would occur in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP3 addresses the Shasta Lake and vicinity and upper Sacramento River portions of the primary study area together, because impacts from construction activities would affect both areas.

Impact LU-1 (CP3): Disruption of Existing Land Uses Project construction activities associated with enlarging Shasta Dam and relocating utilities, infrastructure, and public service and recreational facilities could result in short-term and long-term disruptions to land uses by interfering with the ability to use certain lands and interfering with access to certain lands. Construction activities that could disrupt land uses include the transport of project materials to and from project construction sites. Limitations on site use associated with construction at a particular site or facility would also occur. This impact would be potentially significant.

This impact would be similar to Impact LU-1 (CP1). A dam raise of 18.5 feet would result in a larger area of inundation than under CP1, which would result in additional relocation of existing structures and infrastructure compared to CP1 and a longer duration for the impact. Reclamation estimates that

construction of CP3 would take 60 months, which would be 6 months longer than for CP1. Approximately 2,500 acres of land would be inundated by CP3 and, according to the 2003 infrastructure inventory at Shasta Lake, an estimated 130 buildings would be inundated under an 18.5-foot dam raise (Shasta County 2003). Specific information regarding the location and number of structures that would be permanently lost would be incorporated into the land use impact analysis. CP3 would require a more extensive (longer and wider) system of reservoir dikes than CP1 to accommodate increased Shasta Lake elevations resulting from Shasta Dam operations. A dam raise of 18.5 feet would result in the encroachment of 31 road segments. Lakeshore Drive could be inundated for nearly its entire length between Charlie Creek and Doney Creek.

Project implementation could result in short- and long-term disruptions of existing land uses. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 17.3.5, "Mitigation Measures."

Impact LU-2 (CP3): Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions Project implementation could result in a permanent loss of inundated land around Shasta Lake, which could conflict with land use goals and policies of affected jurisdictions. Relocation of utilities and service systems resulting from project implementation could also conflict with existing land use goals and policies. This impact would be potentially significant.

This impact would be similar to Impact LU-2 (CP1). A dam raise of 18.5 feet would result in a larger area of inundation than CP1, which, compared to CP1, would result in additional relocation of existing structures and infrastructure that would be subject to existing USFS and Shasta County land use goals and policies.

Under CP3, approximately 2,200 feet of the eligible segment of the Sacramento River would be inundated. The portion of this segment subject to inundation is on private lands, not subject to the STNF LRMP.

A site-specific analysis would be conducted to determine where relocation activities and permanent land base losses resulting from project implementation would be inconsistent with the STNF LRMP, the NRA Management Guide, the *Shasta County General Plan,* and the Shasta County Zoning Ordinance.

Project implementation could result in short-term and long-term impacts that could conflict with existing land use goals and policies. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 17.3.5, "Mitigation Measures."

Lower Sacramento River and Delta and CVP/SWP Service Areas
Impact LU-3 (CP3): Disruption of Existing Land Uses Construction activities would be limited to the primary study area; therefore, there would be no

disruption of existing land uses in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact LU-4 (CP3): Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions Construction activities would be limited to the primary study area; therefore, no conflicts with existing land use goals and policies would occur in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP4 and CP4A addresses the Shasta Lake and vicinity and upper Sacramento River portions of the primary study area together, because impacts from construction activities would affect both areas.

Impact LU-1 (CP4 and CP4A): Disruption of Existing Land Uses Project construction activities associated with enlarging Shasta Dam and relocating utilities, infrastructure, and public service and recreational facilities could result in short-term and long-term disruptions to land uses by interfering with the ability to use certain lands and interfering with access to certain lands. Gravel augmentation and the habitat restoration activities along the upper Sacramento River could also cause minor disruptions of existing land uses in the primary study area. Construction activities that could disrupt land uses include the transport of project materials and equipment to and from project construction sites. Limitations on site use associated with construction at a particular site or facility would also occur. This impact would be potentially significant for CP4 and CP4A.

This impact would be similar to Impact LU-1 (CP1). Therefore, this impact would be potentially significant for CP4. Mitigation for this impact is proposed in Section 17.3.5, “Mitigation Measures.”

This impact would be similar to Impact LU-1 (CP1). Therefore, this impact would be potentially significant for CP4A. Mitigation for this impact is proposed in Section 17.3.5, “Mitigation Measures.”

Impact LU-2 (CP4 and CP4A): Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions Project implementation could result in a permanent loss of inundated land around Shasta Lake, which could conflict with land use goals and policies of affected jurisdictions. Relocation of utilities and service systems resulting from project implementation could also conflict with existing land use goals and policies, resulting in a significant impact. The proposed gravel augmentation and the habitat restoration activities along the upper Sacramento River for CP4 and CP4A would not alter land uses and would

not be expected to conflict with existing land use goals and policies. This impact would be potentially significant for CP4 or CP4A.

This impact would be similar to Impact LU-2 (CP3). Therefore, this impact would be potentially significant for CP4. Mitigation for this impact is proposed in Section 17.3.5, "Mitigation Measures."

This impact would be similar to Impact LU-2 (CP3). Therefore, this impact would be potentially significant for CP4A. Mitigation for this impact is proposed in Section 17.3.5, "Mitigation Measures."

Lower Sacramento River and Delta and CVP/SWP Service Areas
Impact LU-3 (CP4 and CP4A): Disruption of Existing Land Uses Construction activities would be limited to the primary study area; therefore, there would be no disruption of existing land uses in the extended study area. No impact would occur for CP4 or CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact LU-4 (CP4 and CP4A): Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions Construction activities would be limited to the primary study area; therefore, no conflicts with existing land use goals and policies would occur in the extended study area. No impact would occur for CP4 or CP4A. Mitigation for this impact is not needed, and thus not proposed.

CP5 – 18.5-Foot Dam Raise, Combination Plan

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP5 addresses the Shasta Lake and vicinity and upper Sacramento River portions of the primary study area together, because impacts from construction activities would affect both areas.

Impact LU-1 (CP5): Disruption of Existing Land Uses Project construction activities associated with enlarging Shasta Dam and relocating utilities, infrastructure, and public service and recreational facilities could result in short-term and long-term disruptions to land uses by interfering with the ability to use certain lands and interfering with access to certain lands. Gravel augmentation and the habitat restoration activities along the upper Sacramento River could also cause minor disruptions of existing land uses in the primary study area. Construction activities that could disrupt land uses include the transport of project materials and equipment to and from project construction sites. Limitations on site use associated with construction at a particular site or facility would also occur. This impact would be potentially significant.

This impact would be similar to Impact LU-1 (CP1). Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 17.3.5, "Mitigation Measures."

Impact LU-2 (CP5): Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions Project implementation could result in a permanent loss

of inundated land around Shasta Lake, which could conflict with land use goals and policies of affected jurisdictions. Relocation of utilities and service systems resulting from project implementation could also conflict with existing land use goals and policies, resulting in a significant impact. Gravel augmentation and the habitat restoration activities along the upper Sacramento River would not alter land uses and would not be expected to conflict with existing land use goals and policies. This impact would be potentially significant.

This impact would be similar to Impact LU-2 (CP-3). Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 17.3.5, "Mitigation Measures."

Lower Sacramento River and Delta and CVP/SWP Service Areas
Impact LU-3 (CP5): Disruption of Existing Land Uses Construction activities would be limited to the primary study area; therefore, there would be no disruption of existing land uses in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact LU-4 (CP5): Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions Construction activities would be limited to the primary study area; therefore, no conflicts with existing land use goals and policies would occur in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

17.3.5 Mitigation Measures

Table 17-2 presents a summary of mitigation measures for land use.

Table 17-2. Summary of Mitigation Measures for Land Use

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact LU-1: Disruption of Existing Land Uses (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	LU-1: Minimize and/or Avoid Temporary Disruptions to Local Communities.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact LU-2: Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	LU-2: Minimize and/or Avoid Conflicts with Land Use Goals and Policies.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact LU-3: Disruption of Existing Land Uses (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	NI	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	NI	NI	NI	NI	NI
Impact LU-4: Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	NI	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	NI	NI	NI	NI	NI

Key:
CP = Comprehensive Plan
CVP = Central Valley Project
LOS = level of significance
LTS = less than significant
NI = no impact
PS = potentially significant
SU = significant and unavoidable
SWP = State Water Project

No-Action Alternative

No mitigation measures are required for this alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impacts LU-3 (CP1) and LU-4 (CP1). Mitigation is provided below for the impacts of CP1 on land uses in the primary study area.

Mitigation Measure LU-1 (CP1): Minimize and/or Avoid Temporary Disruptions to Local Communities To minimize and/or avoid temporary disruption to local communities, the following measures will be implemented during project construction:

- Before construction, Reclamation and its contractor will develop a construction plan for each affected community (i.e., Lakeshore, Sugarloaf), consisting of the following:

- Alternate access routes will be identified for local residences and businesses affected by project construction activities.

- Construction and staging areas will be fenced, secured, and clearly marked. Security will be provided to ensure public safety.

- Public parking areas outside of the construction staging areas will be kept clear of construction-related equipment of materials at all times.

- Any open trenches will be covered or secured after daily activities to protect worker and public safety.

- Construction activities near noise-sensitive land uses (e.g., near residences, campgrounds) or land uses that experience high levels of public activity (e.g., boat ramps, marinas) will be restricted to days and hours that minimize land use conflicts to the extent feasible.

- The contractor will provide advance notice of the construction activities schedule to the affected community members (e.g., residences, property owners, business owners, and public facilities operators), including posting of signs in the project area.

- The contractor will provide a phone number and community contact for inquiries about the project throughout the construction period.

- Reclamation and its contractor will coordinate with local jurisdictions and obtain all necessary permits (e.g., encroachment permit, utility excavation permit), will comply with permit conditions established to minimize construction impacts, and will assign an inspector to the project to oversee construction activities.

Implementation of this mitigation measure would substantially reduce land use capability impacts generated by short-term construction activities, but might not reduce all impacts to a less-than-significant level. As a result, Impact LU-1 (CP1) would be significant and unavoidable.

Mitigation Measure LU-2 (CP1): Minimize and/or Avoid Conflicts with Land Use Goals and Policies To reduce conflicts with land use goals and policies of affected jurisdictions, Reclamation will implement the following measures:

- Reclamation will coordinate with USFS to find the most suitable relocation sites for recreation facilities with respect to consistency with the STNF LRMP and the NRA Management Guide.

- Reclamation will coordinate with USFS to identify measures to minimize the impacts of the loss of use of USFS lands around Shasta Lake (including open space and Riparian Reserve allocations) caused by inundation, and measures to offset inconsistencies with the STNF LRMP and NRA goals and policies related to the loss of use of NRA lands.

- As utility and facility relocation sites are being refined, Reclamation will evaluate consistency of the relocated land uses with the STNF LRMP, the NRA Management Guide, the *Shasta County General Plan*, and the county zoning ordinance. To the degree possible, Reclamation will design the relocated utilities and facilities to comply with these plans and ordinances. If needed, Reclamation will seek permits, easements, and/or plan amendments.

Implementation of this mitigation measure would substantially reduce land use plan consistency impacts, but might not reduce all impacts to a less-than-significant level. As a result, Impact LU-2 (CP1) would be significant and unavoidable.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impacts LU-3 (CP2) and LU-4 (CP2). Mitigation is provided below for the impacts of CP2 on land uses in the primary study area.

Mitigation Measure LU-1 (CP2): Minimize and/or Avoid Temporary Disruptions to Local Communities This mitigation measure is identical to Mitigation Measure LU-1 (CP1). Implementation of this mitigation measure would substantially reduce land use capability impacts generated by short-term construction activities, but might not reduce all impacts to a less-than-significant level. As a result, Impact LU-1 (CP2) would be significant and unavoidable.

Mitigation Measure LU-2 (CP2): Minimize and/or Avoid Conflicts with Land Use Goals and Policies This mitigation measure is identical to Mitigation Measure LU-2 (CP1). Implementation of this mitigation measure would substantially reduce land use plan consistency impacts, but might not reduce all impacts to a less-than-significant level. As a result, Impact LU-2 (CP2) would be significant and unavoidable.

CP3 – 18.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply

No mitigation is required for Impacts LU-3 (CP3) and LU-4 (CP3). Mitigation is provided below for the impacts of CP3 on land uses in the primary study area.

Mitigation Measure LU-1 (CP3): Minimize and/or Avoid Temporary Disruptions to Local Communities This mitigation measure is identical to Mitigation Measure LU-1 (CP1). Implementation of this mitigation measure

would substantially reduce land use capability impacts generated by short-term construction activities, but might not reduce all impacts to a less-than-significant level. As a result, Impact LU-1 (CP3) would be significant and unavoidable.

Mitigation Measure LU-2 (CP3): Minimize and/or Avoid Conflicts with Land Use Goals and Policies This mitigation measure is identical to Mitigation Measure LU-2 (CP1). Implementation of this mitigation measure would substantially reduce land use plan consistency impacts, but might not reduce all impacts to a less-than-significant level. As a result, Impact LU-2 (CP3) would be significant and unavoidable.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

No mitigation is required for Impacts LU-3 (CP4 and CP4A) and LU-4 (CP4 and CP4A) in the extended study area. Mitigation is provided below for the impacts of CP4 or CP4A on land uses in the primary study area.

Mitigation Measure LU-1 (CP4 and CP4A): Minimize and/or Avoid Temporary Disruptions to Local Communities This mitigation measure is identical to Mitigation Measure LU-1 (CP1). Implementation of this mitigation measure would substantially reduce land use capability impacts generated by short-term construction activities, but might not reduce all impacts to a less-than-significant level. As a result, Impact LU-1 (CP4 and CP4A) would be significant and unavoidable.

Mitigation Measure LU-2 (CP4 and CP4A): Minimize and/or Avoid Conflicts with Land Use Goals and Policies This mitigation measure is identical to Mitigation Measure LU-2 (CP1). Implementation of this mitigation measure would substantially reduce land use plan consistency impacts, but might not reduce all impacts to a less-than-significant level. As a result, Impact LU-2 (CP4 and CP4A) would be significant and unavoidable.

CP5 – 18.5-Foot Dam Raise, Combination Plan

No mitigation is required for Impacts LU-3 (CP5) and LU-4 (CP5) for the extended study area. Mitigation is provided below for the impacts of CP5 on land uses in the primary study area.

Mitigation Measure LU-1 (CP5): Minimize and/or Avoid Temporary Disruptions to Local Communities This mitigation measure is identical to Mitigation Measure LU-1 (CP1). Implementation of this mitigation measure would substantially reduce land use capability impacts generated by short-term construction activities, but might not reduce all impacts to a less-than-significant level. As a result, Impact LU-1 (CP5) would be significant and unavoidable.

Mitigation Measure LU-2 (CP5): Minimize and/or Avoid Conflicts with Land Use Goals and Policies This mitigation measure is identical to Mitigation Measure LU-2 (CP1). Implementation of this mitigation measure would substantially reduce land use plan consistency impacts, but might not reduce all impacts to a less-than-significant level. As a result, Impact LU-2 (CP5) would be significant and unavoidable.

17.3.6 Cumulative Effects

Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," discusses overall cumulative impacts methodology related to the action alternatives, including the relationship to the CALFED Bay-Delta Program Programmatic EIS/EIR cumulative impacts analysis, qualitative and quantitative assessment, past and future actions in the study area, and significance criteria. Table 3-1, "Present and Reasonably Foreseeable Future Actions Included in the Analysis of Cumulative Impacts, by Resource Area," lists the present and reasonably foreseeable future projects considered quantitatively and qualitatively within the cumulative impacts analysis. This cumulative impacts analysis accounts for potential project impacts combined with the impacts of existing facilities, conditions, land uses, and reasonably foreseeable actions expected to occur in the study area on a qualitative and quantitative level. None of the programs or projects listed in Table 3-1 under Quantitative Analysis would affect land use or planning in the primary study area. In addition, none of the SLWRI alternatives would affect land uses and planning in the extended study area; therefore, there would be no cumulative impacts in the extended study area. The following analysis is based on the reasonably foreseeable programs and projects listed in the Qualitative Analysis section of Table 3-1.

Current land uses have been impacted in the past by water development projects, land use development, transportation improvements, recreation development, and other construction projects that are inconsistent with land use planning documents.

The action alternatives could temporarily affect land use in the Shasta Lake and vicinity portion of the primary study area during construction, and some components might be inconsistent with the STNF LRMP, the NRA Management Guide, the *Shasta County General Plan*, and the county zoning ordinance. In addition to the projects identified by the City of Shasta Lake (Moody Flats EIR and Mountain Gate at Shasta Mixed-Use Area Plan EIR) in their comments on the DEIS, there are two present or reasonably foreseeable future actions, the Antlers Bridge replacement and the Iron Mountain Restoration Plan, located in the immediate vicinity of Shasta Lake. With respect to projects currently undergoing CEQA review, these projects are still in the planning phase and there is uncertainty as to what, if any, action alternatives may be selected; therefore, they are not considered as reasonably foreseeable. The Antlers Bridge and Iron Mountain project do have the potential to damage or disrupt utilities and public service systems infrastructure. The Antlers Bridge

replacement is currently under construction and is expected to be completed in 2015, which is before any of the action alternatives would begin. With respect to the Iron Mountain Mine Restoration Plan, it is unlikely that this activity would occur simultaneously with the action alternatives, or would considerably and adversely affect use of the same land. Therefore, construction or mitigation activities related to implementation of the proposed SLWRI alternatives would not contribute considerably to significant cumulative impacts related to temporary land use impacts. The cumulative effects of the action alternatives and the two present or reasonably foreseeable future actions on resources managed consistent with the STNF LRMP, the NRA Management Guide, the *Shasta County General Plan*, and the county zoning ordinance are addressed in the other pertinent technical chapters of the EIS.

Chapter 18
Recreation and Public Access

18.1 Affected Environment

This section describes recreational facilities and opportunities and public access in the primary and extended study areas.

18.1.1 Recreation

Shasta Lake and Vicinity

Shasta Lake is the centerpiece of the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA). The Shasta Unit has a total area of approximately 123,100 acres, of which 29,500 acres are currently inundated by Shasta Lake at full pool, leaving approximately 93,600 acres of land area (USFS 2014). Figure 18-1 shows the recreation facilities in the Shasta Unit of the NRA.

Recreation Setting and Activities The USFS, headquartered in Redding, manages the Shasta Unit of the NRA to be a showcase recreational area. Environmental factors such as a hot summer season, steep terrain, and sparse forest cover in some areas favor water-oriented recreation as the main attraction. The focal point of recreation in the Shasta Unit is Shasta Lake itself, with its large surface area and approximately 420 miles of shoreline (USFS 2014). The lake has four major arms; three of the arms are more than 12 miles long at full pool, and all are a mile or more wide at their downstream ends. The main basin of the lake near the dam is about 2 miles across.

Because boating is the predominant recreation activity at Shasta Lake, the lake attracts all types and sizes of powerboats, including personal watercraft (jet skis); runabouts, ski boats, and fishing boats; and larger cabin cruisers, pontoon boats, deck boats, and houseboats (Graefe et al. 2005).

Most fishing at Shasta Lake is done by boat rather than from the shoreline. The summer stratification of the lake into an upper warm layer above a deep cold-water pool provides opportunities for anglers to catch both warm-water and cold-water fish species year-round (USFS 1996, 2014).

Because of the steep terrain around the lake, there are no suitable sites for developed beach facilities (USFS 1996, 2014), and most swimming is associated with boating. Shasta Lake is also a very popular camping destination.

The primary recreation season at Shasta Lake is the period of approximately 100 days from Memorial Day weekend to Labor Day weekend, although recreation uses occur year-round. Daytime high temperatures during the summer average in the mid to high 90s and in midwinter average in the mid-50s. Nearly all of the 30 to 70 inches of precipitation received by the lake area, mostly in the form of rain but occasionally as snowfall, occurs during late fall, winter, and spring (USFS 1996, 2014).

The Shasta Unit is bisected by Interstate 5, which provides easy access in 4 hours or less for more than five million residents of southern Oregon and Northern California (USFS 1996). The population of Shasta County was estimated to be about 181,000 in 2009 (U.S. Census Bureau 2011).

This combination of large size and plentiful water-based recreation opportunities, favorable climate, and easy access make Shasta Lake one of the most visited recreation destinations in the State of California (State) and region. The Shasta Unit of the Whiskeytown-Shasta-Trinity NRA received approximately 2.4 million recreation visitor days of use in 1994 (USFS 1996). Use levels are reduced during low-water years. Boating use levels as high as 1,400 boats have been recorded on summer weekends in recent years. Houseboats have been found to compose 30 percent to 40 percent of boat traffic on summer weekends (Graefe et al. 2005).

Recreation Facilities The boating, fishing, camping, and other recreation activities enjoyed at Shasta Lake are supported by a diverse range of public, commercial, and private facilities. Table 18-1 summarizes the major types of recreation facilities present.

Recreational boating on Shasta Lake is dependent on access to the water via shoreline facilities such as boat ramps and marinas. Six USFS public boat ramps are dispersed around the lake (USFS 2010a). Total parking capacity at the six ramps is about 600 vehicles (USFS 2007). The three largest ramps also offer accessible boat loading platforms for use by disabled persons (USFS 2010a).

Several of the public boat ramps close when lake levels are drawn down more than 50 feet, while others are moved to different locations or have low-level ramps available. There are two public boat ramps that are available when lake levels are drawn down between 160 feet and 210 feet (USFS 2010a). Parking is on the lake bed, and vault toilets are provided when these ramp are in use.

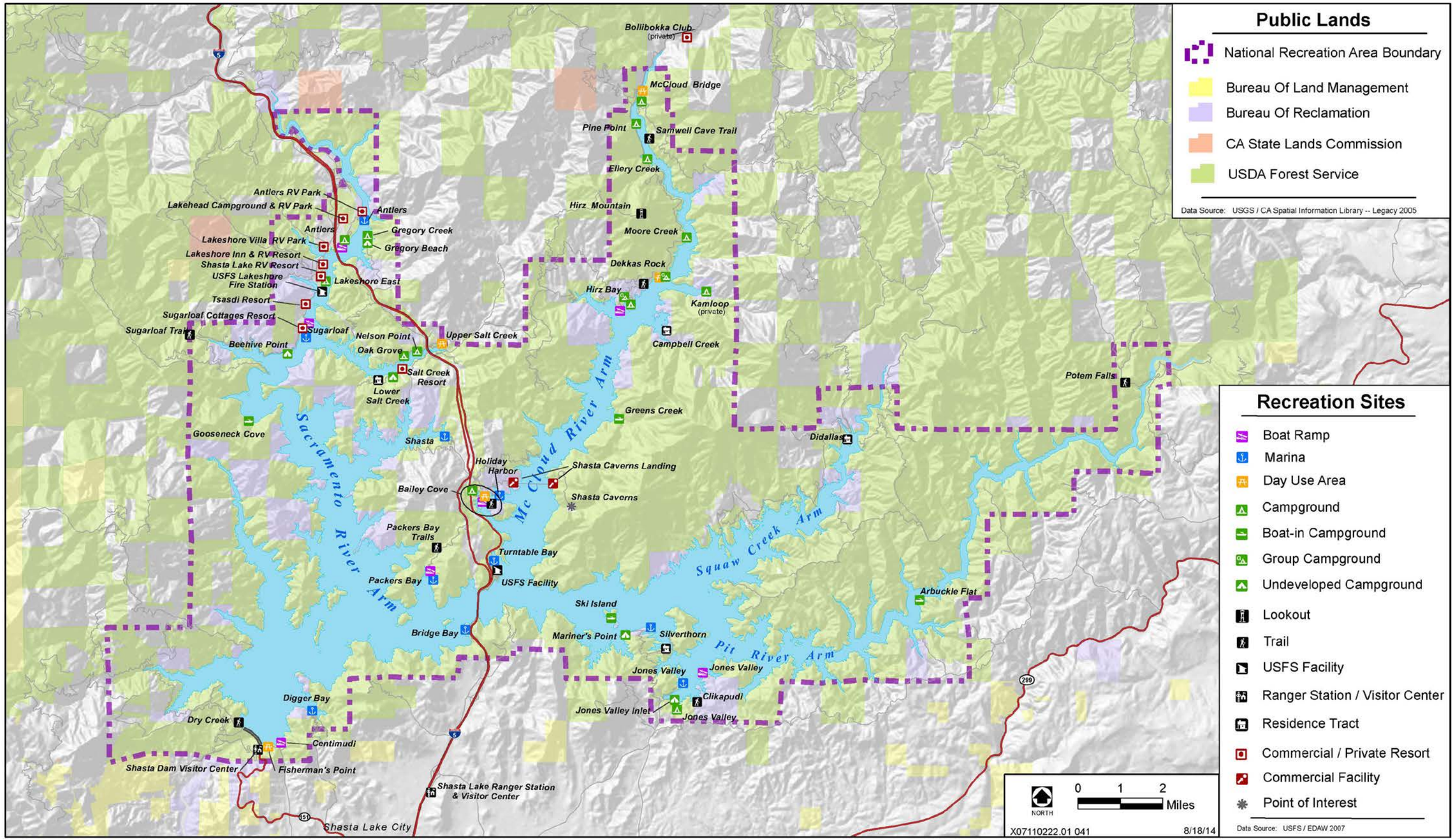

Figure 18-1. Recreation Facilities in the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area

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Table 18-1. Summary of Public, Commercial, and Private Recreation Facilities on Shasta Lake

Type of Facility	Number	Description
Public Facilities		
Boat ramp	6	Each provides parking, restrooms, and two to four paved launch lanes at full pool; some have low level boat ramps with parking on the lake bed when the lake levels are drawn down.
Day-use area	4	Each provides parking, picnic sites with tables and grills, and restrooms.
Family or group campground	15	Twelve family campgrounds with eight to 59 sites per campground; all have flush and/or vault toilets, most have piped water. Three group campgrounds have water and vault toilets.
Shoreline camping area	5	No designated campsites; all are provided with vault toilets, some with piped water.
Boat access campground	4	Eight to 23 sites per campground, accessible only by boat; vault toilets are provided.
Trail/trailhead	12	Twelve trails from one-third mile to 8 miles in length; several trailheads are incorporated into boat ramp or day-use parking areas, while others are stand-alone facilities.
Commercial Facilities		
Marina/marina resort	9	Wide range of sizes and services; most provide boat rentals, gas, groceries, etc.; some provide moorage, and campsites and/or cabins.
Nonmarina resort/ RV park	7	Most provide cabins and/or RV and tent sites, moorage, and groceries/sundries. (Note: Five of these have shoreline infrastructure other than floating docks, two do not; additional resorts are nearby but not on the lake shoreline.)
Organization campground	1	Operated for members and the general public by California Kamloops, Inc.; tent camping, accessible only by boat, and boat dock/moorage provided for campers.
Other commercial facility	2	Shasta Lake Cavern tour; provides ferry and bus transport to caverns, moorage for private boats, and a gift shop.
		Bollibokka Club; offers lodging, meals, and guided trout fishing trips on the McCloud River upstream from the lake. (Note: This facility is not within the Whiskeytown-Shasta-Trinity National Recreation Area, but is accessed via a USFS road.)
Private Facilities		
Recreation Residences	~160	Located in four tracts, managed by USFS for individual recreation use with restrictions on improvements.

Source: USFS 1996

Key:
RV = recreational vehicle
USFS = U.S. Department of Agriculture, Forest Service

Nine commercial marinas and marina resorts, all of which operate under USFS special-use permits, are distributed around Shasta Lake. All of the marinas offer houseboats for rent, providing a combined rental fleet of several hundred

houseboats. Some marinas also rent other types of powerboats, personal watercraft, and nonpowered boats. The other primary service offered by most of the marinas is short- and long-term moorage for private boats. In addition to the rental fleets, several hundred private houseboats are moored at these marinas, along with many other powerboats. Additional commercial services are offered at most marinas/marina resorts, such as boat launching, gas sales, stores, and restaurants. Some have tent and recreational vehicle (RV) campsites and cabin or motel accommodations (ShastaLake.com 2011).

Sixteen nonmarina resorts and RV parks are located on or near Shasta Lake. These typically provide some combination of tent and/or RV campsites and cabins with other ancillary amenities such as stores, game rooms, restaurants, and swimming pools (ShastaLake.com 2011). Some of the resorts have special-use permits from USFS for use of a segment of shoreline land and/or installation of a boat dock. Other resorts are situated a short distance from the shoreline but do not provide direct access to the lake.

Thirteen USFS-constructed and concessionaire-operated and maintained family and group campgrounds are located on the lake. These range in size from 8 to 59 sites and generally provide flush and/or vault restrooms and drinking water. Several of the campgrounds are adjacent to a public boat ramp or are served by a nearby ramp. Also available to campers are five shoreline camping areas with vault toilets but no designated sites; boaters may use one of four boat-access campgrounds ranging in size from 8 to 23 sites, each with fire rings, picnic tables, and vault toilets (USFS 2010b). Four USFS day-use sites with views of the lake provide five to nine picnic sites each, along with restrooms and drinking water (USFS 2011). An additional day-use and swim area is at the upstream end of the Salt Creek inlet, but is not currently operational.

Twelve USFS hiking and mountain biking trails, totaling about 25 miles in length, are located on or near the shoreline of Shasta Lake. Several of these trails are accessed via trailheads located at boat ramp and day-use parking areas, while others are served by stand-alone trailheads (USFS 2010c).

A unique commercial recreation service offered at Shasta Lake is the Shasta Caverns Tour. The tour operator uses a parking area, gift shop, and ferry boarding facility on the west shore of the McCloud Arm, and a similar staging area on the opposite shore, where visitors board buses for the short drive to the caverns.

Four USFS-managed “recreation residence” tracts are located on Shasta Lake, with numerous private cabins near the shoreline. USFS policy is to manage these facilities for the individual recreation use of the cabin owners and to keep the areas in a primarily natural state (USFS 1996, 2014).

Reservoir Operations and Effects on Recreation Reclamation manages Shasta Lake primarily to provide water supply, which results in an annual cycle

of major water level fluctuations at the lake. Such fluctuations affect access to water-based recreation facilities and services. In the typical annual cycle, the reservoir will reach its highest elevation for the year during late spring, then will be gradually drawn down through the summer peak recreation season and into fall. Refilling begins with the arrival of substantial winter rains in the watershed and continues through spring with additional rain and snowmelt. The highest annual reservoir pool level usually occurs between mid-April and mid-May. As the reservoir is drawn down during summer and fall, the lowest elevations are typically reached in November or December (DWR 2011a).

Boating facilities on the lake are generally designed to accommodate these expected and normal fluctuations in reservoir pool levels. All but one of the six primary public boat ramps extend to at least 75 feet below full pool; four extend from 95 feet to more than 200 feet below full pool (USFS 2010a).

Certain boating safety issues are related to pool level fluctuations. Reservoir drawdown places rocks, shoals, and islands just below the water surface where they may be struck by boats. Conversely, rising water levels may put obstacles that were easily seen and avoided one day just beneath the surface the next. Because the lake level varies considerably on a seasonal basis, the pattern of submerged obstacles varies as well.

Rising water levels may also increase the amount of floating debris in the lake, primarily woody debris that may include large tree limbs and logs. The larger debris can present a hazard to boating; even smaller debris can damage props or clog water intake ports in boat-engine cooling systems.

Campers are affected to some degree by falling pool levels because the distance from the campsites to the shoreline increases as the pool level decreases. The sites nearest the shoreline at most public campgrounds will be within a few hundred feet of the water through most summers when the pool level is generally high, but they may be considerably farther from the water during the off-peak seasons or during the latter portion of the peak season in dry years. Because the shoreline terrain is steep in most areas, the drawdown zone is difficult for visitors to use. Drawdown of the reservoir also has aesthetic effects for lake users, with an expanding band of mostly bare earth and rock exposed as the pool level declines.

Upper Sacramento River (Shasta Dam to Red Bluff)

The Sacramento River corridor is an important recreation resource for the northern California region. Access and facilities are found on both public and private land. This section describes existing recreation and public access resources in the primary study area, beginning at and including the downstream side of Shasta Dam and extending to Red Bluff Pumping Plant that could be affected by the project. Figure 18-2 shows the recreation facilities in the upper Sacramento River portion of the primary study area.

Shasta Dam Reclamation controls public access at Shasta Dam. For several years, access was available only by permit for security reasons; since 2010, visitors have been allowed to drive across the dam between 6 a.m. and 10 p.m. after producing a valid driver's license and vehicle registration and subjecting their vehicle and any trailer to inspection (Reclamation 2010).

The area immediately below the dam, where the Shasta Powerplant and associated infrastructure is located and where water is released from Shasta Dam and the powerplant, is closed to public use for safety and security reasons.

Shasta Dam to Keswick Dam Recreation facilities provided along this portion of the Sacramento River include the Chappie-Shasta Off-Highway Vehicle (OHV) Area, Sacramento River Rail Trail and other trails, Shasta Campground, and Keswick Reservoir Boat Ramp.

Keswick Reservoir occupies nearly the full length of the narrow river gorge that stretches 9 miles from Shasta Dam to Keswick Dam. The reservoir has a healthy population of wild trout, including German browns and rainbows, and fish are occasionally planted by CDFW.

The Chappie-Shasta OHV Area, managed by the U.S. Department of the Interior, Bureau of Land Management (BLM), Redding Field Office, provides opportunities for OHV use on 200 miles of roads throughout 52,000 acres of land. Two staging areas provide access to OHV roads and trails that are rated difficult and moderate. Those roads and trails are open to two-wheeled motorcycles, all-terrain vehicles, and four-wheel-drive high-clearance vehicles (BLM 2006). The Shasta staging area and campground are situated close to the river about 1 mile below Shasta Dam. The campground has 30 campsites for tents and RVs. No water or electricity hook-ups are available (USFS 2010b).

The Sacramento River Rail Trail, a nonmotorized-use National Recreation Trail, extends more than 10 miles along an old railroad line and closely follows the west side of the river and of the shoreline of Keswick Reservoir. The wide and generally flat gravel-surface trail is open year-round to equestrians, hikers, and bicyclists. Trailheads are located at the Chappie-Shasta OHV Area, at Keswick Boat Ramp and Rock Creek, at the southern terminus of the trail, and at a location near the midpoint of the trail. The BLM lands above the east side of Keswick Reservoir have more than 20 miles of trails, primarily single-track nonmotorized trails with a dirt surface, connecting at the north end to Shasta Dam (Healthy Shasta 2009).

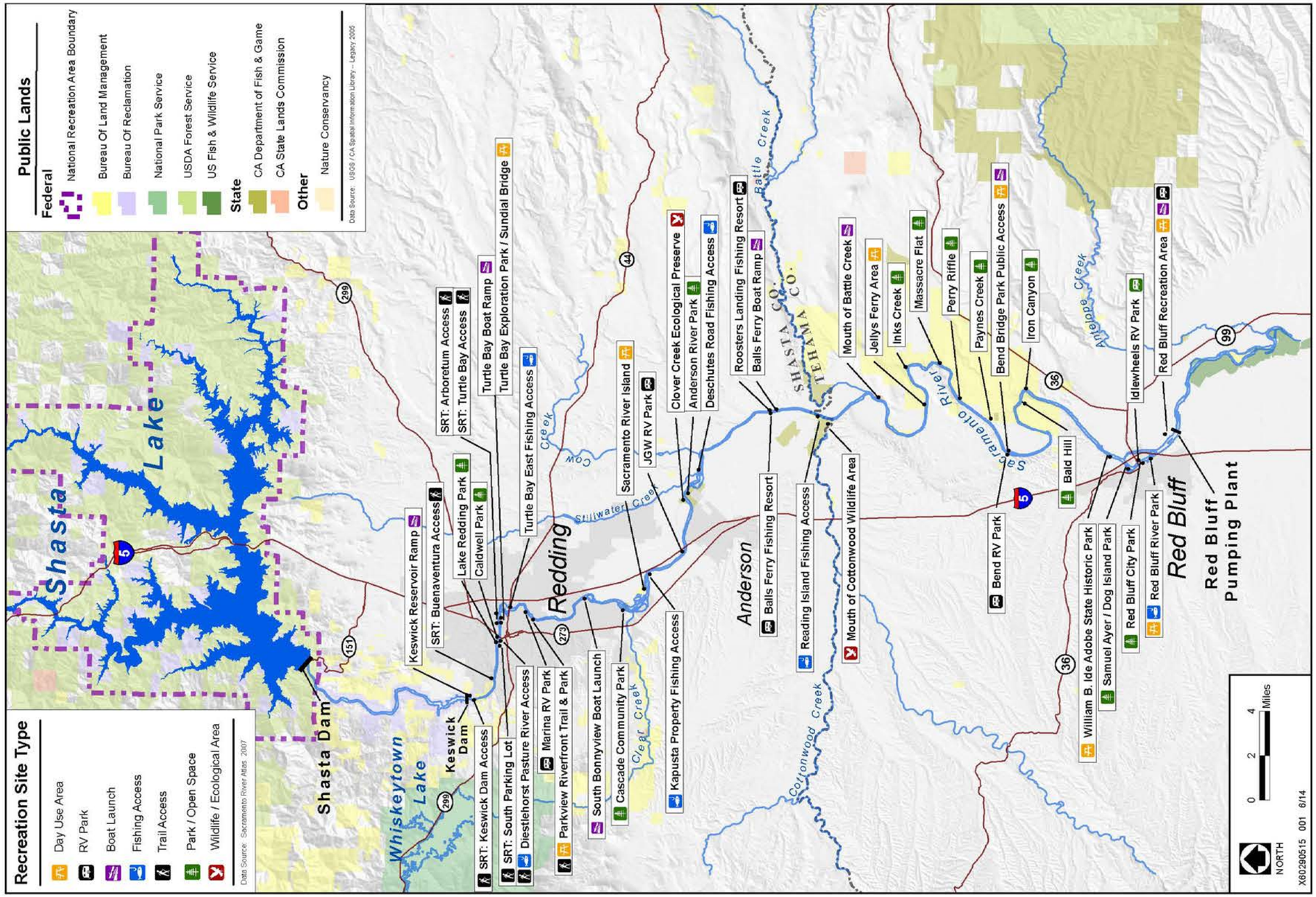

Figure 18-2. Recreation Facilities in the Upper Sacramento River Portion of the Primary Study Area

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Keswick Dam to the Red Bluff Pumping Plant This area encompasses about 60 miles of the Sacramento River and contains the majority of recreation resources and public access sites within the primary study area. Recreational activities are numerous within this area and include fishing, boating, hiking, horseback riding, biking, hunting, camping, picnicking, wildlife viewing/nature observation, viewing historic sites, and enjoying developed urban recreational activities such as soccer and baseball. The discussion below provides a brief overview of the activities supported by the Sacramento River and riverside recreation facilities, followed by additional details about recreation facilities.

Recreational Setting and Activities Between Keswick Dam and the Red Bluff Pumping Plant, the Sacramento River flows past cities and towns and both private and public lands. The riparian forests along the river, the oak woodlands and grasslands on higher ground, and riverside bluffs provide a scenic setting for river users at riverside recreation facilities and for boaters and anglers on the river. The riparian landscape between Redding and Red Bluff is described as the most unspoiled of the entire 375-mile river (DBW 2011a). BLM owns and manages much of the riverside lands between Balls Ferry and Red Bluff (approximately River Mile (RM) 250 to RM 276).

The climate of the northern Sacramento Valley is hot and dry during the summer, with daily high temperatures averaging in the upper 90s Fahrenheit and little or no precipitation. Winter climate can be described as moderate but wet, with average daily high temperatures in the mid-50s during December and January and an average of 4-8 inches of rain per month between November and March.

River use and recreation opportunities available vary throughout the year with the highly variable flow of the river. During the winter and spring, the river may have short-term peak flows of 80,000 to 90,000 cubic feet per second (cfs) and is usually flowing above 20,000 to 30,000 cfs. Flows are less variable during the summer and fall, with typical summer flows of 10,000 to 15,000 cfs and typical fall flows of 5,000 to 10,000 cfs (DWR 2011b). BLM identifies flows of 6,000 to 12,000 cfs as optimal for boating (BLM no date). River temperature is cold year-round because of the release of water from the deep cold-water layers of Keswick Reservoir, and Shasta Lake upstream. Winter water temperatures are in the 40s Fahrenheit and summer water temperatures do not rise above the mid-50s.

The Sacramento River is known for good fishing opportunities. Species such as salmon, steelhead, rainbow trout, sunfish, largemouth bass, and striped bass can be found within the river. Fly fishing is popular, especially when flows are 5,000 to 8,000 cfs, which typically occurs during fall and early winter (Fly Fishing Connection 2003).

Boating opportunities are abundant along the Sacramento River from Keswick Dam to the Red Bluff Pumping Plant. Eight sites along the river provide public boat ramps and two additional sites permit car-top launch and retrieval.

Although the Sacramento River is not generally considered a whitewater river, there are two easy whitewater runs on this section of the river. The first is from Keswick Dam to the Anderson-Cottonwood Irrigation District Diversion Dam in Redding. The second run is from Anderson River Park to William B. Ide Adobe State Historic Park. This run is 22 miles long and rated Class I to Class II. The Class II China Rapid is a few miles upstream from Red Bluff (Tuthill 2005).

Opportunities for trail activities such as walking, jogging, bicycling, and horseback riding are available throughout this stretch of the river. There are 21 sites with trails or access to trails. The most notable trails along this section of river are the Sacramento River Trail and the trails that connect BLM lands below Balls Ferry.

Hunting opportunities are located primarily on BLM land along the Sacramento River. The main hunting areas along the river are Inks Creek, Massacre Flat, Perry Riffle, Paynes Creek, Bald Hill, and Iron Canyon. Hunting is permitted on BLM land unless posted as closed (e.g., along hiking trails and at developed recreation areas). Game species found on BLM lands include quail, dove, waterfowl, deer, pig, bear, and turkey (BLM 1992).

Opportunities for developed camping along or near the river are located mainly at privately operated RV parks and fishing resorts, and are also provided at the public Red Bluff Recreation Area. Most camping opportunities are for RVs, but a few tent and group camping sites are available. Primitive camping is available at five sites within the BLM Sacramento River Area, between about Battle Creek and Payne's Creek, about 10 miles upstream from the Red Bluff Pumping Plant. River visitors may also camp on undeveloped BLM land in the area. The mouth of Inks Creek and 0.75 mile above and below the mouth is closed to camping (BLM 1992).

The Sacramento River corridor provides a beautiful setting for picnickers. A total of 21 sites along this river reach provide picnicking facilities; these sites include municipal parks, RV parks and fishing resorts (private facilities), William B. Ide Adobe State Historic Park, boat ramps, and fishing access sites. Generally, facilities include picnic tables, shade structures (or trees), and barbeque pits.

Another recreation opportunity available along the Sacramento River is viewing historic sites. Historic sites or historical markers exist at a handful of locations.

The Sacramento River meanders through the small cities of Redding, Anderson, and Red Bluff. The municipal parks along this section of the river provide developed urban recreation opportunities such as horseshoes, soccer, and baseball, as well as playgrounds and a swimming pool.

Recreational Facilities More than 40 recreation/public access sites are available along the Sacramento River between Keswick Dam and the Red Bluff Pumping Plant. For this analysis, these sites have been categorized by primary use as

municipal parks, fishing access/day-use areas, boat launches, trail accesses, RV parks, wildlife areas, and undeveloped open space areas. Table 18-2 describes these facilities by type.

Table 18-2. Summary of Recreation Sites along the Sacramento River Between Keswick Dam and the Red Bluff Pumping Plant

Type of Facility	Number	Description
Public Facilities		
Municipal park	6	Managed by the Cities of Redding, Anderson, and Red Bluff. All sites provide parking and picnic sites. Most have restrooms and trails. Several also have boat ramps and two sites have hand launching. Other amenities include horseshoe pits, sports fields, swimming pools, playgrounds, a skateboard park, a fish viewing area, and a bike riding area.
Boat launch	7	Managed by the City of Redding, Shasta County, Tehama County, the State Lands Commission, and the City of Red Bluff. All provide parking and most provide restrooms. One site is a Point of Historical Interest and one site provides raft rentals.
Trail access	6	Managed by Reclamation and the City of Redding. Primarily provide access to Sacramento River Trail. All provide parking, two provide picnic sites, and one provides restrooms. One site has a historical marker and one has a historic powerhouse.
Fishing access/ day-use area	7	Managed by the City of Redding, BLM, and Shasta County. Most provide parking and access to trails. Other amenities include ponds, boat ramps, day-use facilities, group camping, and a community garden.
Wildlife area/ ecological reserve	2	Both managed by CDFW. Mouth of Cottonwood Creek Wildlife Area has parking facilities. Clover Creek Ecological Preserve has no facilities.
Open space area	6	All are managed by BLM. Most have trails, three have parking, and two have restrooms. Other amenities include hand launching, picnic sites, walk-in camping, fishing pond, and beaches. Three are trail or boat access only.
Other public park	2	Red Bluff Recreation Area, administered by USFS, provides river access, day-use, and camping facilities; also includes the Sacramento River Discovery Center. William B. Ide Adobe State Historic Park is a small State Parks unit focused on a historic adobe and related structures.
Subtotal	*35*	
Private/Commercial Facilities		
Educational/nature Park	1	Turtle Bay Exploration Park; includes a museum, butterfly house, live animals, and parking, with access to a scenic pedestrian bridge over the river and the Sacramento River Trail.
RV park	7	The largest facility provides 174 RV sites, four other facilities provide from 44 to 85 RV sites; two “fishing resorts” provide 12 and 20 RV sites. Most provide a boat ramp and showers; other amenities include tent sites, restaurants, swimming pools, a store, a bar, and a group campground.
Subtotal	*8*	
Total – All Facilities	**43**	

Key:
BLM = U.S. Department of the Interior, Bureau of Land Management
CDFW = California Department of Fish and Wildlife
Reclamation = U.S. Department of the Interior, Bureau of Reclamation
RV = recreational vehicle
State Parks = California Department of Parks and Recreation
USFS = U.S. Department of Agriculture, Forest Service

Municipal Parks Municipal parks in this river section consist of Lake Redding Park, Caldwell Park, and Cascade Community Park (City of Redding); Anderson

River Park (City of Anderson); and Samuel Ayer/Dog Island Park and Red Bluff City Park (City of Red Bluff) (CSUC 2006, City of Redding 2004, City of Anderson 2007). Most of the municipal parks provide facilities such as trails or trail access, restrooms, playgrounds, ball fields, swimming pools, horseshoe pits, and picnic sites. Lake Redding Park (Lake Redding is created by the Anderson-Cottonwood Irrigation District Diversion Dam) provides boating facilities, trails, picnic facilities, horseshoe pits, and restrooms. Anderson River Park provides a similar range of amenities, including a boat ramp.

Fishing Access and Day-Use Sites There are four public fishing accesses in this reach of the Sacramento River: the Turtle Bay East, Kapusta Property, Deschutes Road, and Reading Island fishing accesses. All of the fishing accesses provide parking and most provide trails as well. The sites are managed by the City of Redding, Shasta County, and BLM (CSUC 2006). Reading Island provides a cement boat ramp along a slough leading to the river, but sedimentation and dense aquatic vegetation limit use to small car-top boats. Primitive group camping is also available at Reading Island, under a special-use permit issued by BLM (BLM no date).

Three day-use sites are available on this stretch of the Sacramento River. These sites may provide both fishing and trail access, like that found at Diestlehorst Pasture River Access, managed by the City of Redding. Two BLM-managed day-use sites, Jellys Ferry and Sacramento River Island, are also available (CSUC 2006).

Boat Launch Facilities There are seven sites on this river reach that are primarily for boat launching: Turtle Bay Boat Ramp, Caldwell Park Boat Ramp, and South Bonnyview Boat Launch, operated by the City of Redding; Balls Ferry Boat Ramp, operated by Shasta County; Mouth of Battle Creek Boat Launch, owned by the State Lands Commission; Bend Bridge Park Public Access, operated by Tehama County; and Red Bluff River Park, operated by the City of Red Bluff.

Trails and Trail Access Facilities The Sacramento River Trail is a 13-mile paved urban trail system along the riparian corridor on both sides of the river from Keswick Dam to Turtle Bay Park in Redding. Two pedestrian bridges cross the river to create a loop of about 5 miles. At least six sites provide primary access to the trail and a few other sites provide connections to the trail (Healthy Shasta 2008).

Unlike the boating and day-use facilities that occur throughout this river reach, the trail access sites are primarily on the portion of the river that flows through Redding. Six specific Sacramento River Trail access sites and five other sites, all provided by the City of Redding, also provide access to the Sacramento River Trail.

RV Parks There are seven privately operated RV parks along this reach: one in Redding (Marina RV Park), three in the Anderson area (JGW RV Park, Balls

Ferry Fishing Resort, and Roosters Landing Fishing Resort), one near the community of Bend (Bend RV Park), and two in Red Bluff (Idlewheels RV Park and Durango RV Resort). The two largest parks offer 85 and 174 RV sites. Two of the parks also offer tent camping, and two parks offer group camping. All of the RV parks offer picnic facilities and most offer showers. Three of the parks offer boat launches. Two of the parks offer a restaurant and one offers a bar, swimming pool, and store. The largest park, a new facility in Red Bluff, offers a lap pool and spa, a lodge, two clubhouses for meetings, and 45 acres of surrounding land with walking trails (CSUC 2006).

Wildlife Areas There is one CDFW-owned and managed area along this river reach, the Mouth of Cottonwood Creek Wildlife Area. A parking area is the only improvement at the site. The area is excellent habitat for Swainson's hawk, bald eagle, ringtail, and river otter and provides good wildlife viewing, birding, and photography opportunities (CDFG 2011).

Undeveloped Public Lands There are six areas between Inks Creek and Iron Canyon that, for this analysis, are considered undeveloped open space areas: Inks Creek, Massacre Flat, Perry Riffle, Paynes Creek, Bald Hill, and Iron Canyon. All six areas are managed by the BLM Redding Field Office. Other than parking areas, few facilities are available at most of these areas; they are mainly large open areas available for general public use and enjoyment (CSUC 2006).

Other Public and Private Parks Turtle Bay Exploration Park in Redding is a privately operated facility that contains a museum, butterfly house, forest camp replica, arboretum, and gardens. The park provides access to the scenic Sundial pedestrian bridge over the river, and access to the Sacramento River Trail (Turtle Bay Exploration Park 2011). The 3-acre William B. Ide Adobe State Historic Park in Red Bluff focuses on several historical elements and provides parking, trails, picnic facilities, and restrooms (State Parks 1990).

Lower Sacramento River and Delta

Recreation opportunities on the Sacramento River downstream from Red Bluff Pumping Plant include hunting, fishing, boating, RV/tent/group camping, birding, wildlife viewing, picnicking, hiking, and sports activities (softball, soccer, tennis, basketball, and horseshoes). The 100-mile stretch of river down to Colusa includes many parcels of public conservation and recreation lands, as well as a few privately owned commercial recreation sites. There are two primary landowners on the river: the USFWS, with more than two dozen units of the Sacramento River National Wildlife Refuge totaling more than 10,300 acres (many of which are closed to the public) (USFWS 2005); and CDFW, with more than 15 units of the Sacramento River Wildlife Area totaling more than 3,700 acres (most open to the public but accessible only by boat) (CDFG 2004). The California Department of Parks and Recreation (State Parks) operates three park units (one State park and two State recreation areas) on the river between Red Bluff and Colusa–one each near Corning (RM 218), Hamilton City (RM 193 to

RM 200), and Colusa (RM 145) (CSUC 2006). An additional State recreation area is located on the Sacramento River in the Delta.

Recreation facilities are located primarily between Red Bluff and the Bidwell-Sacramento River State Park near Hamilton City, about 50 river miles downstream, because of the availability of the State park facilities and privately owned RV parks and resorts. Downstream from Bidwell-Sacramento River State Park, the variety and density of facilities are reduced. Facilities vary from boat ramps and marinas to campgrounds, picnic sites, and trails (CSUC 2006). Beyond the Red Bluff Pumping Plant, recreation and public access would not likely be affected with implementation of the project; therefore, an in-depth review of recreation activities and facilities south of the Red Bluff Pumping Plant is not presented in this analysis.

CVP/SWP Service Areas

CVP and SWP facilities and service areas are widespread throughout much of California. Facilities include multiple dams, reservoirs, and canals that provide substantial water-based recreational activities. Releases from dams on major tributaries to the Sacramento River provide numerous recreational opportunities, especially boating and fishing. Reservoirs such as Folsom, Oroville, and New Melones provide boating, fishing, camping, and other recreational activities.

18.2 Regulatory Framework

18.2.1 Federal

U.S. Forest Service

Shasta Lake and the surrounding Federal lands compose the Shasta Unit of the Whiskeytown-Shasta-Trinity NRA, established by Congress in November 1965 to provide for public outdoor recreation use and enjoyment, among other purposes. Both the Shasta and Trinity units of the NRA are within the Shasta-Trinity National Forest (STNF) and are administered by USFS. The act establishing the NRA specified that it was to be administered in a manner coordinated with other purposes of the CVP. Reclamation retained management of lands and waters needed for operating the CVP, and controls operation of Shasta Dam and reservoir pool levels. The lake surface and surrounding lands are administered by USFS (an exception is the area in the immediate vicinity of the dam, which is administered by Reclamation).

USFS manages recreation within the Shasta Unit under the authority of the 1987 Master Interagency Agreement between Reclamation and USFS. Administration of the Shasta Unit of the NRA is coordinated with the administration and purposes of the CVP through a memorandum of agreement between Reclamation and USFS established December 31, 1986. The management of Shasta Lake is guided by the 1995 *Shasta-Trinity National Forest Land and Resource*

Management Plan (STNF LRMP) and the *Management Guide: Shasta and Trinity Units of the Whiskeytown-Shasta-Trinity NRA* (USFS 2014).

Shasta-Trinity National Forest Land and Resource Management Plan (1995) The STNF LRMP (USFS 1995a) guides management of both the Shasta and Trinity national forests with the goals of integrating a mixture of management activities that protect forest resources and allow use, fulfill guiding legislation, and address local, regional, and national issues. The project is located within two management units–the Shasta Unit of the Whiskeytown-Shasta-Trinity NRA, which includes Shasta Lake and surrounding lands, and the Front Unit, which includes USFS lands south of the lake. As stated in the STNF LRMP, the Shasta Unit is managed according to the current NRA Management Guide. The portion of the Front Unit located within the primary study area (south of the lake) is managed under Matrix Prescription III, Roaded Recreation. This prescription "emphasizes recreational opportunities associated with developed road systems and dispersed and developed campsites" (USFS 1995a). The STNF LRMP states that this prescription is also the primary prescription for the Shasta Unit of the NRA. The plan provides relevant recreation-related standards and guidelines to ensure road, trail, and facility development and management activities consistent with a Roaded Natural setting.

Shasta-Trinity National Recreation Area Management Guide (2014) The *Shasta-Trinity National Recreation Area Management Guide* (USFS 2014) integrates management of the NRA with and implements the direction in the STNF LRMP. The guide addresses key management concerns related to recreation and other resource management, such as the types and amounts of commercial and USFS recreation facilities to be provided. Desired future conditions for Shasta Lake are described, and management recommendations aimed at implementing the STNF LRMP and achieving desired future conditions are detailed for both lake and land-based recreation and for commercial recreation operations within the NRA.

Mendocino National Forest Land and Resource Management Plan (1995) The *Mendocino National Forest Land and Resource Management Plan* (Mendocino National Forest LRMP) (USFS 1995b) guides management of the Mendocino National Forest with the goals of integrating a mixture of management activities that protect forest resources and allow use, fulfill guiding legislation, and address local, regional, and national issues. Management Area #38, Red Bluff Recreation Area, is at the extreme downstream end of the primary study area. (The Red Bluff Recreation Area was transferred from Reclamation ownership in the late 1980s and is isolated from the rest of the National Forest; all other lands are well to the west of the study area.)

The Mendocino National Forest LRMP states that management and development should conform to the record of decision for the Final EIS for the Red Bluff Recreational Development. Relevant recreation-related major aspects of this decision include a management direction emphasizing supplying quality water-

oriented recreation experiences for the public, maintaining a safe setting for recreational users, and providing educational and interpretive opportunities. The management area is also managed under the Recreation Area prescription, which "provides direction for maintaining attractive landscapes and recreation quality around major lakes and within other areas of concentrated recreation use" (USFS 1995b). The area is to be managed to maintain a Recreation Opportunity Spectrum (ROS) class of "Roaded Natural."

U.S. Bureau of Land Management

Overview BLM administers most of the public lands along the Sacramento River between Shasta Dam and Keswick Dam, and additional lands between Keswick Dam and the City of Redding, as part of the 23,000-acre Interlakes Special Recreation Management Area. BLM administers the Chappie-Shasta OHV Area, which encompasses 52,000 acres and 250 miles of roads and trails between the Sacramento River and Clear Creek. BLM also administers more than 17,000 acres of public lands on both sides of the river within the Sacramento River Management Area, which extends from just downstream from Redding downstream to the Tehama County/Glenn County boundary, about 25 miles south of Red Bluff. Most of the BLM lands are concentrated above Red Bluff, between Jellys Ferry and Iron Canyon. A few hundred additional acres of BLM lands are at two island parcels downstream from Red Bluff.

Proposed Redding Resource Management Plan and Final EIS (1992) The proposed resource management plan (RMP) and Final EIS (BLM 1992) for the Redding Resource Area (BLM 1992) identifies proposed management direction for BLM-administered public lands within the Redding Resource Area, totaling approximately 250,000 acres of land in north-central California. The RMP focuses on resolving four main issues: land tenure adjustment, recreation management, access, and forest management. BLM selected a preferred alternative for each of the seven management areas; collectively these preferred alternatives compose the proposed action of the RMP. The project is located within the Shasta and Sacramento River management areas. The Shasta Management Area includes the lands southwest of Shasta Lake within the Interlakes Special Recreation Management Area. General recreation management direction for the entire Redding Resource Area is also provided within the RMP and focuses on ROS designations and guidelines, camping limits, OHV designations, and wild and scenic rivers.

Recreation-related management direction for the Interlakes Special Recreation Management Area includes objectives to provide a regional opportunity for motorized recreation with a focus within the Gene Chappie-Shasta OHV Area and to enhance nonmotorized recreation opportunities within the area via a greenway connecting Redding to Shasta Dam along the Sacramento River. Motorized vehicle use is limited to designated roads and trails that may be closed between November 15 and April 15 to protect the wintering deer herd. The area is managed as Semi-Primitive, Non-Motorized, Semi-Urban, Semi-Primitive Motorized, and Roaded Natural (ROS classes).

The Sacramento River Management Area includes the Sacramento Island area, between Redding and Anderson, a large block of contiguous parcels along the river between Balls Ferry (RM 276) and Iron Canyon (RM 250), and two islands downstream from Red Bluff. Recreation-related management direction for these areas includes management within the Semi-Primitive Motorized ROS class, closure to motorized vehicles, and an emphasis on boat-in access and use. Because of the special value of the Valley oak riparian forest at Sacramento Island, the area has been designated as a Research Natural Area/Area of Critical Environmental Concern, with special management plans to protect and improve the plant communities and habitat there.

The 25 miles of the Sacramento River between Balls Ferry and Iron Canyon have been determined to be eligible for inclusion in the National Wild and Scenic Rivers System, with recreational, scenic, and wild classifications for various segments. All public lands within one-quarter mile of normal high water will be managed to protect the outstandingly remarkable values and free-flowing character that led to their determination of eligibility.

18.2.2 State

California Department of Fish and Wildlife

CDFW manages the ecological reserve and the wildlife areas within the study area under Title 14 of the California Code of Regulations and the California Fish and Game Code. The regulations provide for various types of public uses in the wildlife areas. However, fish and wildlife protection and enhancement are the primary management purposes of the wildlife areas; recreation and public use is secondary to habitat preservation. Ecological reserves are established to provide rare, threatened, or endangered plants and wildlife and special habitat types; public entry may be restricted to protect wildlife or habitat.

The CDFW-administered wildlife areas on the Sacramento River within the primary and extended study areas are designated by the California Fish and Game Code as “Type C” areas, which generally have no or minimal developed facilities. A “Type C” area designation does not require hunters to have a permit or pass (other than a valid California hunting license and any required stamps) for most areas. General “Type C” area regulations apply to all of the wildlife areas within the study area; special regulations for each area prohibit camping and establish other restrictions on hunting and other uses (see Title 14 of the California Code of Regulations).

CDFW interacts with other management agencies in the study area to ensure that hunting and fishing regulations are enforced on public and private lands and maintains authority over all activities that have the potential to affect wildlife or wildlife habitat. CDFW administers the waterfowl hunting program on a number of Federal wildlife refuges, including the Sacramento River National Wildlife Refuge.

California Department of Parks and Recreation

The California Department of Parks and Recreation (State Parks) manages the State park and recreation areas within the study area under Title 14 of the California Code of Regulations and the California Public Resources Code. Specific management direction and guidance is provided by general plans for individual parks. A preliminary draft general plan was completed for the Bidwell-Sacramento River State Recreation Area in 2003 (a final plan was approved by the California Park and Recreation Commission in 2006 but has not been published). The plan provides specific goals and guidelines for a range of issues related to environmental resources, visitor use and opportunities, and park administration and operations. Additional direction for facility development at each of the park's four subunits is also provided. The management recommendations in the 1990 general plan for William B. Ide Adobe State Historic Park focus on protecting the historic integrity that is the primary value of the 3-acre site, and on protecting the riparian forest in the riverbank area (State Parks 1990). No current park management plans were available for the two other small State Parks units on the river.

18.2.3 Regional and Local

Shasta County

The Open Space and Recreation Element of the *Shasta County General Plan* (Shasta County 2004) is intended to preserve open space for the economy, enjoyment of scenic beauty, recreation, and use of natural resources. The Open Space and Recreation Element addresses recreation as it relates to the tourist industry and recreation at the countywide level. Recreation is considered the active use of open space land. "Recreational areas are essentially open space lands which are designed to accommodate recreational activities such as hiking, picnicking, or camping" (Shasta County 2004). Several sites that fall under the recreation analysis herein are included under Shasta County's Open Space Inventory: the STNF, BLM holdings, Balls Ferry Fishing Access, Anderson River Park and Fishing Access, Lake Redding-Caldwell Memorial Park, Turtle Bay Regional Park, Turtle Bay East, privately owned and operated recreational facilities such as resorts and RV parks, and historic landmarks and points of interest (Shasta County 2004).

The Open Space and Recreation Element describes goals and objectives for protection of open space and recreation resources including the following (Shasta County 2004):

- Protection of open space through certain land-use classifications
- Coordination of parks and recreation systems planning, acquisition, development, and operation among Federal, State, county, and city governments

- Using the National Resource Protection-Recreation Resources land use designation to protect the quality of recreation resource values of national parks and recreation areas, wilderness areas, and State parks

- Permitting commercial recreation uses

- Requirement of public access and easements provided by the Subdivision Map Act along the Sacramento River (Keswick Dam to the county line) and Battle Creek (downstream from Coleman Powerhouse)

- Provision of public access and easements for recreation if riparian habitat is not significantly affected, public access is not available within a reasonable distance, or the corridor is located near urban, town, and rural community centers

The Public Facilities Element contains a discussion of recreation at the community level. The element states that the "community recreation needs of Shasta County residents and the degree to which these needs are met by County government vary with the type of community in which they live" (Shasta County 2004). Recreation needs in urban areas are primarily for publicly owned parklands. The element identifies that "recreation officials in the unincorporated urban areas of the County indicate that a substantial portion of the recreation needs of the residents of these communities is not being met" (Shasta County 2004).

An increase in recreational demand is expected as a result of the growth of urban areas over the 20-year planning period. County policy "will rely upon interagency planning efforts and providing long-term protection of resource and open space lands and features that exhibit future recreation potential" (Shasta County 2004).

The objective in the Public Facilities Element related to recreation describes developing a land use pattern that adequately serves for community recreation. The policy that supports this objective relates to designation of the locations of existing and proposed large-scale community recreation facilities as Natural Resources Protection Parklands (Shasta County 2004).

Tehama County

The Open Space and Conservation Element of the *Tehama County General Plan Update 2009 – 2029* (March 2009) (Tehama County 2009) addresses several resource areas, including Natural Resource Land and Recreation. The element includes a brief description of national forests located within the county, Lassen Volcanic National Park, BLM lands, State parks, Black Butte Lake (USACE), and county parks. The element states one overarching Natural Resource Land and Recreation goal (Goal OS-9): "To protect and enhance resource lands in the County for the continued benefit of agriculture, timber, grazing, recreation, wildlife habitat, and quality of life" (Tehama County 2009). Supporting policies aim to do all of the following:

- Protect and enhance resource lands
- Protect reasonable access to resource lands and not unreasonably deprive users of enjoyment of previously accessible areas through closure
- Coordinate natural resource practices and recreation plans of different jurisdictions and assure cooperation
- Promote recreation opportunities including agritourism, nature tourism, and environmental learning tourism

The Public Services Element of the general plan includes goals and policies related to recreation facilities. The goals and policies aim to develop local services that meet local needs in a cost-effective manner, including supporting enhanced recreation services for existing and future residents, and obtaining dedicated lands for new schools, libraries, and recreational facilities when existing facilities are not adequate.

City of Redding

The Recreation Element of the City of Redding's general plan (City of Redding 2000) contains goals, objectives, and policies addressing natural and scenic open areas, development of a regional river parkway, archaeological and historic resources related to park and recreation sites, park planning and development, compatibility with adjacent land uses, facility funding and management, recreation programs, a citywide trail system, and vandalism and user safety. The plan specifically recognizes the Sacramento River as "the backbone of the City's park system." Policies are established in the plan for a regional river parkway and for trails along the river, including continued development of the Sacramento River Trail.

The *City of Redding Parks, Trails, and Open Space Master Plan* (City of Redding 2004) includes as part of its parks strategy Goal PK4, "The Sacramento River and its major tributary streams will continue to be the focus and the organizing principle of the park, trail, and open space system." In addition, the plan establishes Goal TB1 within the Trails and Bikeway Strategy, "Promote and facilitate the development of a Citywide Trail System." A subgoal is to "continue development of the Sacramento River Trail to establish a common and continuous thread along the river corridor."

City of Anderson

The Recreation Element of the City of Anderson's general plan "addresses parks and recreation facilities throughout the Anderson Planning Area, including both those owned and maintained by the City of Anderson and those under the purview of other agencies or, selectively, private entities" (City of Anderson 2007). The element describes the city's parks, park classifications and standards, park issues, and the recreation trails network. One of the identified additional park needs is to extend, enlarge, and protect Anderson River Park, which is located within the

primary study area. Relevant recreation-related policies contained with the element aim to do all of the following:

- Allow for expanded and diverse recreational programs, areas, and opportunities
- Facilitate community and cultural opportunities
- Formalize and enhance walking trails in existing city parks
- Provide nonmotorized linkages between parks and open spaces
- Develop and promote community trails to provide health benefits for all residents
- Update the Parks and Recreation System Master Plan, incorporating appropriate provisions of the general plan (including the Trails-Sidewalks Network Concept Plan) into the master plan, and establish clear priorities and phasing plans as part of the master plan process

18.3 Environmental Consequences and Mitigation Measures

18.3.1 Methods and Assumptions

The project could affect recreation and public access resources through a variety of impact mechanisms. Primary effects on recreation facilities and recreation activities at Shasta Lake would be tied directly to the increased full pool elevation. Additional impacts could result from changes in reservoir operations that alter the magnitude, rate, or timing of reservoir drawdown; and from construction-related disruption of recreation access and activities at and near Shasta Dam. Primary conflicts with the use of recreation facilities and recreation-related activities on the Sacramento River and tributaries would be tied directly to the changes in flow regime of the rivers and the seasonal timing of those changes.

More specifically, this chapter evaluates the potential impacts on recreation and public access facilities and recreation activities resulting from the following mechanisms:

- Construction-related disruption of recreation access and activities at and near Shasta Dam
- Seasonal inundation of reservoir recreation facilities and shoreline access sites
- Changes in the magnitude, rate, or timing of reservoir drawdown
- Seasonal inundation of river recreation facilities or access sites

- Increased or decreased river flows during particular recreation use periods

- Disruption of recreation access and boating, or changes in river characteristics related to boating, caused by gravel deposition activities

The evaluation of impacts on Shasta Lake recreation facilities was based on several existing information sources. During previous phases of the project, a detailed inventory was prepared and mapping based on high-resolution aerial photographs was completed for all recreation facilities on or near the shoreline of Shasta Lake. The inventory data included descriptions and elevations for the features of each facility–buildings, paved and unpaved roads, paved and unpaved areas, and miscellaneous objects–up to an elevation 30 feet above the current full pool elevation of 1,067 feet above mean sea level. The inventory data included the lowest and highest elevations at which each feature would be affected (buildings excepted; only the lowest elevation was recorded for buildings). The inventory did not include buried infrastructure such as electric and water lines and septic systems. However, nearly all developed facilities on the lake are known to include these types of improvements, and these would also be among the features affected at most locations.

The SLWRI 2012 CalSim-II computer model was used to aid in the evaluation of potential impacts of the project on water-related resources, including recreation resources. This computer modeling used historical California hydrology data to represent the variety of weather and hydrologic patterns, including wet periods and droughts, under which the project would be operated. Each model run represented a constant level of development (2005 for the existing case and 2030 for the future case), so that the performance of the No-Action Alternative and other alternatives could be evaluated under both existing and future conditions.

For statements based on CalSim-II modeling results (e.g., statements regarding project impacts on mean monthly flow), “existing conditions” refers to modeling runs with 2005 facilities and demands; “future conditions” refers to modeling runs with forecasted 2030 demands and reasonably foreseeable future projects and facilities. The existing and future base cases are the without-project conditions in 2005 and 2030, respectively. The No-Action Alternative represents future conditions in 2030, including other reasonably foreseeable future projects and facilities.

The results of the CalSim-II modeling provide information about the seasonal changes in Shasta Lake pool elevation associated with each dam-raise height. This information was used in combination with the inventory data described above to determine impacts of the alternatives on recreation facilities and activities.

The CalSim-II results also describe flow characteristics for the Sacramento River downstream from Shasta Dam, and for other rivers downstream from reservoirs

within the CVP and SWP service areas whose operations may be affected by the project. These data were used to determine potential impacts on recreation and public access on the Sacramento River downstream from Shasta Dam and on tributary rivers and reservoirs within the CVP and SWP service areas. Both average increases and decreases in monthly pool elevation and mean monthly flows were considered with respect to impacts evaluated in this section. Preliminary assessments of impacts on public and commercial recreation facilities at Shasta Lake were reviewed by USFS and revised based on comments received.

A detailed description of the CalSim-II model, the modeling methodology used to evaluate this project, and key assumptions is provided in the Modeling Appendix. Summaries of the analysis and modeling results are provided in Chapter 6, "Hydraulics, Hydrology, and Water Management."

18.3.2 Criteria for Determining Significance of Effects

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by, or result from, the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. An environmental document prepared to comply with CEQA must identify the potentially significant environmental effects of a proposed project. A "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental effects (State CEQA Guidelines, Section 15126.4(a)).

The following significance criteria were developed based on guidance provided by the State CEQA Guidelines, and consider the context and intensity of the environmental effects as required under NEPA. Impacts of an alternative on recreation and public access would be significant if project implementation would do any of the following:

- Substantially affect the operability or seasonal use of or otherwise affect reservoir and river recreation facilities and access sites as a result of water level changes or flow regime modifications
- Substantially increase recreation use such that existing facilities would be used beyond their capacity and degraded
- Substantially reduce recreational opportunities or substantially degrade recreational experiences
- Create hazardous or unusual conditions for boaters, swimmers, waders, or other water-contact activities as a result of increased or decreased water levels related to flow regime modifications associated with the action alternatives

Significance statements are relative to both existing conditions (2005) and future conditions (2030) unless stated otherwise.

18.3.3 Topics Eliminated from Further Consideration

No topics related to recreation and public access that are included in the significance criteria listed above were eliminated from further consideration. All relevant topics are analyzed below.

18.3.4 Direct and Indirect Effects

No-Action Alternative

Under the No-Action Alternative, the existing Shasta Dam would be operated in the same manner as under current operations. Changes to the reservoir flow regime caused by changes in demand and other factors would be small, with a reduction in Shasta Lake storage of 2 percent to 4 percent during the fall of some years. Relative to existing conditions, the change in Shasta Lake storage under the No-Action Alternative would be minimal, ranging between -2 percent and 1 percent at most times. Also, no new project-related recreation facilities would be constructed and no existing facilities would be altered, expanded, or demolished.

If the project alternatives were not implemented, CVP and SWP operations would likely continue under existing regulatory requirements. Analysis of flow modeling indicates that there would be no significant changes in flows with the potential to affect recreation between existing conditions and future No-Action Alternative conditions.

Under the No-Action Alternative, changes to the flow regime of the upper Sacramento River caused by changes in demand and other factors would be small; mean monthly flows in the Sacramento River would be within ±5 percent of flows under existing conditions at most times. (Flows could increase by a greater amount during late summer and early fall of below-normal, dry, and critical water years[1].) Also, no new recreation facilities would be constructed and no existing facilities would be altered, expanded, or demolished.

Under the No-Action Alternative, the flow regime in the lower Sacramento River and Delta and in the CVP/SWP service areas would not change as a result of Shasta Lake operations.

Shasta Lake and Vicinity

Impact Rec-1 (No-Action): Increased Use of Shasta Lake Recreation Facilities and Demand for Recreation Opportunities on Shasta Lake and in the Vicinity

Demand for recreation facilities at Shasta Lake and in the vicinity is expected to increase, but recreation opportunities would still be extensive and varied. This impact would be less than significant.

[1] Throughout this document, water year types are defined according to the Sacramento Valley Index Water Year Hydrologic Classification unless specified otherwise.

Recreational use at Shasta Lake and in the vicinity is expected to increase in the future simply based on population growth in Northern California and southern Oregon from now until 2030. The resulting increase in demands on all recreational facilities and opportunities could affect the quality of the recreational activity. Recreational opportunities would still be extensive and varied in the area; however, and USFS management of the Shasta Unit of the Whiskeytown-Shasta-Trinity NRA would continue to respond to changing recreation needs. Because no substantial hydrologic changes are anticipated under the No-Action Alternative, this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Upper Sacramento River (Shasta Dam to Red Bluff)
Impact Rec-2 (No-Action): Increased Use and Demand for Recreation Opportunities on the Upper Sacramento River Demand for recreation facilities along the upper Sacramento River is expected to increase, but recreation opportunities would still be extensive and varied. This impact would be less than significant.

Recreational use in the upper Sacramento River portion of the primary study area is expected to increase in the future simply based on population growth in Northern California from now until 2030. The resulting increase in demands on all recreational facilities and opportunities could affect the quality of the recreational activity. Recreational opportunities would still be extensive and varied in the area, however. Because no substantial hydrologic changes are anticipated under the No-Action Alternative, this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Lower Sacramento River and Delta
Impact Rec-3 (No-Action): Increased Use and Demand for Recreation Opportunities on the Lower Sacramento River and in the Delta Demand for recreation facilities along the lower Sacramento River and in the Delta is expected to increase, but recreation opportunities would still be extensive and varied. This impact would be less than significant.

Recreational use in the lower Sacramento River and Delta portions of the extended study area is expected to increase in the future simply based on population growth in Northern and Central California from now until 2030. The resulting increase in demands on all recreational facilities and opportunities could affect the quality of the recreational activity. Recreational opportunities would still be extensive and varied in the area, however. Because no substantial hydrologic changes are anticipated under the No-Action Alternative, this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

CVP/SWP Service Areas
Impact Rec-4 (No-Action): Increased Use and Demand for Recreation Opportunities in the CVP and SWP Service Areas Demand for recreation

facilities in the CVP/SWP service areas is expected to increase, but recreation opportunities in the CVP/SWP service areas would still be extensive and varied. This impact would be less than significant.

Recreational use in the CVP/SWP service areas within the extended study area is expected to increase in the future simply based on population growth in California from now until 2030. The resulting increase in demands on all recreational facilities and opportunities could affect the quality of the recreational activity. Recreational opportunities would still be extensive and varied in the area, however. Because no substantial hydrologic changes are anticipated under the No-Action Alternative, this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

By increasing storage at Shasta Lake, this alternative would change the full pool elevation and seasonal pool elevations at Shasta Lake, and the flow regime downstream in the Sacramento River and potentially several other reservoirs and downstream waterways. In turn, these alterations to reservoir pool elevations and river flows could affect the usability of several types of recreation facilities on Shasta Lake and the downstream reservoirs and waterways, particularly marinas, boat ramps, and nearshore campgrounds and day-use areas. These alterations could also affect the ability of recreationists to use the reservoirs and waterways for boating, camping, fishing, and similar activities.

The full pool elevation of Shasta Lake would increase by 8.5 feet and the pool elevation would average as much as 6 to 10 feet higher than under existing (2005) and No-Action Alternative (2030) conditions at various times of the year. The greatest change would occur during the wettest years. The surface area of the reservoir at full pool would increase by about 1,100 acres (4 percent) with a 6.5-foot dam raise. The width of the water body would not increase substantially in most areas, and much of the increase would occur during spring rather than during the high-traffic summer boating period.

At most times, average flows for all year types in the upper Sacramento River within the primary study area (between Shasta Dam and the Red Bluff Pumping Plant) under CP1 would be within about ±5 percent of flows under existing (2005) and No-Action Alternative (2030) conditions.

Reservoir- and river-based recreation facilities and activities are similar in the primary and extended study areas downstream from Shasta Lake; thus, potential effects on reservoir and river recreation would be similar. However, changes to the flow regime affecting reservoirs and rivers in the extended study area would be increasingly attenuated by flows from tributary waterways and other water sources and diversions that are unaffected by the project, reducing the level of effects downstream.

Shasta Lake and Vicinity

Impact Rec-1 (CP1): Seasonal Inundation of Shasta Lake Recreation Facilities or Portions of Recreation Facilities and Public Access at Pool Elevations Above the Current Full Pool Elevation The 8.5-foot increase in full pool elevation associated with a 6.5-foot dam raise would cause seasonal inundation of recreation facilities or portions of facilities surrounding Shasta Lake. In many years, the reservoir would fill to an elevation greater than the current full pool elevation of 1,067 feet; in some years, it would fill to the new full pool elevation of 1,075.5 feet. In each case, portions of existing recreation facilities on the shoreline would be inundated, resulting in substantial effects. However, the affected recreation facilities would be relocated during construction and before inundation. As described in Chapter 2, "Alternatives," the replacement facilities would be of equivalent overall capacity and quality to the affected facilities; would provide comparable shoreline access, where applicable; and would comply with Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) guidelines. Therefore, this impact would be less than significant.

Within each of the three arms of Shasta Lake with recreation development, effects of implementing CP1 on individual recreation facilities would vary. These effects would range from no effect to effects on several of the facilities' inventoried and mapped features (e.g., roads, parking, and restrooms or other buildings) and on features not specifically inventoried (e.g., campsites and picnic sites). Table 18-3 shows the anticipated effects of CP1 on inventoried and mapped (developed) recreation facilities.

Table 18-3. Effects of CP1 on Developed Recreation Facilities at Shasta Lake

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
Sacramento Arm	
Boat Ramps	
1. Antlers Public Boat Ramp	Boat ramp length reduced but ramp usable; parking lot and restroom unaffected
2. Centimudi Public Boat Ramp	Boat ramp entirely affected, most of lower parking lot affected, access road to ramp and parking partly affected
Campgrounds	
1. Antlers Campground	No effect–all features are above full pool elevation
2. Gregory Creek Campground	One restroom affected and shoreline campsites affected
3. Lakeshore East Campground	One restroom, lower portion of access road, and some campsites affected; access substantially affected
4. Nelson Point Campground	Campground access road and possibly some campsites affected
5. Oak Grove Campground	No effect–all features are above full pool elevation

Table 18-3. Effects of CP1 on Developed Recreation Facilities at Shasta Lake (contd.)

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
Boat-in Campgrounds	
1. Gooseneck Cove Boat-in Campground	Some shoreline campsites likely affected
Day-Use Areas	
1. Fisherman's Point Day Use Area	Access road, parking, and restroom unaffected, but part of use area affected
2. Salt Creek Swim Area (nonoperational)	Restroom and portion of paved pathway affected
Marinas	
1. Antlers Resort and Marina	One building affected, boat ramp partially affected
2. Digger Bay Marina	Bottom portion of marina road/ramp affected, but effects appear minor
3. Shasta Marina Resort	Office and equipment shed affected, parking and access roads partially affected
4. Sugarloaf Resort and Marina	Electrical service building and associated structures affected, boat ramp and unpaved parking areas partially affected
Resorts (Nonmarina)	
1. Lakeshore Inn and RV Park	Shoreline campsites and walkway may be affected; access substantially affected
2. Lakeshore Villa RV Park	No effect–entire facility is above full pool elevation
3. Salt Creek Resort and RV Park	Resort unaffected; lower part of old road bed used as boat ramp affected, but usable
4. Shasta Lake RV Resort	No effect–entire facility is above full pool elevation; access substantially affected
5. Sugarloaf Cottages Resort	Unpaved shoreline access roads affected but usable
6. Tsasdi Resort	Entrance and exit roads connecting to Lakeshore Drive affected; resort cabins appear to be unaffected
Trails[1]	
1. Dry Fork Creek Trail	Trailhead and portion of trail along shoreline affected
2. Fisherman's Point Trail	Portion of trail along shoreline affected
Other Facilities	
USFS Lakeshore Fire Station	Five buildings affected, entrance road partially affected; access substantially affected
Salt Creek Recreation Residence Tract Cabins	No effect–all cabins are above full pool elevation
McCloud Arm	
Boat Ramps	
1. Bailey Cove Boat Ramp and Day Use Area	Boat ramp entirely affected, parking area, day-use area, and access road partially affected
2. Hirz Bay Public Boat Ramp	Boat ramp entirely affected; some of lower parking area likely to be affected

Table 18-3. Effects of CP1 on Developed Recreation Facilities at Shasta Lake (contd.)

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
Campgrounds	
1. Bailey Cove Campground	Campsites appear unaffected; access road may be affected
2. Dekkas Rock Campground	Lower part of loop road affected; possibly a portion of group camp affected
3. Ellery Creek Campground	Lower portion of loop road and shoreline campsites affected
4. Hirz Bay Campgrounds	No effect–entire facility is above full pool elevation
5. Kamloop Camp (private organization)	No effect–entire facility is above full pool elevation
6. McCloud Bridge Campground	Portion of access road affected; some campsites likely affected
7. Moore Creek Campground	Lower portion of loop road and shoreline campsites affected
8. Pine Point Campground	No effect–entire facility is above full pool elevation
Boat-in Campgrounds	
1. Greens Creek Boat-in Campground	Some shoreline campsites likely affected
Day-Use Areas	
1. Dekkas Rock Day Use Area	Lower portion of loop road and some parking affected
2. McCloud Bridge Day Use Area	Part of use area affected (no permanent infrastructure present)
Marinas	
1. Holiday Harbor Marina	Two marina buildings and boat ramp affected, overflow parking partially affected; RV park/campground likely to be partially affected
Trails[1]	
1. Bailey Cove Trail	Portion of trail along shoreline affected
2. Hirz Bay Trail	Portion of trail along shoreline affected
3. Samwel Cave Nature Trail	Portion of trail along shoreline affected
Other Facilities	
1. Bollibokka Club	No effect–entire facility is above full pool elevation
2. Campbell Creek Residence Tract cabins	At least four cabins affected, possibly others also affected
3. Shasta Caverns ferry landing	Access roads serving east and west shore landings partially affected; parking and building unaffected
4. USFS Station (Turntable Bay)	Four buildings affected and access road affected
Squaw Arm	
Other Facilities	
1. Didallis Recreation Residence Tract cabins	At least one cabin affected; possibly others also affected

Table 18-3. Effects of CP1 on Developed Recreation Facilities at Shasta Lake (contd.)

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
Pit Arm	
Boat Ramps	
1. Jones Valley Public Boat Ramp	Boat ramp entirely affected, access road from parking area partially affected
2. Packers Bay Public Boat Ramp	Boat ramp and information shelter affected, parking partially affected
Campgrounds	
1. Lower Jones Valley Campground	Footbridge associated with trail affected; culverts and creek may back up into campground during high-water periods
2. Upper Jones Valley Campground	No effect–entire facility is above full pool elevation
3. Mariners Point Campground	Some shoreline campsites likely affected
Boat-in Campgrounds	
1. Ski Island Boat-in Campground	Some shoreline campsites likely affected
2. Arbuckle Flat Boat-in Campground	Some shoreline campsites likely affected
Marinas	
1. Bridge Bay Resort and Marina	Seven buildings, boat ramp, parking lots, and roads affected
2. Jones Valley Resort	Three buildings and access road affected, parking area and resort roads partially affected
3. Packers Bay Marina	Boat ramp partially affected but usable
4. Silverthorn Resort	Parking and ramp mostly affected, shoreline road partially affected
Trails[1]	
1. Clikapudi Trail	Portion of trail along shoreline affected
2. Packers Bay Trails	Portion of trails (3 out of 4 trails) along shoreline affected
Other Facilities	
1. Silverthorn Recreation Residence Tract cabins	No effect–all cabins are above full pool elevation

Source: Reclamation 2003

Note:
[1] For some trails, trailheads are integrated into other recreation facilities. Alternative effects identified for standalone trailheads only.

Key:
CP = Comprehensive Plan
RV = recreational vehicle
USFS = U.S. Forest Service

On the Sacramento Arm, one of the two boat ramps, two of the five campgrounds, and one of the four marinas would be subjected to effects on several features or a substantial portion of the facility's use area. Access to three resorts in the Lakeshore area would be substantially affected due to accessibility despite minor

direct impacts to facilities. Other facilities that would be subject to major effects are the USFS Lakeshore Fire Station, Dry Fork Creek trail and trailhead, and Fisherman's Point trail. The only operational day-use area, one campground, and one boat-in campground would be subject to a somewhat lesser but still substantial effects, while several additional facilities would be subject to relatively minor effects.

On the McCloud Arm, the one marina and both boat ramps would be subject to major effects, as would the USFS station at Turntable Cove, and Bailey Cove trail. At least four of the cabins in the recreation residence tract at Campbell Creek would be affected. Effects would be less, but still substantial at four of the seven public campgrounds and one of the two day-use areas. The other day-use area, boat-in campground, and other two trails would have less-than-substantial effects.

On the Squaw Creek Arm, one private cabin in the Didallis recreation residence tract would be affected. On the Pit Arm, both of the boat ramps, three of the four marinas, and Clikapudi and Packers Bay trails would be subject to major effects, whereas one campground and two boat-in campgrounds would experience a lesser effect.

Although they are not included in the table because of a lack of permanent infrastructure, shoreline camping areas at Beehive Point (Sacramento Arm), Gregory Beach (Sacramento Arm), Lower Salt Creek (Sacramento Arm), and Jones Valley Inlet (Pit Arm) would also be subject to substantial effects with the inundation of access roads and use areas. Although Mariner's Point (Pit Arm) has no permanent restroom facility, minor infrastructure such as picnic tables and fire pits are provided.

It is important to note that effects on roads and bridges that are outside of the recreation facilities themselves but are used to access the facilities would also affect recreation at Shasta Lake. (Effects on roads and bridges are discussed in more detail in Chapter 20, "Transportation and Traffic.") A prominent example is the effect on a long stretch of Lakeshore Drive, the primary route on the west side of the Sacramento Arm providing visitors access to several commercial recreation facilities (marinas and nonmarina resorts) and a campground. Effects on the road would begin at a small segment near the north end of the Doney Creek Bridge and extend about 2 miles south to the Sugarloaf area. Two major bridges over inlets of the lake would be affected as well. (These roads and bridges are also used to access private homes and nonrecreation businesses.) Numerous segments of Shasta County and USFS roads that provide access to facilities or the shoreline on each of the lake's arms would also be affected.

In summary, the most prominent direct effects on recreation facilities and public access at Shasta Lake and in the vicinity from the 6.5-foot dam raise would be the major effects on five of six boat ramps, six of 15 family and group campgrounds, five of nine commercial marinas, three of six resorts, two of four recreation

residence tracts, and USFS stations on both the Sacramento and McCloud arms. A lesser effect would occur at several day-use areas, campgrounds, and boat-in campgrounds, and minor effects would occur at several additional facilities. Table 18-4 summarizes the number of recreation facilities of specific types substantially affected.

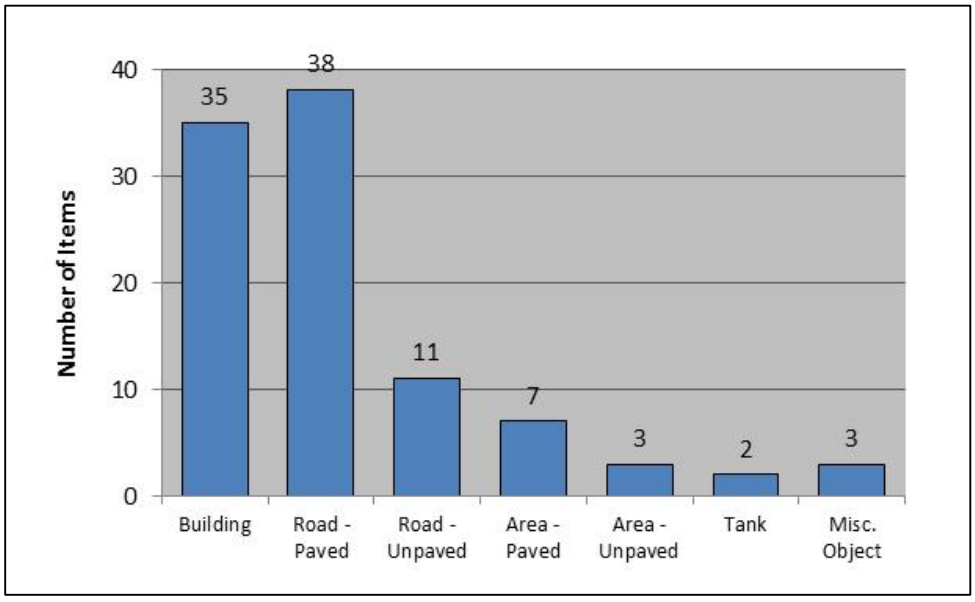
Table 18-4. Summary of Shasta Lake Recreation Facilities Substantially Affected by CP1

Type of Facility	Number of Facilities Affected
Boat ramp	5
Marina	5
Resorts	3
Campground (family and group)	6
Day-use area	1
USFS operations	2
Trailhead/Trails	1/5
Recreation residence tract	2

Source: Reclamation 2003

Key:
USFS = U.S. Department of Agriculture, Forest Service

Figure 18-3 depicts the total number of inventoried Shasta Lake recreation facility items, at all recreation facilities combined, that would be affected by inundation under CP1. A total of 99 facility and infrastructure elements would be affected, with nearly three-fourths of those being buildings and segments of paved roads. A lesser number of unpaved road segments, paved and unpaved areas (usually parking areas), tanks, and miscellaneous objects would also be affected.



Source: Reclamation 2003

Figure 18-3. Number of Recreation Facility Infrastructure Items Affected by a 6.5-Foot Dam Raise Under CP1

As described in Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," affected recreation facilities would be relocated as part of the construction activities for all action alternatives. This could include relocation of affected portions of facilities within existing use areas, in adjacent undeveloped areas, or at new sites in the general vicinity of the lake. While the preference will be to replace all recreation facilities in the immediate vicinity of the existing facilities, consolidation is possible due to institutional requirements and limitations. Because of the possible consolidation of facilities, the total number of facilities of specific types may be reduced. However, all affected recreation capacity would be replaced. Replacement facilities would be of equivalent overall capacity and quality to affected facilities and would provide comparable shoreline access, where applicable. With the relocation of affected facilities, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-2 (CP1): Temporary Construction-Related Disruption of Recreation Access and Activities at and near Shasta Dam Construction activity that would be necessary to raise Shasta Dam and complete related modifications would prevent recreation visitors from crossing the dam, and thus could affect other recreation activities in the area. These effects are expected only during the construction period. However, this impact would be potentially significant.

One of the primary routes used by recreation visitors to the Chappie-Shasta OHV Area, situated below Shasta Dam on the west side of Keswick Reservoir, crosses Shasta Dam. It is assumed that public access to the road crossing the dam would be temporarily suspended during the construction phase of the project. An alternative route to the Chappie-Shasta OHV Area from the south exists; however, that route requires several more miles of travel on unpaved roads than the route across the dam, and it may not be suitable for some visitors to the OHV area who bring OHVs to the area on trailers.

The road across the dam is also the primary access route to the Dry Fork Creek trailhead near the west end of Shasta Dam, used by hikers and anglers to access the Dry Fork Creek Trail, which follows the shoreline of Shasta Lake. Access to this trailhead and trail would be disrupted during the project construction period. (As noted under Impact Rec-1 (CP1) above, the trailhead itself would be destroyed by modifications to the dam and portions of the trail would be affected by the increased reservoir elevation.)

Construction at Shasta Dam would also result in a temporary cessation of Reclamation's public tours of the dam and powerhouse. In addition, noise, dust, and aesthetic changes would disturb recreation visits to the Shasta Dam Visitor Center (situated just below the east end of the dam).

For the reasons described above, this impact would be potentially significant. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

Impact Rec-3 (CP1): Effects on Boating and Other Recreation Use and Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the Reservoir An increase in the magnitude or rate or changes in the timing of the annual summer and fall drawdown of Shasta Lake could adversely affect boating enjoyment and safety on the reservoir. Conversely, a reduced or slower drawdown could have beneficial effects. However, under CP1, reservoir operations would be similar to existing operations, except during dry and critical water years. Little change would occur in the annual magnitude, rate, or timing of reservoir drawdown associated with any water year type. Therefore, this impact would be less than significant.

Over the past decade, Shasta Lake has had an average drawdown of about 67 feet from the annual high pool. (The annual high pool is typically reached in April or May; the reservoir is drawn down during summer and fall, before the winter rains arrive.) During most of those years, the drawdown has been in the range of 50 to 85 feet, but it has been as much as 108 feet and as little as 38 feet. Total drawdown, as compared to the full pool elevation of 1,067 feet (which the reservoir does not reach every year), has averaged about 77 feet and has been as great as 130 feet.

Both public launch ramps and commercial recreation facilities such as marinas and shoreline resorts on the lake are designed and operated to remain functional at a wide range of pool elevations, although some facilities are closed or have restricted use below certain pool elevations. Table 18-5 shows simulated exceedences for public boat ramp availability for selected months. Boaters familiar with the lake generally know to expect a substantial annual drawdown and are aware of the effects of drawdown on facilities and navigation on the lake. Signs at boat ramps and marinas warn boaters of the potential for rapidly changing conditions on the lake as a result of regular seasonal drawdowns.

Table 18-5. Simulated Percent Exceedence of Shasta Lake Boat Ramp Availability for Future Conditions

		May						
Boat Ramp	**Minimum Ramp Elevation (feet)**	**No-Action**	**CP1**	**CP2**	**CP3**	**CP4**	**CP4A**	**CP5**
Antlers	991	90%	90%	90%	90%	93%	90%	90%
Bailey Cove	1013	86%	87%	87%	88%	90%	89%	87%
Centimudi	844	100%	100%	100%	100%	100%	100%	100%
Hirz Bay	920	99%	99%	99%	99%	99%	99%	99%
Jones Valley	852	100%	100%	100%	100%	100%	100%	100%
Packers Bay	947	96%	98%	98%	98%	99%	98%	98%
Sugarloaf	914	99%	99%	99%	99%	99%	99%	99%

Table 18-5. Simulated Percent Exceedence of Shasta Lake Boat Ramp Availability for Future Conditions (contd.)

July								
Boat Ramp	**Minimum Ramp Elevation (feet)**	**No-Action**	**CP1**	**CP2**	**CP3**	**CP4**	**CP4A**	**CP5**
Antlers	991	81%	81%	82%	82%	88%	86%	83%
Bailey Cove	1013	63%	66%	68%	73%	79%	76%	73%
Centimudi	844	99%	99%	100%	99%	100%	100%	100%
Hirz Bay	920	94%	94%	94%	94%	96%	95%	94%
Jones Valley	852	98%	99%	99%	99%	100%	100%	99%
Packers Bay	947	91%	90%	90%	91%	93%	91%	90%
Sugarloaf	914	95%	95%	94%	95%	97%	95%	94%
September								
Boat Ramp	**Minimum Ramp Elevation (feet)**	**No-Action**	**CP1**	**CP2**	**CP3**	**CP4**	**CP4A**	**CP5**
Antlers	991	63%	70%	71%	73%	80%	80%	74%
Bailey Cove	1013	32%	46%	55%	60%	64%	64%	60%
Centimudi	844	96%	96%	97%	97%	100%	100%	97%
Hirz Bay	920	91%	91%	91%	91%	92%	92%	90%
Jones Valley	852	96%	96%	95%	96%	100%	100%	95%
Packers Bay	947	86%	87%	88%	88%	91%	91%	88%
Sugarloaf	914	91%	91%	91%	91%	93%	93%	91%

Key:
% = percent
CP = Comprehensive Plan

Potential adverse effects of an increase in the magnitude or rate of drawdown include an increase in seasonally exposed shoals and other boating hazards, and increased navigation challenges compared to what boaters have typically experienced in past years. Other potential adverse effects of such changes in drawdown include a need to more frequently adjust docks and moorings at boat launches and marinas and other locations, and an increase in the distance between developed shoreline campsites and day-use areas and the water's edge. Facilities that operate only above a certain pool level would be usable for a shorter period of time each year. Aesthetically, an increased drawdown would result in a less appealing recreation setting characterized by a wider unvegetated inundation zone.

Conversely, a reduced drawdown or slower drawdown during the primary summer boating season could have beneficial effects by reducing the adverse effects described above, which normally occur to some degree each year under existing conditions and would continue under the No-Action Alternative.

The increase in full pool elevation during the late spring could have adverse effects on houseboat traffic passing underneath the Pit River Bridge due to the possible decrease in clearance height. For the 6.5-foot, 12.5-foot, and 18.5-foot raise, the maximum clearance is 26.5 feet, 20.5 feet, and 14.5 feet respectively. The temporary reduction in clearance underneath the Pit River Bridge would limit houseboat traffic from passing but smaller water craft would still be able to pass underneath the bridge.

Under CP1, storage would increase but reservoir operations would be similar to existing operations, except during dry and critical water years; therefore, the character of the annual reservoir drawdown would not be expected to change greatly in most years. This conclusion is confirmed by CalSim-II modeling results, which indicate that the reservoir elevation would be as much as 10 feet higher at various points in the year, but that the magnitude, rate, and timing of the annual drawdown would be essentially unchanged relative to the existing (2005) and No-Action Alternative (2030) conditions. As a result, no effects related to drawdown changes are expected under CP1. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-4 (CP1): Increased Hazards to Boaters and Other Recreationists at Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of the Inundation Zone At full pool, the increased pool elevation would result in approximately 730 acres of newly inundated area where the existing trees and other vegetation would not be removed. Anglers would generally benefit from the associated enhancement of fish habitat; however, the standing trees and stumps remaining in these areas would increase the number of areas and total acreage where this type of hazard to boaters and other recreation visitors would exist. Therefore, this impact would be significant.

Approximately 730 acres (66 percent) of the 1,100 acres of newly inundated area that would result from the 6.5-foot dam raise at full pool would receive no vegetation treatment (no vegetation removed), to maximize the habitat benefits of inundated and residual vegetation. The remaining 370 acres would be subject to either complete vegetation removal or overstory removal. In areas of overstory removal, all trees greater than 10 inches in diameter at breast height would be removed, with stumps cut to within 24 inches of the ground surface. The intent of these treatments would be to minimize the risk to boaters and other visitors from snags and water hazards. However, stumps would be left in place to reduce shoreline erosion. These treatments would be targeted for areas adjacent to developed recreation sites and houseboat mooring areas, and other areas where snags pose the greatest risk to boaters.

Because no vegetation would be removed from portions of the newly inundated area, the area at Shasta Lake where boaters would be exposed to potential hazards from standing timber and stumps would increase. The hazards may increase as the trees die and decay, leaving stumps that may be at or just below the water surface. The hazard represented by the standing timber and stumps would exist only when

the reservoir surface elevation is above the current full pool elevation, which would occur only during the highest pool elevation period (generally late spring and early summer) of wetter-than-normal years.

Although the number and acreage of areas where this hazard would be present would expand, the hazard already exists on portions of the Pit and Squaw Creek arms of the lake, where vegetation was not cleared when the reservoir was constructed and where numerous inundated trees still exist. The Shasta Lake Boating Safety brochure provided to Shasta Lake boaters by USFS warns that numerous underwater obstacles (as well as floating debris and shallows) are present and not marked, and that responsibility for boating safety rests with each individual vessel operator. Also, the Shasta County ordinance that limits boat speeds on Shasta Lake to 5 miles per hour within 100 feet of the shoreline would serve to reduce the hazard. Finally, the standing timber and other remaining vegetation would provide structural diversity that is attractive to fish; therefore, these areas are likely to be attractive to anglers, who could benefit from the increase in uncleared areas and may consider them a recreation enhancement rather than a hindrance.

Despite these factors, the untreated areas of the new inundation zone would represent an increased hazard to boaters and potentially other types of recreationists. For this reason, this impact would be significant. Mitigation for this impact is proposed in Section 18.3.5, “Mitigation Measures.”

Upper Sacramento River (Shasta Dam to Red Bluff)
Impact Rec-5 (CP1): Seasonal Inundation of Portions of Recreation Facilities or Informal River Access Sites as a Result of Increased River Flows Within the upper Sacramento River portion of the primary study area, increased mean monthly river flows associated with project implementation and operation could inundate recreation facilities or portions of recreation facilities, such as boat launch ramps and unimproved riverbank sites used for boat launching and other activities. In general, the flow increases that would occur in some years would be expected to be small (6 percent or less); likewise, only a small additional area would be inundated relative to the area inundated under existing conditions or the No-Action Alternative. As a result, the adverse effects are unlikely to be substantial. This impact would be less than significant.

Increased river flows associated with project implementation could temporarily inundate portions of developed recreation facilities used by boaters, anglers, and other recreationists to access the upper Sacramento River between Shasta Dam and Red Bluff. Any of the more than 15 boat ramps at public and privately operated parks on the river would be affected if increased river flows were to cause overtopping of the ramps, which are generally designed to be used at a range of river elevations. These facilities are often associated with picnic areas, shoreline fishing access areas, and similar day-use facilities, as well as campgrounds. The portions of these areas nearest to the riverbank could also be affected. Many of these facilities are used year-round, but the peak period for

boating on the river is late spring through fall (May to November), when river flows are most likely to be in the optimum range of 6,000 to 12,000 cfs. Although existing average monthly flows are within this range year-round, in most winter and spring seasons the river experiences much higher peak flows of 30,000 to 50,000 cfs or more that may last several weeks.

Many of the locations that recreationists use to access the river and to hand-launch watercraft are informal sites, where conditions such as gradually sloping and sandy riverbanks create beaches that are conducive to recreation use. Like developed sites, these undeveloped and informal use areas could be affected by increased river flows if increased flows were to result in temporary inundation of the area.

CalSim-II model simulations indicate that at nearly all times, Sacramento River flows below Keswick Dam under CP1 would be within about ±5 percent of flows under existing (2005) and No-Action Alternative (2030) conditions. Regarding increases to river stage, the CalSim-II model simulations indicate that mean monthly river stage below Keswick Dam would increase by 0.1 to 0.3 foot during fall months (September through November) relative to existing (2005) and No-Action Alternative (2030) conditions. (River stage during the summer below Keswick Dam is typically 10 to 11 feet under existing conditions.) The modeling results also indicate the potential for lower river levels during winter and spring in some years. Effects of decreased river flows are addressed below under Impact Rec-7 (CP1).

River stage information was not assessed for points within the primary study area downstream from Keswick Dam. However, the effects of the project on river stage at those locations would be expected to be moderated by inflows from tributaries, and would therefore be less than the potential changes below Keswick Dam. As a result, potential effects of the project on recreation facilities would be progressively less as one moves downstream from Keswick Dam.

Because most recreation facilities are designed to be used well above the highest annual river stage elevations that commonly occur during late summer and spring, the stage increases cited above would not affect the functionality of those facilities. Likewise, the small fall increases in river stage would be unlikely to have noticeable adverse effects on informal use sites, because those sites exist at a range of elevations and at many river locations. During periods of very high flows that may occur during winter and spring, boat ramps and other recreation facilities on the river may close, and safety warnings may be issued to boaters to stay off the river until the flow subsides.

It is important to note that for this assessment of environmental consequences, specific information was not available regarding how specific river stages affect specific recreation facilities. The assessment has also not considered the riverbank slope in specific river reaches, which would determine how much increased inundation would result from river stage increases at undeveloped recreation sites.

Additional analysis would be required to provide accurate projections of effects at specific recreation sites or specific stretches of riverbank. Overall, however, the hydrologic changes in the Sacramento River's high flows that would result from CP1 would be relatively small and within the variability of flows that already occur in the river.

For the reasons described above, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-6 (CP1): Increased Difficulty for Boaters in Using the Sacramento River as a Result of Increased River Flows Increased mean monthly flows within the primary study area, particularly during summer and fall when boating activity is most likely, could result in more difficult conditions for boat launching and boating on the Sacramento River. Depending on the time of year and base river flows, increased flow may also have beneficial effects. Because the magnitude of flow increases associated with CP1 would be small (averaging less than 8 percent for any month or water year type), adverse effects on boaters within the primary study area are unlikely. This impact would be less than significant.

Increased river flows associated with project implementation could affect boating conditions on the upper Sacramento River between Shasta Dam and Red Bluff. Increased flows can make boating on the river more difficult, particularly for nonmotorized boats such as canoes and dories or "drift boats." Drift boats are controlled by oars; these boats are commonly used by anglers and commercial angling guide services, primarily during summer, before lower flows during fall make their use more difficult. Canoeing, kayaking, and similar forms of nonmotorized boating are also most common on the river during summer, but are less affected by low flows than drift boating. Boating activity occurs on the river year-round, but the peak period for boating is late spring through fall (May to November), when river flows are most likely to be in the optimum range.

As described above under Impact Rec-5 (CP1), CalSim-II model simulations indicate that at nearly all times, Sacramento River flow below Keswick Dam under CP1 would be within about ±5 percent of flows under existing (2005) and No-Action Alternative (2030) conditions. The CalSim-II model simulations indicate that mean monthly river stage below Keswick Dam could increase by as much as 0.3 foot relative to existing (2005) and No-Action Alternative (2030) conditions during fall months (September through November) of some years. Changes in flows farther downstream within the primary study area would be expected to be progressively smaller as the influence of tributary streams increases.

The generally small flow increases that would occur as a result of the project in some years would be unlikely to adversely affect boating, which occurs primarily during summer and fall. These flow increases may have small beneficial effects during dry years by reducing exposure of sand bars and shallows and thus

increasing navigability on the river. Although boating activity is lower during winter, particularly during peak-flow periods when facilities may be closed and conditions are hazardous, increased flows during dry years and decreased flows during wet years could have similarly minor beneficial effects during those months.

For the reasons described above, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-7 (CP1): Increased Difficulty for Swimmers and Waders in Using the Sacramento River as a Result of Increased River Flows Increased mean monthly flows within the upper Sacramento River, particularly during summer when swimming activity is most likely, and during fall and winter nonpeak-flow periods when wade angling activity is most likely, could result in more difficult swimming and wading conditions. Increased flows can make swimming and wading more challenging and potentially more hazardous. The magnitude of flow increases associated with CP1 would be small (averaging less than 8 percent for any month or water year type), and the timing of the increases would be such that adverse effects on angling waders within the primary study area are unlikely. Swimming is not a common activity on the main channel of the river because of cold-water temperatures. As a result, this impact would be less than significant.

Increased river flows associated with project implementation could affect swimming and wading conditions on the upper Sacramento River between Shasta Dam and Red Bluff. Increased flows can make swimming and wading more difficult. Because of cold-water temperatures (a maximum of less than 60 degrees during summer), swimming is not a major activity on the Sacramento River; however, it does occur, particularly in association with other activities like tubing and nonmotorized boating. Anglers commonly wade in the river; their use is particularly focused on the months of September and October, when flows typically decrease substantially from summer levels and the opportunities for wading correspondingly increase.

As described above under Impact Rec-5 (CP1), CalSim-II model simulations indicate that at nearly all times, Sacramento River flow below Keswick Dam under CP1 would be within about ±5 percent of flows under existing (2005) and No-Action Alternative (2030) conditions. However, CalSim-II model simulations indicate that mean monthly river stage below Keswick Dam could increase by as much as 0.3 foot relative to existing (2005) and No-Action Alternative (2030) conditions during fall months (September through November). Changes in flows farther downstream within the primary study area would be expected to be progressively smaller as the influence of tributary streams increases.

The small magnitude of river stage increases during the fall peak period for wading by anglers indicates that adverse effects of the project on wading anglers are unlikely. Likewise, the generally small increases in summer flows throughout the primary study area that would occur as a result of the project in some years

(generally smaller than the increases in fall flows described above) would be unlikely to adversely affect the limited amount of swimming that occurs during those months.

For the reasons described above, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-8 (CP1): Increased Usability of the Sacramento River for Boating and Water-Contact Recreation as a Result of Decreased River Flows Decreased mean monthly flows within the primary study area, particularly during summer when boating and swimming activity is most likely and during fall and winter low-flow periods when wade angling activity is most likely, could result in enhanced boating, swimming, and wading conditions. Decreased flows during normally high-flow periods can make boating less challenging and potentially less hazardous. The magnitude of flow decreases associated with the project would be small (averaging less than 7 percent for any month or water year type), and the timing of the decreases (fall and winter months) would be such that effects on boaters, swimmers, and waders within the primary study area are unlikely. As a result, this impact would be less than significant.

Decreased river flows associated with project implementation could benefit boating conditions on the Sacramento River in the primary study area, between Shasta Dam and Red Bluff. Decreased flows can make boating on the river easier, particularly for nonmotorized boats such as canoes and dories or "drift boats." BLM has identified an optimum range of 6,000 to 12,000 cfs for boating on the Sacramento River in the primary study area. Boating may benefit if the decrease in river flows lowers the flows below the high end of the optimum range. Under existing conditions, average monthly flows below Keswick Dam and below Cottonwood Creek are above the optimum level during midsummer most years and during much of the winter and early spring of wet years.

Decreased river flows associated with project implementation could also benefit conditions for swimming and wading, although boating conditions could be adversely affected if flows were to fall below the low end of the optimum range of 6,000 cfs. Decreased flow could make swimming and wading easier and may lengthen the period when these activities are best pursued. For example, wading anglers typically concentrate their activity in the fall months, when flows are lowest, whereas fishing from a boat is more common in summer, when flows are higher. Reduced flows in late summer or early fall may extend the wading season.

As described above under Impact Rec-5 (CP1), CalSim-II model simulations indicate that at nearly all times, Sacramento River flows below Keswick Dam under CP1 would be within about ±5 percent of flows under existing (2005) and No-Action Alternative (2030) conditions. The CalSim-II model simulations indicate that mean monthly river stage below Keswick Dam could decrease by as much as 0.5 foot relative to existing (2005) and No-Action Alternative (2030) conditions during winter (December through February) of wetter-than-normal

years. Again, changes in flows farther downstream within the primary study area would be expected to be progressively smaller as the influence of tributary streams increases.

The reduction in mean monthly flows during winter months of wetter-than-normal years would have minimal effects on boating because the existing mean flows during those months are usually within the optimum range. However, the decreased flow could have a beneficial effect on boating during the winter months of some wet years, when the existing mean flows are above the optimum range.

The small reduction in flows and corresponding decrease in river stage during some spring months during both wetter-than-normal and drier-than-normal years could have a beneficial effect on wading. Flows could be reduced to a level that is similar to existing fall conditions, when wading by anglers is most popular. However, because the spring months are not the period when most wading anglers are present, and because swimming activity is low in the spring months, the effects are likely to be minimal.

For the reasons described above, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-9 (CP1): Enhanced Angling Opportunities in the Upper Sacramento River as a Result of Improved Flows and Reduced Water Temperatures Project operation would result in improved flow and water temperature conditions in the upper Sacramento River, which would benefit Chinook salmon populations. This would result in enhanced populations of these game fish in the river, which would provide enhanced sport angling opportunities. This impact would be beneficial.

Chinook salmon contribute to the popular sport fishery in the upper Sacramento River. With increased flows and cooler water temperatures resulting from project operation, salmon populations would benefit from reduced mortality. These beneficial effects on Chinook salmon could result in enhanced angling opportunities on the upper Sacramento River, which would have a beneficial effect on recreation. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-10 (CP1): Disruption of Sacramento River Boating and Access Resulting from the Gravel Augmentation Program The proposed gravel augmentation program would not be implemented under CP1. Therefore, no impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-11 (CP1): Changes in Usability of Reading Island Fishing Access Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration Sites The proposed restoration of flow through various sites along the upper Sacramento River, rehabilitation of the Reading Island boat ramp for use by motorized boats, and construction of a handicap fishing access area would not be

implemented under CP1. Therefore, no impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Rec-12 (CP1): Seasonal Inundation of Portions of River Recreation Facilities or Informal River Access Sites on the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows

Within the extended study area, if increased mean monthly river flows were to occur in some months of some years as a result of project implementation and operation under CP1, the increased flows could inundate recreation facilities or portions of recreation facilities, such as boat launch ramps and unimproved riverbank sites used for boat launching and other activities. However, even with the increases, flows on the Sacramento, American, and Feather rivers would remain moderate and well below normal winter and spring high flows. As a result, adverse effects on river facilities or informal use areas within the extended study area are unlikely. This impact would be less than significant.

Increases in Sacramento River stage (elevation) within the extended study area associated with increased flows under CP1 would be small (averaging less than 0.3 foot). Likewise, only a small additional area would be inundated relative to the area inundated under existing conditions and the No-Action Alternative. On the Feather River below Thermalito Afterbay and on the lower American River (at the H Street Bridge), the increase in flows would be larger during some months of some years, with some increases exceeding 25 percent. However, the largest increases on the lower American River would occur during late summer of critical water years, when flows are generally low, and the largest increases on the Feather River would occur during early fall of dry years, when flows are generally moderate. On both rivers, flows would remain well below winter and spring high flows experienced in most years. Therefore, adverse effects on river recreation facilities and informal use areas appear unlikely.

For the reasons described above, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-13 (CP1): Increased Difficulty for Boaters in Using the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows Increased mean monthly flows within the extended study area, particularly during summer and fall when boating activity is most likely, could result in more difficult conditions for boat launching and boating on the Sacramento River and other rivers affected by the project. Depending on the time of year and base river flows, increased flow may also have beneficial effects on boating by reducing shallow bars and riffles, thus improving navigability. However, the timing and flow conditions under which the flow increases are likely to occur on the Sacramento, Feather, and American rivers under CP1, and the continuation of moderate flows even with the increase, suggest that adverse effects on boaters within the extended study area are unlikely. This impact would be less than significant.

CalSim-II modeling results indicate that the magnitude of flow increases in the lower Sacramento River associated with CP1 would be generally small, averaging less than 6 percent in any month in all water year types. Also, the largest changes would occur primarily during fall months (September through November) of dry and critical water years, when flows are normally relatively low. Thus, even with the flow increases, flows would remain moderate (7,500 to 11,000 cfs at Verona and 7,500 to 13,000 cfs below Freeport, on average) during those periods.

CalSim-II modeling results indicate that the magnitude of flow increases in the Feather River below Thermalito Afterbay associated with CP1 may occasionally exceed 100 percent. More typically, however, the largest increases would be in the range of 20 percent to 30 percent and would occur during mid- and late-summer and fall and primarily during drier-than-normal years, when flows are often lower than average. Flows would remain moderate (1,500 to 4,500 cfs) with the increases. CalSim-II modeling results also indicate that flows in the American River at the H Street Bridge (below Folsom Lake) would also substantially increase during some months of some years, but would remain moderate. Although some of the potential flow increases in the Sacramento, Feather, and American rivers would be substantial, adverse effects on boating appear to be unlikely.

Hydrologic changes in more distant areas of the CVP and SWP service areas resulting from CP1 cannot be accurately predicted but would be small. Such slight changes occur on a dynamic and daily basis under existing conditions as water is moved throughout California. Other CVP and SWP reservoir elevations, canal flows, and flows below the reservoirs could be slightly modified, but any resulting effects on recreation would be negligible and speculative.

For the reasons described above, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-14 (CP1): Increased Difficulty for Swimmers and Waders in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows Increased mean monthly river flows within the extended study area during some months of some years, particularly during summer when swimming activity is most likely and nonpeak-flow periods when wade angling activity is most likely, could result in more difficult swimming and wading conditions. These activities could become more hazardous, and thus less attractive to river users. However, given the timing of the likely flow increases under CP1, the conditions under which such increases would occur, and the continuation of moderate flows even with the increase, adverse effects on swimmers and waders in the extended study area are unlikely. This impact would be less than significant.

Even during the lowest flow months of late summer and early fall, average flow in the more downstream portions of the Sacramento River is around 10,000 cfs; average flow is much higher at other times of the year. As a result, swimming and

wading are not common activities on the river in much of the extended study area, where the most common uses are boating and bank angling.

CalSim-II modeling results indicate that the magnitude of flow increases in the lower Sacramento River associated with CP1 would be generally small, averaging less than 6 percent for any month in all water year types. Also, the largest changes would occur primarily during fall months (September through November) of dry and critical water years, when flows are normally relatively low. Thus, even with the flow increases, flows would remain moderate (7,500 to 11,000 cfs at Verona and 7.500 to 13,000 cfs below Freeport, on average) during those periods.

CalSim-II modeling results indicate that the magnitude of flow increases in the Feather River below Thermalito Afterbay associated with CP1 exceeds 100 percent in two Septembers during the simulation period of 1922 to 2003. Flow increases occur sporadically, typically during mid- and late-summer and fall, are usually in the range of 0 to 20 percent, and primarily occur during drier-than-normal years when flows are typically lower than average. Flows would remain moderate (1,500 to 4,500 cfs) with the increases. CalSim-II modeling results also indicate that flows in the American River at the H Street Bridge (below Folsom Lake) would increase by more than 100 percent once during the simulation period, with flow increases more typically in the range of 0 to 30 percent. Even with these increases, flows would remain moderate. While a few of the simulated flow increases in the Sacramento, Feather, and American rivers would be substantial, adverse effects on swimming and wading appear to be unlikely. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-15 (CP1): Increased Difficulty for Boaters and Anglers in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Decreased River Flows Decreased mean monthly flows below CVP and SWP reservoirs during fall and winter low-flow periods when wade angling activity is most common, and during summer and fall when boating and river floating is popular in some areas, could have adverse effects if reduced flows were to reduce fishing success or boating navigability. Given the modest flow decreases in the Sacramento River associated with CP1 and the timing of the changes, effects on these recreation uses of the Sacramento River in the extended study area are unlikely. However, given the magnitude and timing of the largest flow decreases during some years on the Feather and American rivers below CVP and SWP reservoirs in the extended study area, adverse effects may occur. This impact would be potentially significant.

CalSim-II results indicate that the magnitude of mean monthly flow decreases that would occur in some years in the Sacramento River below Wilkins Slough, at Verona, and below Freeport associated with CP1 would be small (averaging less than 2 percent for any month in all water year types) and would equate to elevation (stage) decreases of no more than about 6 inches. The occasional larger decreases would occur during mid- and late fall and early winter (October through

December) rather than in the summer months, when boating activity is highest. Wade angling is not common on most of the river in the extended study area because of the depth and volume of the river, among other factors. As a result of these factors, adverse effects on boating or angling from the flow decreases appear to be unlikely.

CalSim-II results indicate that mean monthly flows in the Feather River below Thermalito Afterbay would be reduced in some years by as much as 32 percent during mid-summer through mid-fall (June through October), particularly during drier-than-normal years. However, the reduction in flow would average 6 percent or less in all months of those years, with the exception of the month of June in dry years, when the reduction would average 10 percent. The boating and angling activity that occurs on the Feather River during summer and fall months could be adversely affected if navigability or angling success were to be hampered by reduced flow and shallower water.

CalSim-II results indicate that mean monthly flows in the American River at the H Street Bridge (below Folsom Lake) would also be reduced by as much as 20 percent to 50 percent in some months of some years, primarily during mid-summer to mid-fall (June through October). Many of these reductions would occur during wetter-than-average years, when flows would typically be high, and the average reduction in flow would be 10 percent or less for any months in all water year types. However, in drier-than-average years, the effect would be to reduce flows during periods when the flows are already below average. This may adversely affect boating and angling on the river if navigability or angling success is hampered by reduced flow and shallower water.

For the reasons described above, this impact would be potentially significant. Mitigation for this impact is proposed in Section 18.3.5, “Mitigation Measures.”

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Like CP1, CP2 would increase storage at Shasta Lake, thus changing the full pool elevation at Shasta Lake, and the seasonal pool elevations and the flow regime in the Sacramento River and potentially several other reservoirs and downstream waterways. In turn, these alterations to reservoir pool elevations and river flows could affect the usability of some types of recreation facilities on the lake and downstream waterways, particularly marinas, boat ramps, and nearshore campgrounds and day-use areas. These alterations could also affect the ability of recreationists to use the reservoirs and waterways for boating, camping, fishing, and similar activities.

The full pool elevation of Shasta Lake would increase by 14.5 feet and the pool elevation would average as much as 12 to 17 feet higher than under existing (2005) and No-Action Alternative (2030) conditions at various times of the year. The greatest change would occur during the wettest years.

Raising the dam by 12.5 feet would increase the surface area of the reservoir at full pool by about 1,750 acres (6 percent). The width of the water body would not increase substantially in most areas, and much of the increase would occur during spring rather than during the high-traffic summer boating period.

In general, the proposed changes in flow and river stage on the upper Sacramento River associated with CP2 are similar to but slightly greater than the changes associated with CP1, as outlined above.

Reservoir- and river-based recreation facilities and activities in the primary and extended study areas downstream from Shasta Lake are similar; thus, potential reservoir and river recreation impacts would be similar. However, changes to the flow regime affecting reservoirs and rivers in the extended study area would be increasingly attenuated by flows from tributary waterways and other water sources and diversions that are unaffected by the project, reducing the level of impacts.

Shasta Lake and Vicinity

Impact Rec-1 (CP2): Seasonal Inundation of Shasta Lake Recreation Facilities or Portions of Recreation Facilities and Public Access at Pool Elevations Above the Current Full Pool Elevation The 14.5-foot increase in full pool elevation associated with a 12.5-foot dam raise would cause seasonal inundation of recreation facilities or portions of facilities at Shasta Lake. In many years, the reservoir would fill to an elevation greater than the current full pool elevation of 1,067 feet; in some years, it would fill to the new full pool elevation of 1,081.5 feet. In each case, portions of existing recreation facilities on the shoreline would be inundated, resulting in substantial effects. However, the affected recreation facilities would be relocated during construction and before inundation. The replacement facilities would be of equivalent overall capacity and quality to the affected facilities; would provide comparable shoreline access, where applicable; and would comply with ADA and ABA guidelines. Therefore, this impact would be less than significant.

Within each of the three arms of Shasta Lake with recreation development, effects of implementing CP2 on individual recreation facilities would vary. These effects would range from no effect to effects on several of the facilities' inventoried and mapped features (e.g., roads, parking, and restrooms or other buildings) and on features not specifically inventoried (e.g., campsites and picnic sites). Table 18-6 shows the anticipated effects of CP2 on inventoried and mapped (developed) recreation facilities.

Table 18-6. Effects of CP2 on Developed Recreation Facilities at Shasta Lake

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
Sacramento Arm	
Boat Ramps	
1. Antlers Public Boat Ramp	Boat ramp length shortened but usable; courtesy dock and rail would also be affected
2. Centimudi Public Boat Ramp	Boat ramp and lower parking entirely affected, part of access road to ramp and lower parking affected
Campgrounds	
1. Antlers Campground	All features are above full pool elevation; shoreline erosion may threaten portions of site
2. Gregory Creek Campground	One restroom, part of campground road, and shoreline campsites affected
3. Lakeshore East Campground	One restroom, lower half of campground road, and several campsites affected; access substantially affected
4. Nelson Point Campground	Campground road and some campsites affected
5. Oak Grove Campground	All features are above full pool elevation; access road affected
Boat-in Campgrounds	
1. Gooseneck Cove Boat-in Campground	Some shoreline campsites likely affected
Day-Use Areas	
1. Fisherman's Point Day Use Area	Parking and restroom unaffected but most picnic sites affected; also loss of access to shoreline trail
2. Salt Creek Swim Area (nonoperational)	Restroom and portion of paved pathway affected
Marinas	
1. Antlers Resort and Marina	Generator/pumphouse building and boat ramp/dock access road affected
2. Digger Bay Marina	Bottom portion of marina access road/ramp affected, but appears to remain usable
3. Shasta Marina Resort	Two buildings (office and equipment shed) affected, most of parking and access roads affected
4. Sugarloaf Resort and Marina	Electrical service building and associated structures affected, boat ramp and unpaved parking areas partially affected
Resorts (Nonmarina)	
1. Lakeshore Inn and RV Park	Shoreline campsites and walkway, and underground septic system may be affected; access substantially affected
2. Lakeshore Villa RV Park	No effect–entire facility is above full pool elevation
3. Salt Creek Resort and RV Park	Resort unaffected; old road bed used as boat ramp (outside resort) affected
4. Shasta Lake RV Resort	Entire facility appears to be unaffected; access substantially affected
5. Sugarloaf Cottages Resort	Four cottages and large portion of unpaved shoreline access roads affected
6. Tsasdi Resort	Three cabins and entrance and exit roads connecting to Lakeshore Drive affected

Table 18-6. Effects of CP2 on Developed Recreation Facilities at Shasta Lake (contd.)

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
Trails[1]	
1. Dry Fork Creek Trail	Trailhead and portion of trail along shoreline affected
2. Fisherman's Point Trail	Portion of trail along shoreline affected
Other Facilities	
1. USFS Lakeshore Fire Station	Five buildings and entrance road affected (entire facility)
2. Salt Creek Recreation Residence Tract cabins	At least one cabin affected; possibly others also affected
McCloud Arm	
Boat Ramps	
1. Bailey Cove Boat Ramp and Day Use Area	Boat ramp entirely affected, parking area, day-use area, and access road partially affected
2. Hirz Bay Public Boat Ramp	Boat ramp and lower parking area, restroom, entirely affected
Campgrounds	
1. Bailey Cove Campground	No effect–entire facility is above full pool elevation
2. Dekkas Rock Campground	Lower part of loop road and portion of group camp affected
3. Ellery Creek Campground	Lower portion of loop road and shoreline campsites affected
4. Hirz Bay Campgrounds	No effect–entire facility is above full pool elevation
5. Kamloop Camp (private organization)	No effect–entire facility is above full pool elevation
6. McCloud Bridge Campground	One restroom, lower part of camp loop and shoreline campsites affected
7. Moore Creek Campground	Lower portion of loop road, shoreline campsites likely affected
8. Pine Point Campground	Possible that some shoreline campsites affected
Boat-in Campgrounds	
1. Greens Creek Boat-in Campground	Some shoreline campsites likely affected
Day-Use Areas	
1. Dekkas Rock Day Use Area	Lower portion of loop road and parking affected
2. McCloud Bridge Day Use Area	Most of picnic sites affected
Marinas	
1. Holiday Harbor Marina	Three buildings, boat ramp, and tank affected, some overflow parking affected; RV park and road to RV park affected
Trails[1]	
Bailey Cove Trail	Portion of trail along shoreline affected
Hirz Bay Trail	Portion of trail along shoreline affected
Samwel Cave Nature Trail	Portion of trail along shoreline affected

Table 18-6. Effects of CP2 on Developed Recreation Facilities at Shasta Lake (contd.)

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
Other Facilities	
1. Bollibokka Club	No effect–entire facility is above the full pool elevation
2. Campbell Creek Residence Tract cabins	At least seven cabins affected; possibly others also affected
3. Shasta Caverns ferry landing	Two buildings at east landing affected, access roads serving east and west shore landings partially affected
4. USFS Station (Turntable Bay)	Four buildings and access road affected
Squaw Arm	
Other Facilities	
1. Didallis Recreation Residence Tract cabins	At least one cabin affected; possible others also affected
Pit Arm	
Boat Ramps	
1. Jones Valley Public Boat Ramp	Boat ramp and turnaround area at top of ramp entirely affected, access road to parking lot partially affected
2. Packers Bay Public Boat Ramp	Boat ramp and restroom, information shelter, and pump house buildings affected, portion of parking affected
3. Mariners Point Campground	Some shoreline campsites likely affected
Campgrounds	
1. Lower Jones Valley Campground	One restroom building and trail footbridge affected, camp loop road and campsites partially affected
2. Upper Jones Valley Campground	No effect–entire facility is above full pool elevation
Boat-in Campgrounds	
1. Ski Island Boat-in Campground	Some shoreline campsites likely affected
2. Arbuckle Flat Boat-in Campground	Some shoreline campsites likely affected
Marinas	
1. Bridge Bay Resort and Marina	Most of facility–including eight buildings, boat ramp, parking lots, and roads–affected
2. Jones Valley Resort	Three buildings, parking area, ramp, and shoreline access roads affected
3. Packers Bay Marina	Access road from public ramp affected, boat ramp partially affected
4. Silverthorn Resort	Parking and ramp affected, shoreline access road partially affected

Table 18-6. Effects of CP2 on Developed Recreation Facilities at Shasta Lake (contd.)

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
Trails[1]	
1. Clikapudi Trail	Trailhead and portion of trail along shoreline affected
2. Packers Bay Trails	Portion of trails (3 out of 4 trails) along shoreline affected
Other Facilities	
1. Silverthorn Recreation Residence Tract cabins	No effect–entire facility is above full pool elevation

Source: Reclamation 2003

Note:
[1] For some trails, trailheads are integrated into other recreation facilities. Alternative effects identified for standalone trailheads only.

Key:
CP = Comprehensive Plan
RV = recreational vehicle
USFS = U.S. Department of Agriculture, Forest Service

Under CP2, the recreation facilities on the Sacramento Arm that would be subject to effects on several features or a substantial portion of the facility's use area are one of the two boat ramps, three of the five campgrounds, two of the four marinas, four of the six nonmarina resorts, and the only operational day-use area. The USFS Lakeshore Fire Station, Dry Fork Creek trail and trailhead, Fisherman's Point trail, and at least one private cabin in the Salt Creek recreation residence tract would also be subject to major effects. One boat-in campground would be subject to a somewhat lesser but still substantial effects, while several additional facilities would be subject to relatively minor effects.

On the McCloud Arm, many of the major facilities would be subject to effects on several features or on a substantial portion of the facility's use area: both public boat ramps, both day-use areas, the one marina, four of seven public campgrounds, and the one boat-in campground. Other facilities affected to a similar degree are the USFS station at Turntable Cove, the Shasta Caverns Tour facilities on the east and west shores, Bailey Cove trail, and several of the cabins within the recreation residence tract on the east shore at Campbell Creek.

On the Squaw Creek Arm, one private cabin within the Didallis recreation residence tract would be affected. All but one of the public and commercial recreation facilities on the Pit Arm would be subject to major effects under CP2–both boat ramps, all four marinas, one of the two campgrounds, and both boat-in campgrounds.

Although they are not included in the table because of a lack of permanent infrastructure, shoreline camping areas at Beehive Point (Sacramento Arm), Gregory Beach (Sacramento Arm), Lower Salt Creek (Sacramento Arm), Jones

Valley Inlet (Pit Arm), and Mariner's Point (Pit Arm) would also be subject to substantial effects with the inundation of access roads and use areas.

Thus, the most prominent direct effects on recreation facilities and public access at Shasta Lake and in the vicinity under CP2 would be the major effects on five of six boat ramps, seven of nine marinas, four of six resorts, eight of 15 family and group campgrounds, all four boat-in campgrounds, and three of four day-use areas. Other facilities subject to major effects are USFS stations on the Sacramento and McCloud arms; trails and trailheads on the Sacramento, McCloud, and Pit arms (most located at day-use areas or boat ramps addressed above); the Shasta Caverns ferry landing; and several private cabins located within recreation residence tracts on the Sacramento, McCloud, and Squaw arms. Table 18-7 summarizes the number of recreation facilities of specific types substantially affected.

Table 18-7. Summary of Shasta Lake Recreation Facilities Substantially Affected by CP2

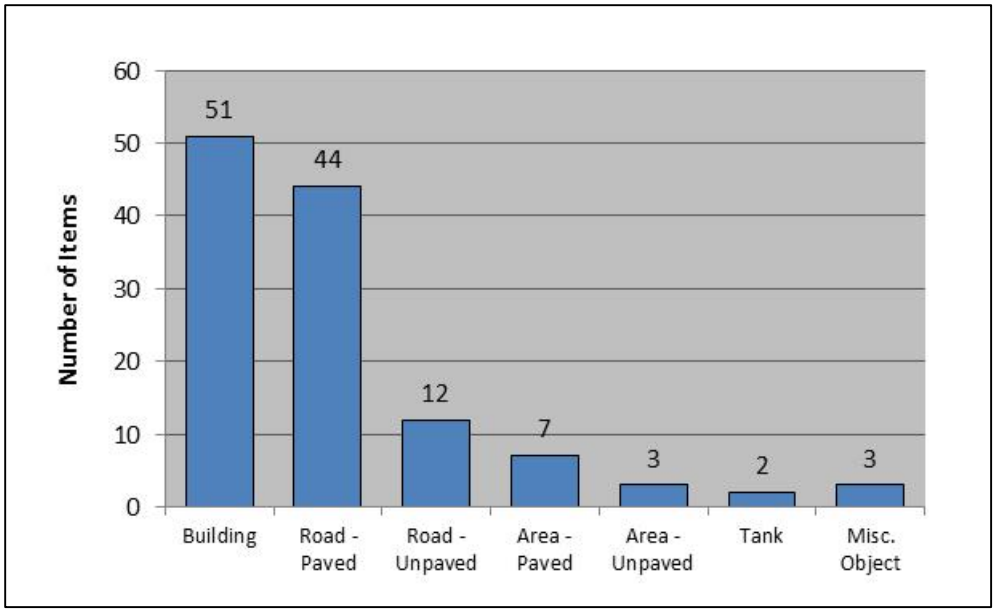
Type of Facility	Number of Facilities Affected
Boat ramp	5
Marina	7
Resort	4
Campground (family and group)	8
Day-use area	3
Boat-in campground	4
USFS operations	2
Trailhead/trail	2/7
Recreation residence tract	3
Commercial tour	1

Source: Reclamation 2003

Key:
CP = Comprehensive Plan
USFS = U.S. Department of the Interior, Forest Service

Somewhat lesser effects would occur at several campgrounds and one marina. Minor effects would occur at additional facilities of several types.

Figure 18-4 depicts the total number of inventoried Shasta Lake recreation facility items, at all recreation facilities combined, that would be affected by inundation under CP2. A total of 122 facility and infrastructure elements would be affected, with more than three-fourths of those being buildings and segments of paved roads. A lesser number of unpaved road segments, paved and unpaved areas (usually parking areas), tanks, and miscellaneous objects would also be affected.



Source: Reclamation 2003

Figure 18-4. Number of Recreation Facility Infrastructure Items Affected by a 12.5-Foot Dam Raise Under CP2

As described in Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," affected recreation facilities would be relocated as part of the construction activities for all action alternatives. This could include relocation of affected portions of facilities within existing use areas, in adjacent undeveloped areas, or at new sites in the general vicinity of the lake. Because of the possible consolidation of facilities, the total number of facilities of specific types may be reduced. However, all affected recreation capacity would be replaced. Replacement facilities would be of equivalent overall capacity and quality to affected facilities and would provide comparable shoreline access, where applicable. With the relocation of affected facilities, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-2 (CP2): Temporary Construction-Related Disruption of Recreation Access and Activities at and near Shasta Dam Construction activity that would be necessary to raise Shasta Dam and complete related modifications would prevent recreation visitors from crossing the dam, and thus could affect other recreation activities in the area. These effects are expected only during the construction period. However, this impact would be potentially significant.

This impact would be similar to Impact Rec-2 (CP1). If the increased dam-raise height relative to CP1 (12.5 feet versus 6.5 feet under CP1) would substantially lengthen the period during which construction would occur or would otherwise increase construction-related disruption in the dam area, the effects described

under CP1 could be increased. This impact would be potentially significant. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

Impact Rec-3 (CP2): Effects on Boating and Other Recreation Use and Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the Reservoir An increase in the magnitude or rate or changes in the timing of the annual summer and fall drawdown of Shasta Lake could adversely affect boating enjoyment and safety on the reservoir. Conversely, a reduced or slower drawdown could have beneficial effects. However, under CP2, reservoir operations would be similar to existing operations, exception during dry and critical water years. Little change would occur in the annual magnitude, rate, or timing of reservoir drawdown associated with any water year type. Therefore, this impact would be less than significant.

This impact would be similar to Impact Rec-3 (CP1) and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-4 (CP2): Increased Hazards to Boaters and Other Recreationists at Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of the Inundation Zone At full pool, the increased pool elevation would result in approximately 1,167 acres of newly inundated area where the existing trees and other vegetation would not be removed. Anglers would generally benefit from the associated enhancement of fish habitat; however, the standing trees and stumps that would remain in these areas would increase the number of areas and total area where this type of hazard to boaters and other recreation visitors would exist. Therefore, this impact would be significant.

Approximately 1,167 acres (67 percent) of the 1,750 acres of newly inundated area that would result from the 12.5-foot dam raise at full pool would receive no vegetation treatment (no vegetation removed), to maximize the habitat benefits of inundated and residual vegetation. In general, this impact would be similar to Impact Rec-4 (CP1), although the total area of potential hazard from remaining trees and stumps would be greater under CP2. Because the untreated areas of the new inundation zone would represent an increased hazard to boaters and potentially other types of recreationists, this impact would be significant. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Rec-5 (CP2): Seasonal Inundation of Portions of Recreation Facilities or Informal River Access Sites as a Result of Increased River Flows Within the upper Sacramento River portion of the primary study area, increased mean monthly river flows associated with project implementation and operation could inundate recreation facilities or portions of recreation facilities, such as boat launch ramps and unimproved riverbank sites used for boat launching and other activities. In general, the flow increases that would occur in some years would be expected to be small (averaging 14 percent or less for any month in all water year types); likewise, only a small additional area would be inundated relative to the

area inundated under existing conditions and the No-Action Alternative. As a result, the adverse effects are unlikely to be substantial. This impact would be less than significant.

This impact would be similar to but slightly greater than Impact Rec-5 (CP1), because the alteration of the flow regime of the Sacramento River would be more substantial under CP2 than under CP1. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-6 (CP2): Increased Difficulty for Boaters in Using the Sacramento River as a Result of Increased River Flows Increased mean monthly flows within the primary study area, particularly during summer and fall when boating activity is most likely, could result in more difficult conditions for boat launching and boating on the Sacramento River. Depending on the time of year and base river flows, increased flow may also have beneficial effects. Because the magnitude of flow increases associated with CP2 would be small (averaging less than 14 percent for any month or water year type), adverse effects on boaters within the primary study area are unlikely. This impact would be less than significant.

This impact would be similar to but slightly greater than Impact Rec-6 (CP1), because the alteration of the flow regime of the Sacramento River would be more substantial under CP2 than under CP1. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-7 (CP2): Increased Difficulty for Swimmers and Waders in Using the Sacramento River as a Result of Increased River Flows Increased mean monthly flows within the upper Sacramento River, particularly during summer when swimming activity is most likely and during fall and winter nonpeak-flow periods when wade angling activity is most likely, could result in more difficult swimming and wading conditions. Increased flows can make swimming and wading more challenging and potentially more hazardous. The magnitude of flow increases associated with CP2 would be small (averaging less than 14 percent for any month and water year type), and the timing of the increases would be such that adverse effects on angling waders within the primary study area are unlikely. Swimming is not a common activity on the main channel of the river because of cold-water temperatures. As a result, this impact would be less than significant.

This impact would be similar to but slightly greater than Impact Rec-7 (CP1), because the alteration of the flow regime of the Sacramento River would be more substantial under CP2 than under CP1. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-8 (CP2): Increased Usability of the Sacramento River for Boating and Water-Contact Recreation as a Result of Decreased River Flows Decreased mean monthly flows within the primary study area, particularly during summer when boating and swimming activity is most likely and during fall and winter

low-flow periods when wade angling activity is most likely, could result in enhanced boating, swimming, and wading conditions. Decreased flows during normally high-flow periods can make boating less challenging and potentially less hazardous. The magnitude of flow decreases associated with CP2 would be small (averaging less than 10 percent for any month or water year type), and the timing of the decreases (fall and winter months) would be such that effects on boaters, swimmers, and waders within the primary study area are unlikely. As a result, this impact would be less than significant.

This impact would be similar to but slightly greater than Impact Rec-8 (CP1), because the alteration of the flow regime of the Sacramento River would be more substantial under CP2 than under CP1. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-9 (CP2): Enhanced Angling Opportunities in the Upper Sacramento River as a Result of Improved Flows and Reduced Water Temperatures Project operation would result in improved flow and water temperature conditions in the upper Sacramento River, which would benefit Chinook salmon populations. This would result in enhanced populations of these game fish in the river, which would provide enhanced sport angling opportunities. This impact would be beneficial.

This impact would be similar to Impact Rec-9 (CP1) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-10 (CP2): Disruption of Sacramento River Boating and Access Resulting from the Gravel Augmentation Program The proposed gravel augmentation program would not be implemented under CP2. Therefore, no impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-11 (CP2): Changes in Usability of Reading Island Fishing Access Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration Sites The proposed restoration of flow through various sites along the upper Sacramento River, rehabilitation of the Reading Island boat ramp for use by motorized boats, and construction of a handicap fishing access area would not be implemented under CP2. Therefore, no impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Rec-12 (CP2): Seasonal Inundation of Portions of River Recreation Facilities or Informal River Access Sites on the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows Within the extended study area, if increased mean monthly river flows were to occur in some months of some years as a result of project implementation and operation under CP2, the increased flows could inundate recreation facilities or portions of recreation facilities, such as boat launch ramps and unimproved riverbank sites used for boat launching and other activities. However, even with

the increases, flows on the Sacramento, Feather, and American rivers would remain moderate and well below normal winter and spring high flows. As a result, adverse effects on river facilities or informal use areas within the extended study area are unlikely. This impact would be less than significant.

This impact would be similar to but slightly greater than Impact Rec-12 (CP1), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be more substantial under CP2 than under CP1. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-13 (CP2): Increased Difficulty for Boaters in Using the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows Increased mean monthly flows within the extended study area, particularly during summer and fall when boating activity is most likely, could result in more difficult conditions for boat launching and boating on the Sacramento River and other rivers affected by the project. Depending on the time of year and base river flows, increased flow may also have beneficial effects on boating by reducing shallow bars and riffles, thus improving navigability. However, the timing and flow conditions under which the flow increases are likely to occur on the Sacramento, Feather, and American rivers under CP2, and the continuation of moderate flows even with the increase, suggest that adverse effects on boaters within the extended study area are unlikely. This impact would be less than significant.

Hydrologic changes in more distant areas of the CVP/SWP service areas resulting from CP2 cannot be accurately predicted but would be small. Such slight changes occur on a dynamic and daily basis under existing conditions as water is moved throughout California. Other CVP and SWP reservoir elevations, canal flows, and flows below the reservoirs could be modified slightly, but any resulting impacts on recreation would be negligible and speculative.

This impact would be similar to but slightly greater than Impact Rec-13 (CP1), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be more substantial under CP2 than under CP1. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-14 (CP2): Increased Difficulty for Swimmers and Waders in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows Increased mean monthly river flows within the extended study area during some months of some years, particularly during summer when swimming activity is most likely and nonpeak-flow periods when wade angling activity is most likely, could result in more difficult swimming and wading conditions. These activities could become more hazardous and thus less attractive to river users. However, given the timing of the likely flow increases under CP2, the flow conditions under which such increases would occur, and the continuation

of moderate flows even with the increase, adverse effects on swimmers and waders within the extended study area are unlikely. This impact would be less than significant for CP2.

This impact would be similar to but slightly greater than Impact Rec-14 (CP1), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be more substantial under CP2 than under CP1. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-15 (CP2): Increased Difficulty for Boaters and Anglers in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Decreased River Flows Decreased mean monthly flows below CVP and SWP reservoirs during fall and winter low-flow periods when wade angling activity is most common, and during summer and fall when boating and river floating is popular in some areas, could have adverse effects if reduced flows were to reduce fishing success or boating navigability. Given the modest flow decreases in the Sacramento River associated with CP2 and the timing of the changes, effects on these recreation uses of the Sacramento River within the extended study area are unlikely. However, given the magnitude and timing of the largest flow decreases during some years on the Feather and American rivers below CVP and SWP reservoirs in the extended study area, adverse effects may occur. This impact would be potentially significant.

This impact would be similar to but slightly greater than Impact Rec-15 (CP1), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be more substantial under CP2 than under CP1. This impact would be potentially significant. Mitigation for this impact is proposed in Section 18.3.5, “Mitigation Measures.”

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

Like each of the alternatives discussed above, CP3 would alter storage and operations at Shasta Lake, thus changing the full pool elevation at Shasta Lake, and the seasonal pool elevations and the flow regime in the Sacramento River and potentially several other reservoirs and downstream waterways. In turn, these alterations to reservoir pool elevations and river flows could affect the usability of some types of recreation facilities on the lake and downstream waterways, particularly marinas, boat ramps, and nearshore campgrounds and day-use areas. These alterations could also affect the ability of recreationists to use the reservoirs and waterways for boating, camping, fishing, and similar activities.

The full pool elevation of Shasta Lake would increase by 20.5 feet and the pool elevation would average as much as 18 to 24 feet higher than under existing (2005) and No-Action (2030) conditions at various times of the year. The greatest change would occur during the wettest years. Raising the dam by 18.5 feet would increase the surface area of the reservoir at full pool by about 2,570 acres (9

percent). The width of the water body would not increase substantially in most areas, and much of the increase would occur during spring rather than during the high-traffic summer boating period.

In general, the proposed changes in flow and river stage on the upper Sacramento River associated with CP3 are more substantial than the changes associated with CP1 and CP2. However, these changes are still within a few percentage points of the changes associated with CP1 and CP2, as outlined above.

Reservoir- and river-based recreation facilities and activities in the primary and extended study areas downstream from Shasta Lake are similar; thus, potential reservoir and river recreation impacts would be similar. However, changes to the flow regime affecting reservoirs and rivers in the extended study area would be increasingly attenuated by flows from tributary waterways and other water sources and diversions that are unaffected by the project, reducing the level of impacts.

Shasta Lake and Vicinity

Impact Rec-1 (CP3): Seasonal Inundation of Shasta Lake Recreation Facilities or Portions of Recreation Facilities and Public Access at Pool Elevations Above the Current Full Pool Elevation The 20.5-foot increase in full pool elevation associated with an 18.5-foot dam raise would cause seasonal inundation of recreation facilities or portions of facilities at Shasta Lake, such as boat launch ramps, campgrounds, marinas, and day-use areas. In many years, the reservoir would fill to an elevation greater than the current full pool elevation of 1,067 feet; in some years, it would fill to the new full pool elevation of 1,087.5 feet. In each case, portions of existing recreation facilities on the shoreline would be inundated, resulting in substantial effects. However, the affected recreation facilities would be relocated during construction and before inundation. The replacement facilities would be of equivalent overall capacity and quality to the affected facilities; would provide comparable shoreline access, where applicable; and would comply with ADA and ABA guidelines. Therefore, this impact would be less than significant.

Within each of the three arms of Shasta Lake with recreation development, effects of implementing CP3 on individual recreation facilities would vary. These effects would range from no effect to effects on several of the facilities' inventoried and mapped features (e.g., roads, parking, and restrooms or other buildings) and on features not specifically inventoried (e.g., campsites and picnic sites). Table 18-8 shows the anticipated effects of CP3 on inventoried and mapped (developed) recreation facilities.

Table 18-8. Effects of CP3 on Developed Recreation Facilities at Shasta Lake

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
Sacramento Arm	
Boat Ramps	
1. Antlers Public Boat Ramp	Boat ramp entirely affected; courtesy dock and rail would also be affected; restroom may be affected; parking lot is primarily unaffected
2. Centimudi Public Boat Ramp	Boat ramp and lower parking entirely affected, part of access road to ramp and lower parking affected
Campgrounds	
1. Antlers Campground	Amphitheater may be affected; shoreline erosion may threaten portions of site
2. Gregory Creek Campground	Two restrooms, lower half of campground road, and associated campsites affected
3. Lakeshore East Campground	One restroom and majority of campground road and campsites affected; access substantially affected
4. Nelson Point Campground	Most of campground road and several campsites affected
5. Oak Grove Campground	All features are above full pool elevation; access road affected
Boat-in Campgrounds	
1. Gooseneck Cove Boat-in Campground	Most shoreline campsites likely affected
Day-Use Areas	
1. Fisherman's Point Day Use Area	Parking and restroom unaffected but most picnic sites affected; also loss of access to shoreline trail
2. Salt Creek Swim Area (nonoperational)	Two restrooms, bathhouse, and paved pathways affected
Marinas	
1. Antlers Resort and Marina	Generator/pumphouse building and boat ramp/dock access road affected
2. Digger Bay Marina	One building affected; lower portion of marina access road/ramp affected, but appears to remain usable
3. Shasta Marina Resort	Three buildings (office, equipment shed, residence) affected; most parking and access roads affected
4. Sugarloaf Resort and Marina	Electrical service building and associated structures affected, boat ramp and unpaved parking areas partially affected

Table 18-8. Effects of CP3 on Developed Recreation Facilities at Shasta Lake (contd.)

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
Resorts (Nonmarina)	
1. Lakeshore Inn and RV Park	Shoreline campsites and walkway, storage building, cabin, covered patio area affected; underground septic system may be affected; access substantially affected
2. Lakeshore Villa RV Park	No effect–entire facility is above full pool elevation
3. Salt Creek Resort and RV Park	Resort unaffected; old road bed used as boat ramp (outside resort) affected
4. Shasta Lake RV Resort	Resort office affected; access substantially affected
5. Sugarloaf Cottages Resort	Seven cottages and large portion of unpaved cabin and shoreline access roads affected
6. Tsasdi Resort	Five cabins and entrance and exit roads connecting to Lakeshore Drive affected
Trails[1]	
1. Dry Fork Creek Trail	Trailhead and portion of trail along shoreline affected
2. Fisherman's Point Trail	Portion of trail along shoreline affected
Other Facilities	
1. USFS Lakeshore Fire Station	Five buildings and entrance road affected (entire facility)
2. Salt Creek Recreation Residence Tract cabins	At least one cabin affected; possibly others also affected
McCloud Arm	
Boat Ramps	
1. Bailey Cove Boat Ramp and Day Use Area	Boat ramp, parking area, day-use area, and access road entirely affected
2. Hirz Bay Public Boat Ramp	Boat ramp and lower parking area, restroom entirely affected
Campgrounds	
1. Bailey Cove Campground	Access road from ramp/day-use area affected
2. Dekkas Rock Campground	Loop road and associated portion of group camp affected
3. Ellery Creek Campground	Most of loop road and associated campsites affected
4. Hirz Bay Campgrounds	No effect entire facility is above full pool elevation
5. Kamloop Camp (private organization)	One building affected
6. McCloud Bridge Campground	Entire facility–two restrooms, camp loop road, and associated campsites–affected

Table 18-8. Effects of CP3 on Developed Recreation Facilities at Shasta Lake (contd.)

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
7. Moore Creek Campground	Lower portion of loop road and shoreline campsites appear to be affected
8. Pine Point Campground	Possible that some shoreline campsites affected
Boat-in Campgrounds	
1. Greens Creek Boat-in Campground	Most shoreline campsites likely affected
Day-Use Areas	
1. Dekkas Rock Day Use Area	Loop road and associated picnic sites and parking affected
2. McCloud Bridge Day Use Area	Entire facility, including picnic sites and restroom, affected
Marinas	
1. Holiday Harbor Marina	Entire facility, including three buildings, boat ramp, and tank affected; most parking, RV park, and road to RV park affected
Trails[1]	
Bailey Cove Trail	Portion of trail along shoreline affected
Hirz Bay Trail	Portion of trail along shoreline affected
Samwel Cave Nature Trail	Portion of trail along shoreline affected
Other Facilities	
1. Bollibokka Club	Facility appears to be unaffected; McCloud Arm would extend near one building and one miscellaneous object, which may be affected
2. Campbell Creek Recreation Residence Tract cabins	At least eight cabins affected; possibly others also affected
3. Shasta Caverns ferry landing	Most of east and west side landings affected; two buildings at east landing, and access roads serving east and west shore landings also affected
4. USFS Station (Turntable Bay)	Entire facility, including four buildings and access road, affected
Squaw Arm	
Other Facilities	
1. Didallis Recreation Residence Tract cabins	At least one cabin affected; possibly others also affected

Table 18-8. Effects of CP3 on Developed Recreation Facilities at Shasta Lake (contd.)

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
Pit Arm	
Boat Ramps	
1. Jones Valley Public Boat Ramp	Boat ramp and turnaround area at top of ramp entirely affected, access road to parking lot partially affected
2. Packers Bay Public Boat Ramp	Boat ramp and restroom, information shelter, and pump house buildings affected; large portion of parking affected
Campgrounds	
1. Lower Jones Valley Campground	ne restroom building, trail footbridge, and large portion of camp loop road and associated campsites affected
2. Upper Jones Valley Campground	No effect–entire facility is above full pool elevation
3. Mariners Point Campground	Some shoreline campsites likely affected
Boat-in Campgrounds	
1. Ski Island Boat-in Campground	Most shoreline campsites likely affected
2. Arbuckle Flat Boat-in Campground	Most shoreline campsites likely affected
Marinas	
1. Bridge Bay Resort and Marina	Nearly entire facility–eight buildings, boat ramp, parking lots, and access roads–affected
2. Jones Valley Resort	Most of facility–five buildings, parking area, ramp, and shoreline access roads – affected
3. Packers Bay Marina	Access road from public ramp and marina ramp affected
4. Silverthorn Resort	Most of facility–resort office and restaurant building, parking, ramp, and shoreline access road – affected
Trails[1]	
1. Clikapudi Trail	Trailhead and portion of trail along shoreline affected
2. Packers Bay Trails	Portion of trails (3 out of 4 trails) along shoreline affected
Other Facilities	
1. Silverthorn Recreation Residence Tract cabins	No effect–entire facility is above full pool elevation

Source: Reclamation 2003

Note:
[1] For some trails, trailheads are integrated into other recreation facilities. Alternative effects identified for standalone trailheads only.

Key:
CP = Comprehensive Plan
RV = recreational vehicle
USFS = U.S. Department of Agriculture, Forest Service

Under CP3, nearly all of the public and commercial recreation facilities on the Sacramento Arm would be subject to effects on several features or a substantial portion of the facility's use area. Both boat ramps, three of the five campgrounds, two of the four marinas, four of the six nonmarina resorts, one boat-in campground, and the one operational day-use area would all be subject to these major effects. The USFS Lakeshore Fire Station and the Dry Fork Creek trail and trailhead, Fisherman's Point trail, and at least one private cabin in the Salt Creek recreation residence tract would also be subject to major effects. Salt Creek Swim Area would also be subject to major effects, which is currently not operational but is used occasionally for overflow camping and as a base camp for firefighting crews. One marina would be subject to lesser but still substantial effects, and several of the remaining facilities would be subject to minor effects.

On the McCloud Arm, both public boat ramps, both day-use areas, the one marina, five of eight campgrounds, and the one boat-in campground would be subject to major effects. Other facilities that would experience major effects are the USFS station at Turntable Cove, the Shasta Caverns Tour facilities on the east and west shores, Bailey Cove trail, and at least eight cabins on the east shore within the Campbell Creek recreation residence tract.

On the Squaw Creek Arm, one cabin within the Didallis recreation residence tract would be affected. Anticipated effects on recreation facilities on the Pit Arm under CP3 are similar to those that would occur under CP2. All but one of the public and commercial recreation facilities–both boat ramps, all four marinas, one of the two campgrounds, and both boat-in campground–would be subject to major effects.

Shoreline camping areas at Beehive Point (Sacramento Arm), Gregory Beach (Sacramento Arm), Lower Salt Creek (Sacramento Arm), Jones Valley Inlet (Pit Arm), and Mariner's Point (Pit Arm) would also be subject to substantial effects, with the unpaved access roads and use areas mostly inundated.

The most prominent direct effects on recreation facilities and public access at Shasta Lake and in the vicinity under CP3 would be the major effects on all six boat ramps, eight of nine marinas, four of six nonmarina resorts, nine of 15 family and group campgrounds, all four boat-in campgrounds, and all four day-use areas. Other facilities subject to major effects are USFS stations on the Sacramento and McCloud arms; trails and trailheads on the Sacramento, McCloud, and Pit arms (most located at day-use areas or boat ramps addressed above); the Shasta Caverns ferry landing; and several private cabins located within recreation residence tracts on the Sacramento, McCloud, and Squaw arms. Many of these facilities would be entirely or nearly inundated at the new full pool elevation associated with CP3. Table 18-9 summarizes the number of recreation facilities of specific types affected.

Table 18-9. Tally of Shasta Lake Recreation Facilities Substantially Affected by CP3

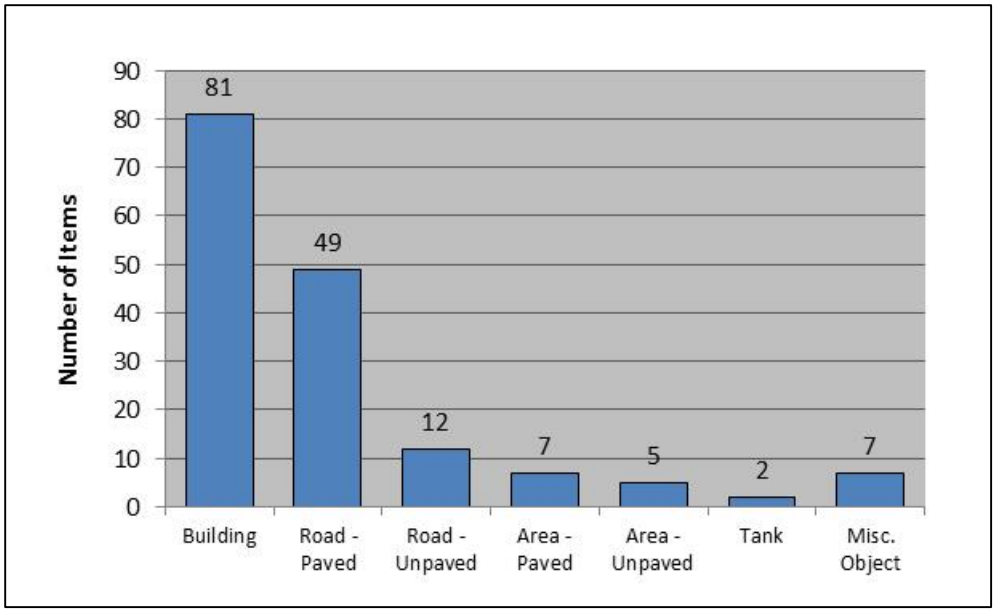
Type of Facility	Number of Facilities Affected
Boat ramp	6
Marina	8
Resort	4
Campground (family and group)	8
Private campground	1
Day-use area	4
Boat-in campground	4
USFS operations	2
Trailhead/trail	2/7
Recreation residence tract	3
Commercial tour	1

Source: Reclamation 2003

Key:
CP = Comprehensive Plan
USFS = U.S. Department of Agriculture, Forest Service

Somewhat lesser but still considerable effects would occur at one campground and one marina, while relatively minor effects would occur at additional facilities of several types.

Figure 18-5 depicts the total number of inventoried Shasta Lake recreation facility items, at all recreation facilities combined, that would be affected by inundation under CP3. A total of 163 facility and infrastructure elements would be affected, with more than three-fourths of those being buildings and segments of paved roads. A lesser number of unpaved road segments, paved and unpaved areas (usually parking areas), tanks, and miscellaneous objects would also be affected.



Source: Reclamation 2003

Figure 18-5. Number of Recreation Facility Infrastructure Items Affected by an 18.5-Foot Dam Raise Under CP3

As described in Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," affected recreation facilities would be relocated as part of the construction activities for all action alternatives. This could include relocation of affected portions of facilities within existing use areas, in adjacent undeveloped areas, or at new sites in the general vicinity of the lake. Because of the possible consolidation of facilities, the total number of facilities of specific types may be reduced. However, all affected recreation capacity would be replaced. Replacement facilities would be of equivalent overall capacity and quality to affected facilities and would provide comparable shoreline access, where applicable. With the relocation of affected facilities, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-2 (CP3): Temporary Construction-Related Disruption of Recreation Access and Activities at and near Shasta Dam Construction activity that would be necessary to raise Shasta Dam and complete related modifications would prevent recreation visitors from crossing the dam, and thus could affect other recreation activities in the area. These effects are expected only during the construction period. However, this impact would be potentially significant.

This impact would be similar to Impact Rec-2 (CP1). If the increased dam raise height relative to CP1 (18.5 feet versus 6.5 feet under CP1) would substantially lengthen the period during which construction would occur or would otherwise increase construction-related disruption in the dam area, the effects described

under CP1 could be increased. This impact would be potentially significant. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

Impact Rec-3 (CP3): Effects on Boating and Other Recreation Use and Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the Reservoir An increase in the magnitude or rate or changes in the timing of the annual summer and fall drawdown of Shasta Lake could adversely affect boating enjoyment and safety on the reservoir. Conversely, a reduced or slower drawdown could have beneficial effects. However, under CP3, reservoir operations would be similar to existing operations. Little change would occur in the annual magnitude, rate, or timing of reservoir drawdown. Therefore, this impact would be less than significant.

This impact would be similar to Impact Rec-3 (CP1) and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-4 (CP3): Increased Hazards to Boaters and Other Recreationists at Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of the Inundation Zone At full pool, the increased pool elevation would result in approximately 1,738 acres of newly inundated area where the existing trees and other vegetation would not be removed. Anglers would generally benefit from the associated enhancement of fish habitat; however, the standing trees and stumps that would remain in these areas would increase the number of areas and total area where this type of hazard to boaters and other types of recreation visitors would exist. Therefore, this impact would be significant.

Approximately 1,738 acres (68 percent) of the 2,570 acres of newly inundated area that would result from the 18.5-foot dam raise at full pool would receive no vegetation treatment (no vegetation removed), to maximize the habitat benefits of inundated and residual vegetation. In general, this impact would be similar to Impacts Rec-4 (CP1) and Rec-4 (CP2), although the total area of potential hazard resulting from remaining trees and stumps would be greater under CP3 than under CP1 or CP2. Because the untreated areas of the new inundation zone would represent an increased hazard to boaters and potentially other types of recreationists, this impact would be significant. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Rec-5 (CP3): Seasonal Inundation of Portions of Recreation Facilities or Informal River Access Sites as a Result of Increased River Flows Within the upper Sacramento River portion of the primary study area, increased mean monthly river flows associated with project implementation and operation could inundate recreation facilities or portions of recreation facilities, such as boat launch ramps and unimproved riverbank sites used for boat launching and other activities. In general, the flow increases that would occur in some years would be expected to be small (averaging 15 percent or less for any month in all water year types); likewise, only a small additional area would be inundated relative to the

area inundated under existing conditions or the No-Action Alternative. As a result, the adverse effects are unlikely to be substantial. This impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-5 (CP1) and Rec-5 (CP2), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP3 than under CP1 or CP2. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-6 (CP3): Increased Difficulty for Boaters in Using the Sacramento River as a Result of Increased River Flows Increased mean monthly flows within the primary study area, particularly during summer and fall when boating activity is most likely, could result in more difficult conditions for boat launching and boating on the Sacramento River. Depending on the time of year and base river flows, increased flow may also have beneficial effects. Because the magnitude of flow increases associated with CP3 would be small (averaging less than 15 percent for any month or water year type), adverse effects on boaters within the primary study area are unlikely. This impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-6 (CP1) and Rec-6 (CP2), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP3 than under CP1 or CP2. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-7 (CP3): Increased Difficulty for Swimmers and Waders in Using the Sacramento River as a Result of Increased River Flows Increased mean monthly flows within the upper Sacramento River, particularly during summer when swimming activity is most likely and during fall and winter nonpeak-flow periods when wade angling activity is most likely, could result in more difficult swimming and wading conditions. Increased flows can make swimming and wading more challenging and potentially more hazardous. The magnitude of flow increases associated with CP3 would be small (averaging less than 15 percent for any month or water year type), and the timing of the increases would be such that adverse effects on angling waders within the primary study area are unlikely. Swimming is not a common activity on the main channel of the river because of cold-water temperatures. As a result, this impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-7 (CP1) and Rec-7 (CP2), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP3 than under CP1 or CP2. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-8 (CP3): Increased Usability of the Sacramento River for Boating and Water-Contact Recreation as a Result of Decreased River Flows Decreased mean monthly flows within the primary study area, particularly during summer when boating and swimming activity is most likely and during fall and winter low-flow periods when wade angling activity is most likely, could result in enhanced boating, swimming, and wading conditions. Decreased flows during normally high-flow periods can make boating less challenging and potentially less hazardous. The magnitude of flow decreases associated with CP3 would be small (averaging less than 12 percent for any month or water year type), and the timing of the decreases (fall and winter months) would be such that effects on boaters, swimmers, and waders within the primary study area are unlikely. As a result, this impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-8 (CP1) and Rec-8 (CP2), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP3 than under CP1 or CP2. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-9 (CP3): Enhanced Angling Opportunities in the Upper Sacramento River as a Result of Improved Flows and Reduced Water Temperatures Project operation would result in improved flow and water temperature conditions in the upper Sacramento River, which would benefit Chinook salmon populations. This would result in enhanced populations of these game fish in the river, which would provide enhanced sport angling opportunities. This impact would be beneficial.

This impact would be similar to Impact Rec-9 (CP1) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-10 (CP3): Disruption of Sacramento River Boating and Access Resulting from the Gravel Augmentation Program The proposed gravel augmentation program would not be implemented under CP3. Therefore, no impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-11 (CP3): Changes in Usability of Reading Island Fishing Access Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration Sites The proposed restoration of flow through various sites along the upper Sacramento River, rehabilitation of the Reading Island boat ramp for use by motorized boats, and construction of a handicap fishing access area would not be implemented under CP3. Therefore, no impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Rec-12 (CP3): Seasonal Inundation of Portions of River Recreation Facilities or Informal River Access Sites on the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows

Within the extended study area, if increased mean monthly river flows were to occur in some months of some years as a result of project implementation and operation under CP3, the increased flows could inundate recreation facilities or portions of recreation facilities, such as boat launch ramps and unimproved riverbank sites used for boat launching and other activities. However, even with the increases, flows on the Sacramento and Feather rivers would remain moderate and well below normal winter and spring high flows. As a result, adverse effects on river facilities or informal use areas within the extended study area are unlikely. This impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-12 (CP1) and Rec-12 (CP2), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP3 than under CP1 or CP2. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-13 (CP3): Increased Difficulty for Boaters in Using the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows Increased mean monthly flows within the extended study area, particularly during summer and fall when boating activity is most likely, could result in more difficult boating launching and boating conditions on the Sacramento River and other rivers affected by the project. Depending on the time of year and base river flows, increased flow may also have beneficial effects on boating by reducing shallow bars and riffles, thus improving navigability. However, the timing and flow conditions under which the flow increases are likely to occur on the Sacramento, Feather, and American rivers under CP3, and the continuation of moderate flows even with the increase, suggest that adverse effects on boaters within the extended study area are unlikely. This impact would be less than significant.

Hydrologic changes in more distant areas of the CVP and SWP service areas resulting from CP3 cannot be accurately predicted but would be small. Such slight changes occur on a dynamic and daily basis under existing conditions as water is moved throughout California. Other CVP and SWP reservoir elevations, canal flows, and flows below the reservoirs could be modified slightly, but any resulting effects on recreation would be negligible and speculative.

This impact would be similar to but greater than Impacts Rec-13 (CP1) and Rec-13 (CP2), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP3 than under CP1 or CP2. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-14 (CP3): Increased Difficulty for Swimmers and Waders in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows Increased mean monthly river flows within the extended study area during some months of some years, particularly during summer when

swimming activity is most likely and during nonpeak-flow periods when wade angling activity is most likely, could result in more difficult swimming and wading conditions. These activities could become more hazardous and thus less attractive to river users. However, given the timing of the likely flow increases under CP3, the conditions under which such increases would occur, and the continuation of moderate flows even with the increase, adverse effects on swimmers and waders in the extended study area are unlikely. This impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-14 (CP1) and Rec-14 (CP2), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP3 than under CP1 or CP2. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-15 (CP3): Increased Difficulty for Boaters and Anglers in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Decreased River Flows Decreased mean monthly flows below CVP and SWP reservoirs during fall and winter low-flow periods when wade angling activity is most common, and during summer and fall when boating and river floating is popular in some areas, could have adverse effects if reduced flows were to reduce fishing success or boating navigability. Given the modest flow decreases in the Sacramento River associated with CP3 and the timing of the changes, effects on these recreation uses of the Sacramento River in the extended study area are unlikely. However, given the magnitude and timing of the largest flow decreases during some years on the Feather and American rivers below CVP and SWP reservoirs in the extended study area, adverse effects may occur. This impact would be potentially significant.

This impact would be similar to but greater than Impacts Rec-15 (CP1) and Rec-15 (CP2), because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP3 than under CP1 or CP2. This impact would be potentially significant. Mitigation for this impact is proposed in Section 18.3.5, “Mitigation Measures.”

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply Reliability

Like each of the alternatives discussed above, CP4 or CP4A would increase storage at Shasta Lake, thus changing the full pool elevation at Shasta Lake, and the seasonal pool elevations and the flow regime in the Sacramento River and potentially several other reservoirs and downstream waterways. In turn, these alterations to reservoir pool elevations and river flows could affect the usability of some types of recreation facilities on the lake and downstream waterways, particularly marinas, boat ramps, and nearshore campgrounds and day-use areas. These alterations could also affect the ability of recreationists to use the reservoirs and waterways for boating, camping, fishing, and similar activities.

As under CP3, under CP4 or CP4A, the full pool elevation of Shasta Lake would increase by 20.5 feet and the pool elevation would average as much as 18 to 24 feet higher than under existing (2005) and No-Action Alternative (2030) conditions at various times of the year. The greatest change would occur during the driest years. However, the dedicated Shasta Lake cold water storage for fisheries benefit of 378,000 acre-feet for CP4, and dedicated storage of 191,000 acre-feet for CP4A, is unique to CP4 and CP4A and would result in different drawdown scenarios than under CP3.

Raising the dam by 18.5 feet would increase the surface area of the reservoir at full pool by about 2,570 acres (9 percent). In general, the effect of this increase would be slight, given that the reservoir would exceed the current full pool elevation only during wetter-than-normal years. Also, the increase in acreage would be distributed around the several hundred miles of the reservoir's rim. The width of the water body would not increase substantially in most areas, and much of the increase would occur during spring rather than during the high-traffic summer boating period.

The changes in flow and river stage on the upper Sacramento River associated with CP4 would be the same as the changes associated with CP1, as outlined above, in that the operated storage of 256,000 acre-feet would be the same for CP1 and CP4.

The changes in flow and river stage on the upper Sacramento River associated with CP4A would be the same as the changes associated with CP2, as outlined above, in that the operated storage of 443,000 acre-feet would be the same for CP2 and CP4A.

Reservoir- and river-based recreation facilities and activities are similar in the primary and extended study areas downstream from Shasta Lake; thus, potential reservoir and river recreation impacts would be similar. However, changes to the flow regime affecting reservoirs and rivers in the extended study area would be increasingly attenuated by flows from tributary waterways and other water sources and diversions that are unaffected by the project, reducing the level of effects.

Shasta Lake and Vicinity

Impact Rec-1 (CP4 and CP4A): Seasonal Inundation of Shasta Lake Recreation Facilities or Portions of Recreation Facilities and Public Access at Pool Elevations Above the Current Full Pool Elevation The 20.5-foot increase in full pool elevation associated with an 18.5-foot dam raise would cause inundation of recreation facilities or portions of facilities at Shasta Lake. In many years, the reservoir would fill to an elevation greater than the current full pool elevation of 1,067 feet; in some years, it would fill to the new full pool elevation of 1,087.5 feet. In each case, portions of existing recreation facilities on the shoreline would be inundated, resulting in substantial effects. However, the affected recreation facilities would be relocated during construction and before inundation. The

replacement facilities would be of equivalent overall capacity and quality to the affected facilities; would provide comparable shoreline access, where applicable; and would comply with ADA and ABA guidelines. Therefore, this impact would be less than significant for CP4 or CP4A.

This impact would be the same as Impact Rec-1 (CP3) because the full pool elevation would increase by the same amount under CP4 or CP4A as under CP3. The same developed recreation facilities would be inundated under CP4 or CP4A as under CP3 (see Tables 18-8 and 18-9 and Figure 18-5).

As described in Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," affected recreation facilities would be relocated as part of the construction activities for all action alternatives. This could include relocation of affected portions of facilities within existing use areas, in adjacent undeveloped areas, or at new sites in the general vicinity of the lake. Because of the possible consolidation of facilities, the total number of facilities of specific types may be reduced. However, all affected recreation capacity would be replaced. Replacement facilities would be of equivalent overall capacity and quality to affected facilities and would provide comparable shoreline access, where applicable. With the relocation of affected facilities, this impact would be less than significant for CP4 or CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-2 (CP4 and CP4A): Temporary Construction-Related Disruption of Recreation Access and Activities at and near Shasta Dam Construction activity that would be necessary to raise Shasta Dam and complete related modifications would prevent recreation visitors from crossing the dam, and could affect other recreation activities in the area. These effects are expected only during the construction period. However, this impact would be potentially significant.

This impact would be similar to Impact Rec-2 (CP1). If the increased dam-raise height relative to CP1 (18.5 feet versus 6.5 feet under CP1) would substantially lengthen the period during which construction would occur or otherwise increase construction-related disruption in the dam area, the effects described under CP1 could be increased.

This impact would be potentially significant for CP4. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

This impact would be potentially significant for CP4A. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

Impact Rec-3 (CP4 and CP4A): Effects on Boating and Other Recreation Use and Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the Reservoir An increase in the magnitude or rate or changes in the timing of the annual summer and fall drawdown of Shasta Lake could adversely affect boating enjoyment and safety on the reservoir. Conversely, a reduced or slower drawdown

could have beneficial effects. However, under CP4 or CP4A, reservoir operations would be similar to existing operations, except during dry and critical water years. Little change would occur in the annual magnitude, rate, or timing of reservoir drawdown associated with any water year type. Therefore, this impact would be less than significant for CP4 or CP4A.

This impact would be similar to Impact Rec-3 (CP1) and would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be similar to Impact Rec-3 (CP1) and would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-4 (CP4 and CP4A): Increased Hazards to Boaters and Other Recreationists at Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of the Inundation Zone At full pool, the increased pool elevation would result in approximately 1,738 acres of newly inundated area where the existing trees and other vegetation would not be removed. Anglers would generally benefit from the associated enhancement of fish habitat; however, the standing trees and stumps that would remain in these areas would increase the number of areas and total area where this type of hazard to boaters and other types of recreation visitors would exist. Therefore, this impact would be significant for CP4 or CP4A.

This impact would be the same as Impact Rec-4 (CP3) and would be significant for CP4. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

This impact would be the same as Impact Rec-4 (CP3) and would be significant for CP4A. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Rec-5 (CP4 and CP4A): Seasonal Inundation of Portions of Recreation Facilities or Informal River Access Sites as a Result of Increased River Flows

Within the upper Sacramento River portion of the primary study area, increased mean monthly river flows associated with project implementation and operation could inundate recreation facilities or portions of recreation facilities, such as boat launch ramps and unimproved riverbank sites used for boat launching and other activities. In general, the flow increases that would occur in some years would be expected to be small (8 percent or less for any month in all water year types for CP4 and 14 percent or less for any month in all water year types for CP4A); likewise, only a small additional area would be inundated relative to the area inundated under existing conditions and the No-Action Alternative. As a result, the adverse effects are unlikely to be substantial. This impact would be less than significant for CP4 or CP4A.

This impact would be the same as Impact Rec-5 (CP1) for CP4 and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

This impact would be similar to but slightly greater than Impact Rec-5 (CP1) for CP4A because the alteration of the flow regime of the Sacramento River would be more substantial under CP2 than under CP1. This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-6 (CP4 and CP4A): Increased Difficulty for Boaters in Using the Sacramento River as a Result of Increased River Flows Increased mean monthly flows within the primary study area, particularly during summer and fall when boating activity is most likely, could result in more difficult conditions for boat launching and boating on the Sacramento River. Depending on the time of year and base river flows, increased flow may also have beneficial effects. Because the magnitude of flow increases associated with CP4 or CP4A would be small (averaging less than 8 percent for any month in all water year types for CP4 and 14 percent of less for any month in all water year types for CP4A), adverse effects on boaters within the primary study area are unlikely. As a result, this impact would be less than significant for CP4 or CP4A.

This impact would be the same as Impact Rec-6 (CP1) and would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be similar to but slightly greater than Impact Rec-6 (CP1) for CP4A, because the alteration of the flow regime of the Sacramento River would be more substantial under CP2 than under CP1. This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-7 (CP4 and CP4A): Increased Difficulty for Swimmers and Waders in Using the Sacramento River as a Result of Increased River Flows Increased mean monthly flows within the upper Sacramento River, particularly during summer when swimming activity is most likely and during fall and winter nonpeak-flow periods when wade angling activity is most likely, could result in more difficult swimming and wading conditions. Increased flows can make swimming and wading more challenging and potentially more hazardous. The magnitude of flow increases associated with CP4 or CP4A would be small (averaging less than 8 percent for any month in any water year type for CP4 and 14 percent of less for any month in all water year types for CP4A), and the timing of the increases would be such that adverse effects on angling waders within the primary study area are unlikely. Swimming is not a common activity on the main channel of the river because of cold-water temperatures. As a result, this impact would be less than significant for CP4 or CP4A.

This impact would be the same as Impact Rec-7 (CP1) for CP4 and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

This impact would be similar to but slightly greater than Impact Rec-7 (CP1) for CP4A, because the alteration of the flow regime of the Sacramento River would be more substantial under CP2 than under CP1. This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-8 (CP4 and CP4A): Increased Usability of the Sacramento River for Boating and Water-Contact Recreation as a Result of Decreased River Flows Decreased mean monthly flows within the primary study area, particularly during the summer months when boating and swimming activity is most likely and during fall and winter low-flow periods when wade angling activity is most likely, could result in enhanced boating, swimming, and wading conditions. Decreased flows during normally high-flow periods can make boating less challenging and potentially less hazardous. The magnitude of flow decreases associated with CP4 or CP4A is small (averaging less than 7 percent for any month or water year type for CP4 and 10 percent of less for any month in all water year types for CP4A), and the timing of the decreases (fall and winter months) is such that effects on boaters, swimmers, and waders within the primary study area are unlikely. As a result, this impact would be less than significant for CP4 or CP4A.

This impact would be the same as Impact Rec-8 (CP1) for CP4 and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

This impact would be similar to but slightly greater than Impact Rec-8 (CP1) for CP4A because the alteration of the flow regime of the Sacramento River would be more substantial under CP2 than under CP1. This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-9 (CP4 and CP4A): Enhanced Angling Opportunities in the Upper Sacramento River as a Result of Improved Flows and Reduced Water Temperatures Project operation would result in improved flow and water temperature conditions in the upper Sacramento River, which would benefit Chinook salmon populations, as well as steelhead, American shad, and striped bass. This would result in enhanced populations of these game fish in the river, which would provide enhanced sport angling opportunities. This impact would be beneficial for CP4 or CP4A.

Chinook salmon, steelhead, American shad, and striped bass all contribute to the popular sport fishery in the upper Sacramento River. With increased flows and cooler water temperature resulting from project operation, salmon populations would benefit from reduced mortality. Cooler water temperatures would also create more suitable conditions in the river for steelhead, American shad, and striped bass. These beneficial effects on game fish species could result in

enhanced angling opportunities on the upper Sacramento River, which would have a beneficial effect on recreation for CP4 or CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-10 (CP4 and CP4A): Disruption of Sacramento River Boating and Access Resulting from the Gravel Augmentation Program Access to and boating on the upper Sacramento River may be affected temporarily while gravel is placed in the river under the proposed gravel augmentation program. However, gravel placement would occur during only a 1-month period and most augmentation sites would not be adjacent to public river access sites; further, the method of gravel deposition would have little effect on boating. The program could increase the number of shallows encountered by boaters, but shallows are normal characteristics of the targeted river reaches. Therefore, this impact would be less than significant for CP4 or CP4A.

The proposed gravel augmentation program could affect boating on the upper Sacramento River by increasing the number of shallow riffles where boating could be made more difficult or hazardous, or where boats may drag the bottom during low-water periods. In the short term, river access and boating may be affected while the gravel is being placed in the river. However, the program would affect only a few sites between Keswick Dam and Clear Creek each year, and the sites under consideration are well distributed along more than 10 miles of the river. Gravel placement would most likely occur only during an approximately 1-month period of late summer (late August to late September), limiting the time during which access or boating could be disrupted. Only a few of the gravel augmentation sites under consideration are adjacent to public river access sites, where access could be disrupted for 1 or 2 days during gravel placement. Deposition of gravel at most sites would occur using a talus cone or lateral berm method, which would use dump trucks or conveyors to place gravel near the riverbank, and would have little effect on boating. Only a few sites would use a direct placement method, which would use front-end loaders to deposit gravel directly in the river channel, and which could conflict with boating during the 1 or 2 days of gravel deposition.

The gravel augmentation program would increase the number of shallows that boaters on the river could encounter. However, shallows as well as rocks and other obstructions are normal characteristics of the targeted reaches of the river (Tuthill 2005). As a result, the boats most commonly used on the upper river (e.g., shallow-draft prop and jet-driven power boats, canoes, kayaks, and rafts) are able to navigate shallow waters, and published boating guides warn boaters of depth changes caused by shifting sands and silts, shallowness, snags, and other obstructions they may encounter (DBW 2011b). For these reasons, both short- and long-term effects on river access and boating are likely to be minimal. As a result, this impact would be less than significant for CP4 or CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-11 (CP4 and CP4A): Changes in Usability of Reading Island Fishing Access Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration Sites Restoring flow through various sites along the upper Sacramento River would increase boating and fishing access and opportunities for day-use visitors to the park. This impact would be beneficial for CP4 or CP4A.

Several options for restoring the upper Sacramento River to enhance habitat for anadromous salmonid fish species exist, including restoring flow through Anderson Slough at Reading Island. The restoration at Anderson Slough would deepen the slough and flush out the aquatic vegetation that now clogs the waterway and renders the Reading Island boat ramp on the slough nearly unusable. Also under consideration are rehabilitation of the boat ramp for motorized boat use and construction of a handicap fishing access area. These actions to restore habitat and rehabilitate and enhance recreation facilities would increase boating and fishing access and opportunities for day-use visitors to the park. They would also make the park more functional and attractive for river float trip groups that occasionally camp at the island under BLM special-use permits. This impact would be beneficial for CP4 or CP4A. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Rec-12 (CP4 and CP4A): Seasonal Inundation of Portions of River Recreation Facilities or Informal River Access Sites on the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows Within the extended study area, if increased mean monthly river flows were to occur in some months of some years as a result of project implementation and operation under CP4 or CP4A, the increased flows could inundate recreation facilities or portions of recreation facilities, such as boat launch ramps and unimproved riverbank sites used for boat launching and other activities. However, even with the increases, flows on the Sacramento, Feather, and American rivers would remain moderate and well below normal winter and spring high flows. As a result, adverse effects on river facilities or informal use areas within the extended study area are unlikely. This impact would be less than significant for CP4 or CP4A.

This impact would be the same as Impact Rec-12 (CP1) for CP4 and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

This impact would be similar to but slightly greater than Impact Rec-12 (CP1) for CP4A because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be more substantial under CP2 than under CP1. This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-13 (CP4 and CP4A): Increased Difficulty for Boaters in Using the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result

of Increased River Flows Increased mean monthly flows within the extended study area, particularly during summer and fall when boating activity is most likely, could result in more difficult conditions for boat launching and boating on the Sacramento River and other rivers affected by the project. Depending on the time of year and base river flows, increased flow may also have beneficial effects on boating by reducing shallow bars and riffles, thus improving navigability. However, the timing and flow conditions under which the flow increases are likely to occur on the Sacramento, Feather, and American rivers under CP4 or CP4A, and the continuation of moderate flows even with the increase, suggest that adverse effects on boaters within the extended study area are unlikely. This impact would be less than significant for CP4 or CP4A.

Hydrologic changes in more distant areas of the CVP/SWP service areas resulting from CP4 or CP4A cannot be accurately predicted but would be small. Such slight changes occur on a dynamic and daily basis under existing conditions as water is moved throughout California. Other CVP and SWP reservoir elevations, canal flows, and flows below the reservoirs could be slightly modified, but any resulting impacts on recreation would be negligible and speculative.

This impact would be the same as Impact Rec-13 (CP1) for CP4 and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

This impact would be similar to but slightly greater than Impact Rec-13 (CP1) for CP4A because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be more substantial under CP2 than under CP1. This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-14 (CP4 and CP4A): Increased Difficulty for Swimmers and Waders in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows Increased mean monthly river flows within the extended study area during some months of some years, particularly during summer when swimming activity is most likely and during nonpeak-flow periods when wade angling activity is most likely, could result in more difficult swimming and wading conditions. These activities could become more hazardous and thus less attractive to river users. However, given the timing of the likely flow increases under CP4 or CP4A, the conditions under which such increases would occur, and the continuation of moderate flows even with the increase, adverse effects on swimmers and waders within the extended study area are unlikely. This impact would be less than significant for CP4 or CP4A.

This impact would be the same as Impact Rec-14 (CP1) for CP4 and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

This impact would be similar to but slightly greater than Impact Rec-14 (CP1) for CP4A because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be more substantial under CP2 than under CP1. This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-15 (CP4 and CP4A): Increased Difficulty for Boaters and Anglers in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Decreased River Flows Decreased mean monthly flows below CVP and SWP reservoirs during fall and winter low-flow periods when wade angling activity is most common, and during summer and fall when boating and river floating is popular in some areas, could have adverse effects if reduced flows were to reduce fishing success or boating navigability. Given the modest flow decreases in the Sacramento River associated with CP4 or CP4A, and the timing of the changes, effects on these recreation uses of the Sacramento River in the extended study area are unlikely. However, given the magnitude and timing of the largest flow decreases during some years on the Feather and American rivers below CVP and SWP reservoirs in the extended study area, adverse effects may occur. This impact would be potentially significant for CP4 or CP4A.

This impact would be the same as Impact Rec-15 (CP1) for CP4 and would be potentially significant. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

This impact would be similar to but slightly greater than Impact Rec-15 (CP1) for CP4A because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be more substantial under CP2 than under CP1. This impact would be potentially significant for CP4A. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

CP5 – 18.5-Foot Dam Raise, Combination Plan

Like each of the alternatives discussed above, CP5 would increase storage at Shasta Lake, thus increasing the full pool elevation at Shasta Lake, and the seasonal pool elevations and the flow regime in the Sacramento River and potentially several other reservoirs and downstream waterways. In turn, these alterations to reservoir pool elevations and river flows could affect the usability of some types of recreation facilities on the lake and downstream waterways, particularly marinas, boat ramps, and nearshore campgrounds and day-use areas. These alterations could also affect the ability of recreationists to use the reservoirs and waterways for boating, camping, fishing, and similar activities.

The full pool elevation of Shasta Lake would increase by 20.5 feet and the pool elevation would average as much as 18 to 24 feet higher than under existing (2005) and No-Action Alternative (2030) conditions at various times of the year. The greatest change would occur during the wettest years. Raising the dam by 18.5 feet would increase the surface area of the reservoir at full pool by about 2,570 acres (9 percent). In general, the effect of this increase would be slight,

given that the reservoir would exceed the current full pool elevation only during wetter-than-normal years. Also, the increase in acreage would be distributed around the several hundred miles of the reservoir's rim. The width of the water body would not increase substantially in most areas, and much of the increase would occur during spring rather than during the high-traffic summer boating period.

Changes in flow and river stage on the upper Sacramento River associated with CP5 would be similar to those associated with CP3, as outlined above.

Reservoir- and river-based recreation facilities and activities in the primary and extended study areas downstream from Shasta Lake are similar; thus potential reservoir and river recreation impacts would be similar. However, changes to the flow regime affecting reservoirs and rivers in the extended study area would be increasingly attenuated by flows from tributary waterways and other water sources and diversions that are unaffected by the project, reducing the level of impacts.

Shasta Lake and Vicinity

Impact Rec-1 (CP5): Seasonal Inundation of Shasta Lake Recreation Facilities or Portions of Recreation Facilities and Public Access at Pool Elevations Above the Current Full Pool Elevation The 20.5-foot increase in full pool elevation associated with an 18.5-foot dam raise would cause seasonal inundation of recreation facilities or portions of facilities at Shasta Lake. In many years, the reservoir would fill to an elevation greater than the current full pool elevation of 1,067 feet; in some years, it would fill to the new full pool elevation of 1,087.5 feet. In each case, portions of existing recreation facilities on the shoreline would be inundated, resulting in substantial effects. However, the affected recreation facilities would be relocated during construction and before inundation. The replacement facilities would be of equivalent overall capacity and quality to the affected facilities; would provide comparable shoreline access, where applicable; and would comply with ADA and ABA guidelines. Therefore, this impact would be less than significant.

This impact would be the same as Impact Rec-1 (CP3) because the full pool elevation would increase by the same amount under CP5 as under CP3. The same developed recreation facilities would be inundated under CP5 as under CP3 (see Tables 18-8 and 18-8 and Figure 18-5).

As described in Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," affected recreation facilities would be relocated as part of the construction activities for all action alternatives. This could include relocation of affected portions of facilities within existing use areas, in adjacent undeveloped areas, or at new sites in the general vicinity of the lake. Because of the possible consolidation of facilities, the total number of facilities of specific types may be reduced. However, all affected recreation capacity would be replaced. Replacement facilities would be of equivalent overall capacity and

quality to affected facilities and would provide comparable shoreline access, where applicable. With the relocation of affected facilities, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-2 (CP5): Temporary Construction-Related Disruption of Recreation Access and Activities at and near Shasta Dam Construction activity that would be necessary to raise Shasta Dam and complete related modifications would prevent recreation visitors from crossing the dam, and could affect other recreation activities in the area. These effects are expected only during the construction period. However, this impact would be potentially significant.

This impact would be similar to Impact Rec-2 (CP1). If the increased dam-raise height relative to CP1 (18.5 feet versus 6.5 feet under CP1) would substantially lengthen the period during which construction would occur or otherwise increase construction-related disruption in the dam area, the effects described under CP1 could be increased. This impact would be potentially significant. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

Impact Rec-3 (CP5): Effects on Boating and Other Recreation Use and Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the Reservoir An increase in the magnitude or rate or changes in the timing of the annual summer and fall drawdown of Shasta Lake could adversely affect boating enjoyment and safety on the reservoir. Conversely, a reduced or slower drawdown could have beneficial effects. However, under CP5, reservoir operations would be similar to existing operations, except during dry and critical water years. Little change would occur in the annual magnitude, rate, or timing of reservoir drawdown associated with any water year type. Therefore, the impact would be less than significant.

This impact would be similar to Impact Rec-3 (CP1) and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-4 (CP5): Increased Hazards to Boaters and Other Recreationists at Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of the Inundation Zone At full pool, the increased pool elevation would result in approximately 1,738 acres of newly inundated area where the existing trees and other vegetation would not be removed. Anglers would generally benefit from the associated enhancement of fish habitat; however, the standing trees and stumps that would remain in these areas would increase the number of areas and total area where this type of hazard to boaters and other recreation visitors would exist. Therefore, this impact would be significant.

This impact would be the same as Impact Rec-4 (CP3) and would be significant. Mitigation for this impact is proposed in Section 18.3.5, "Mitigation Measures."

Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Rec-5 (CP5): Seasonal Inundation of Portions of Recreation Facilities or Informal River Access Sites as a Result of Increased River Flows Within the upper Sacramento River portion of the primary study area, increased mean monthly river flows associated with project implementation and operation could inundate recreation facilities or portions of recreation facilities, such as boat launch ramps and unimproved riverbank sites used for boat launching and other activities. In general, the flow increases that would occur in some years would be expected to be small (19 percent or less for any month in all water year types); likewise, only a small additional area would be inundated relative to the area inundated under existing conditions or the No-Action Alternative. As a result, the adverse effects are unlikely to be substantial. This impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-5 (CP1), Rec-5 (CP2), and Rec-5 (CP3) because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP5 than under CP1, CP2, or CP3. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-6 (CP5): Increased Difficulty for Boaters in Using the Sacramento River as a Result of Increased River Flows Increased mean monthly flows within the primary study area, particularly during summer and fall when boating activity is most likely, could result in more difficult conditions for boat launching and boating on the Sacramento River. Depending on the time of year and base river flows, increased flow may also have beneficial effects. Because the magnitude of flow increases associated with CP5 would be small (averaging less than 19 percent for any month in all water year types), adverse effects on boaters within the primary study area are unlikely. This impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-6 (CP1), Rec-6 (CP2), and Rec-6 (CP3) because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP5 than under CP1, CP2, or CP3. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-7 (CP5): Increased Difficulty for Swimmers and Waders in Using the Sacramento River as a Result of Increased River Flows Increased mean monthly flows within the upper Sacramento River, particularly during summer when swimming activity is most likely and during fall and winter nonpeak-flow periods when wade angling activity is most likely, could result in more difficult swimming and wading conditions. Increased flows can make swimming and wading more challenging and potentially more hazardous. The magnitude of flow increases associated with CP5 would be small (averaging less than 19 percent for any month in all water year types), and the timing of the increases would be such that adverse effects on angling waders within the primary study area are unlikely.

Swimming is not a common activity on the main channel of the river because of cold-water temperatures. As a result, this impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-7 (CP1), Rec-7 (CP2), and Rec-7 (CP3) because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP5 than under CP1, CP2, or CP3. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-8 (CP5): Increased Usability of the Sacramento River for Boating and Water-Contact Recreation as a Result of Decreased River Flows Decreased mean monthly flows within the primary study area, particularly during summer when boating and swimming activity is most likely and during fall and winter low-flow periods when wade angling activity is most likely, could result in enhanced boating, swimming, and wading conditions. Decreased flows during normally high-flow periods can make boating less challenging and potentially less hazardous. The magnitude of flow decreases associated with CP5 would be small (averaging less than 12 percent for any month or water year type), and the timing of the decreases (fall and winter months) would be such that effects on boaters, swimmers, and waders within the primary study area are unlikely. As a result, this impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-8 (CP1), Rec-8 (CP2), and Rec-8 (CP3) because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP5 than under CP1, CP2, or CP3. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-9 (CP5): Enhanced Angling Opportunities in the Upper Sacramento River as a Result of Improved Flows and Reduced Water Temperatures Project operation would result in improved flow and water temperature conditions in the upper Sacramento River, which would benefit Chinook salmon populations. This would result in enhanced populations of these game fish in the river, which would provide enhanced sport angling opportunities. This impact would be beneficial.

This impact would be the same as Impact Rec-9 (CP2) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-10 (CP5): Disruption of Sacramento River Boating and Access Resulting from the Gravel Augmentation Program Access to and boating on the upper Sacramento River may be affected temporarily while gravel is placed in the river under the proposed gravel augmentation program. However, gravel placement would occur during only a 1-month period and most augmentation sites would not be adjacent to public river access sites; further, the method of gravel deposition would have little effect on boating. The program could increase the number of shallows encountered by boaters, but shallows are normal

characteristics of the targeted river reaches. Therefore, this impact would be less than significant.

This impact would be the same as Impact Rec-10 (CP4 and CP4A) and would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-11 (CP5): Changes in Usability of Reading Island Fishing Access Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration Sites Restoring flow through various sites along the upper Sacramento River would increase boating and fishing access and opportunities for day-use visitors to the park. This impact would be beneficial.

This impact would be the same as Impact Rec-11 (CP4 and CP4A) and would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Rec-12 (CP5): Seasonal Inundation of Portions of River Recreation Facilities or Informal River Access Sites on the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows Within the extended study area, if increased mean monthly river flows were to occur in some months of some years as a result of project implementation and operation under CP5, the increased flows could inundate recreation facilities or portions of recreation facilities, such as boat launch ramps and unimproved riverbank sites used for boat launching and other activities. However, even with the increases, flows on the Sacramento, Feather, and American rivers would remain moderate and well below normal winter and spring high flows. As a result, adverse effects on river facilities or informal use areas within the extended study area are unlikely. This impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-12 (CP1), Rec-12 (CP2), and Rec-12 (CP3) because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP5 than under CP1, CP2, or CP3. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-13 (CP5): Increased Difficulty for Boaters in Using the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows Increased mean monthly flows within the extended study area, particularly during summer and fall when boating activity is most likely, could result in more difficult conditions for boat launching and boating on the Sacramento River and other rivers affected by the project. Depending on the time of year and base river flows, increased flow may also have beneficial effects on boating by reducing shallow bars and riffles, thus improving navigability. However, the timing and flow conditions under which the flow increases are likely to occur on the Sacramento, American, and Feather rivers under CP5, and the continuation of moderate flows even with the increase, suggest that adverse

effects on boaters within the extended study area are unlikely. This impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-13 (CP1), Rec-13 (CP2), and Rec-13 (CP3) because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP5 than under CP1, CP2, or CP3. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-14 (CP5): Increased Difficulty for Swimmers and Waders in Using the Sacramento River and Rivers below CVP and SWP Reservoirs as a Result of Increased River Flows Increased mean monthly river flows within the extended study area during some months of some years, particularly during summer when swimming activity is most likely and during nonpeak-flow periods when wade angling activity is most likely, could result in more difficult swimming and wading conditions. These activities could become more hazardous and thus less attractive to river users. However, given the timing of the likely flow increases under CP5, the conditions under such increases would occur, and the continuation of moderate flows even with the increase, adverse effects on swimmers and waders in the extended study area are unlikely. This impact would be less than significant.

This impact would be similar to but greater than Impacts Rec-14 (CP1), Rec-14 (CP2), and Rec-14 (CP3) because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP5 than under CP1, CP2, or CP3. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Rec-15 (CP5): Increased Difficulty for Boaters and Anglers in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Decreased River Flows Decreased mean monthly flows below CVP and SWP reservoirs during fall and winter low-flow periods when wade angling activity is most common, and during summer and fall when boating and river floating is popular in some areas, could have adverse effects if reduced flows were to reduce fishing success or boating navigability. Given the modest flow decreases in the Sacramento River associated with CP5 and the timing of the changes, effects on these recreation uses of the Sacramento River within the extended study area are unlikely. However, given the magnitude and timing of the largest flow decreases during some years on the Feather and American rivers below CVP and SWP reservoirs in the extended study area, adverse effects may occur. This impact would be potentially significant.

This impact would be similar to but greater than Impacts Rec-15 (CP1), Rec-15 (CP2), and Rec-15 (CP3) because the alteration of flow regimes of the lower Sacramento River and rivers below CVP and SWP reservoirs would be greater under CP5 than under CP1, CP2, or CP3. This impact would be potentially

significant. Mitigation for this impact is proposed in Section 18.3.5, “Mitigation Measures.”

18.3.5 Mitigation Measures

Table 18-10 presents a summary of mitigation measures for recreation and public access.

Table 18-10. Summary of Mitigation Measures for Recreation and Public Access

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact Rec-1 (No-Action): Increased Use of Shasta Lake Recreation Facilities and Demand for Recreation Opportunities on Shasta Lake and in the Vicinity Impact Rec-1 (CP1–CP5): Seasonal Inundation of Shasta Lake Recreation Facilities or Portions of Recreation Facilities and Public Access at Pool Elevations Above the Current Full Pool Elevation	LOS before Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Rec-2 (No-Action): Increased Use and Demand for Recreation Opportunities on the Upper Sacramento River Impact Rec-2 (CP1–CP5): Temporary Construction-Related Disruption of Recreation Access and Activities at and near Shasta Dam	LOS before Mitigation	LTS	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Rec-2: Provide Information About and Improve Alternate Recreation Access and Opportunities to Mitigate the Temporary Loss of Recreation Access and Opportunities During Construction at Shasta Dam.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Rec-3 (No-Action): Increased Use and Demand for Recreation Opportunities on the Lower Sacramento River and in the Delta Impact Rec-3 (CP1–CP5): Effects on Boating and Other Recreation Use and Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the Reservoir	LOS before Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Rec-4 (No-Action): Increased Use and Demand for Recreation Opportunities in the CVP and SWP Service Areas Impact Rec-4 (CP1–CP5): Increased Hazards to Boaters and Other Recreationists at Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of the Inundation Zone	LOS before Mitigation	LTS	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure Rec-4: Provide Information to Shasta Lake Visitors About Potential Safety Hazards in Newly Inundated Areas from Standing Timber and Stumps.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS

Table 18-10. Summary of Mitigation Measures for Recreation and Public Access (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact Rec-5 (CP1–CP5): Seasonal Inundation of Portions of Recreation Facilities or Informal River Access Sites as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-6 (CP1–CP5): Increased Difficulty for Boaters in Using the Sacramento River as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-7 (CP1–CP5): Increased Difficulty for Swimmers and Waders in Using the Sacramento River as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-8 (CP1–CP5): Increased Usability of the Sacramento River for Boating and Water-Contact Recreation as a Result of Decreased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-9 (CP1–CP5): Enhanced Angling Opportunities in the Upper Sacramento River as a Result of Improved Flows and Reduced Water Temperatures	LOS before Mitigation	NI	B	B	B	B	B
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	B	B	B	B	B

Table 18-10. Summary of Mitigation Measures for Recreation and Public Access (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/CP4A	CP5
Impact Rec-10 (CP1–CP5): Disruption of Sacramento River Boating and Access Resulting from the Gravel Augmentation Program	LOS before Mitigation	NI	NI	NI	NI	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	NI	NI	NI	LTS	LTS
Impact Rec-11 (CP1–CP5): Changes in Usability of Reading Island Fishing Access Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration Sites	LOS before Mitigation	NI	NI	NI	NI	B	B
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	NI	NI	NI	B	B
Impact Rec-12 (CP1–CP5): Seasonal Inundation of Portions of River Recreation Facilities or Informal River Access Sites on the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-13 (CP1–CP5): Increased Difficulty for Boaters in Using the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS

Table 18-10. Summary of Mitigation Measures for Recreation and Public Access (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/CP4A	CP5
Impact Rec-14 (CP1–CP5): Increased Difficulty for Swimmers and Waders in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-15 (CP1–CP5): Increased Difficulty for Boaters and Anglers in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Decreased River Flows	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None Required.	Mitigation Measure Rec-15: Implement Mitigation Measure Aqua-15: Maintain Flows in the Feather River, American River, and Trinity River Consistent with Existing Regulatory and Operational Requirements and Agreements.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS

Key:
B = beneficial
CP = Comprehensive Plan
CVP = Central Valley Project
LOS = level of significance
LTS = less than significant
NI = no impact
PS = potentially significant
S = significant
SWP = State Water Project

No-Action Alternative

No mitigation measures are needed for this alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is needed for Impact Rec-1 (CP1), Impact Rec-3 (CP1), and Impacts Rec-5 (CP1) through Rec-14 (CP1). Mitigation is provided below for Impacts Rec-2 (CP1) and Rec-4 (CP1), which would affect recreation at Shasta Lake recreation facilities, and for Impact Rec-15 (CP1), which would affect recreation on rivers in the extended study area.

Mitigation Measure Rec-2 (CP1): Provide Information About and Improve Alternate Recreation Access and Opportunities to Mitigate the Temporary Loss of Recreation Access and Opportunities During Construction at Shasta Dam Reclamation will inform recreation users of the Chappie-Shasta OHV Area about an alternate access route. This route will use existing river crossings either immediately downstream from Shasta Dam or further south. The route will be improved to provide adequate access, security features, and road improvements (e.g., by grading unpaved portions), as necessary, and made sufficient so that vehicles can safely use the route. To mitigate the temporary disruption in public tours of Shasta Dam during construction, Reclamation will develop and provide enhanced information about the dam and its operation at the Reclamation Visitor Center at the dam, which would remain open. Mitigation for temporary loss of access to the trailhead at the west end of Shasta Dam is not necessary because the trailhead itself would be affected by construction.

Implementation of this mitigation measure would reduce Impact Rec-2 (CP1) to a less-than-significant level.

Mitigation Measure Rec-4 (CP1): Provide Information to Shasta Lake Visitors About Potential Safety Hazards in Newly Inundated Areas from Standing Timber and Stumps To mitigate impacts on visitor safety from remaining trees and stumps in untreated areas of the newly inundated zone, Reclamation will work with USFS to provide maps, bulletins, informational postings, and other media as deemed appropriate by USFS at boat ramps, marinas, and other developed Shasta Lake recreation sites. Similar information could be provided at public meetings and events and at USFS and other Web sites used by Shasta Lake visitors to learn about conditions at the lake. The information provided will identify the general areas of the shoreline where the hazard exists. It will also inform boaters of the nature of the hazard, the periods of time when the hazard is of concern (i.e., when the reservoir elevation is above the current full pool elevation), and best practices to avoid the hazard while recreating on the lake. Implementation of this mitigation measure would reduce Impact Rec-4 (CP1) to a less-than-significant level.

Mitigation Measure Rec-15 (CP1): Implement Mitigation Measure Aqua-15: Maintain Flows in the Feather River, American River, and Trinity River Consistent with Existing Regulatory and Operational Requirements and Agreements This measure is identical to Mitigation Measure Aqua-15 (CP1), described in Chapter 11, "Fisheries and Aquatic Ecosystems."

This measure would also protect recreation uses on these rivers by ensuring that any potential changes in flow would be within the current range of variability. Implementation of this mitigation measure would reduce Impact Rec-15 (CP1) to a less-than-significant level.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is needed for Impact Rec-1 (CP2), Impact Rec-3 (CP2), and Impacts Rec-5 (CP2) through Rec-14 (CP2). Mitigation is provided below for Impacts Rec-2 (CP2) and Rec-4 (CP2), which would affect recreation at Shasta Lake recreation facilities, and for Impact Rec-15 (CP2), which would affect recreation on rivers in the extended study area.

Mitigation Measure Rec-2 (CP2): Provide Information About and Improve Alternate Recreation Access and Opportunities to Mitigate the Temporary Loss of Recreation Access and Opportunities During Construction at Shasta Dam This mitigation measure is identical to Mitigation Measure Rec-2 (CP1). Implementation of this mitigation measure would reduce Impact Rec-2 (CP2) to a less-than-significant level.

Mitigation Measure Rec-4 (CP2): Provide Information to Shasta Lake Visitors About Potential Safety Hazards in Newly Inundated Areas from Standing Timber and Stumps This mitigation measure is identical to Mitigation Measure Rec-4 (CP1). Implementation of this mitigation measure would reduce Impact Rec-4 (CP2) to a less-than-significant level.

Mitigation Measure Rec-15 (CP2): Implement Mitigation Measure Aqua-15: Maintain Flows in the Feather River, American River, and Trinity River Consistent with Existing Regulatory and Operational Requirements and Agreements This mitigation measure is identical to Mitigation Measure Rec-15 (CP1). Implementation of this mitigation measure would reduce Impact Rec-15 (CP2) to a less-than-significant level.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

No mitigation is needed for Impact Rec-1 (CP3), Impact Rec-3 (CP3), and Impacts Rec-5 through Rec-14 (CP3). Mitigation is provided below for Impacts Rec-2 (CP3) and Rec-4 (CP3), which would affect recreation at Shasta Lake recreation facilities, and for Impact Rec-15 (CP3), which would affect recreation on rivers in the extended study area.

Mitigation Measure Rec-2 (CP3): Provide Information About and Improve Alternate Recreation Access and Opportunities to Mitigate the Temporary Loss of Recreation Access and Opportunities During Construction at Shasta Dam This mitigation measure is identical to Mitigation Measure Rec-2 (CP1). Implementation of this mitigation measure would reduce Impact Rec-2 (CP3) to a less-than-significant level.

Mitigation Measure Rec-4 (CP3): Provide Information to Shasta Lake Visitors About Potential Safety Hazards in Newly Inundated Areas from Standing Timber and Stumps This mitigation measure is identical to Mitigation Measure Rec-4 (CP1). Implementation of this mitigation measure would reduce Impact Rec-4 (CP3) to a less-than-significant level.

Mitigation Measure Rec-15 (CP3): Implement Mitigation Measure Aqua-15: Maintain Flows in the Feather River, American River, and Trinity River Consistent with Existing Regulatory and Operational Requirements and Agreements This mitigation measure is identical to Mitigation Measure Rec-15 (CP1). Implementation of this mitigation measure would reduce Impact Rec-15 (CP3) to a less-than-significant level.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply Reliability

No mitigation is needed for Impact Rec-1 (CP4 and CP4A), Impact Rec-3 (CP4 and CP4A), and Impacts Rec-5 through Rec-14 (CP4 and CP4A). Mitigation is provided below for Impacts Rec-2 (CP4 and CP4A) and Rec-4 (CP4 and CP4A), which would affect recreation at Shasta Lake recreation facilities, and for Impact Rec-15 (CP4 and CP4A), which would affect recreation on rivers in the extended study area.

Mitigation Measure Rec-2 (CP4 and CP4A): Provide Information About and Improve Alternate Recreation Access and Opportunities to Mitigate the Temporary Loss of Recreation Access and Opportunities During Construction at Shasta Dam This mitigation measure is identical to Mitigation Measure Rec-2 (CP1). Implementation of this mitigation measure would reduce Impact Rec-2 (CP4 and CP4A) to a less-than-significant level.

Mitigation Measure Rec-4 (CP4 and CP4A): Provide Information to Shasta Lake Visitors About Potential Safety Hazards in Newly Inundated Areas from Standing Timber and Stumps This mitigation measure is identical to Mitigation Measure Rec-4 (CP1). Implementation of this mitigation measure would reduce Impact Rec-4 (CP4 and CP4A) to a less-than-significant level.

Mitigation Measure Rec-15 (CP4 and CP4A): Implement Mitigation Measure Aqua-15: Maintain Flows in the Feather River, American River, and Trinity River Consistent with Existing Regulatory and Operational Requirements and Agreements This mitigation measure is identical to

Mitigation Measure Rec-15 (CP1). Implementation of this mitigation measure would reduce Impact Rec-15 (CP4 and CP4A) to a less-than-significant level.

CP5 – 18.5-Foot Dam Raise, Combination Plan

No mitigation is needed for Impact Rec-1 (CP5), Impact Rec-3 (CP5), and Impacts Rec-5 (CP5) through Rec-14 (CP5). Mitigation is provided below for Impacts Rec-2 (CP5) and Rec-4 (CP5), which would affect recreation at Shasta Lake recreation facilities, and for Impact Rec-15 (CP5), which would affect recreation on rivers in the extended study area.

Mitigation Measure Rec-2 (CP5): Provide Information About and Improve Alternate Recreation Access and Opportunities to Mitigate the Temporary Loss of Recreation Access and Opportunities During Construction at Shasta Dam This mitigation measure is identical to Mitigation Measure Rec-2 (CP1). Implementation of this mitigation measure would reduce Impact Rec-2 (CP5) to a less-than-significant level.

Mitigation Measure Rec-4 (CP5): Provide Information to Shasta Lake Visitors About Potential Safety Hazards in Newly Inundated Areas from Standing Timber and Stumps This mitigation measure is identical to Mitigation Measure Rec-4 (CP1). Implementation of this mitigation measure would reduce Impact Rec-4 (CP5) to a less-than-significant level.

Mitigation Measure Rec-15 (CP5): Implement Mitigation Measure Aqua-15: Maintain Flows in the Feather River, American River, and Trinity River Consistent with Existing Regulatory and Operational Requirements and Agreements This mitigation measure is identical to Mitigation Measure Rec-15 (CP1). Implementation of this mitigation measure would reduce Impact Rec-15 (CP5) to a less-than-significant level.

18.3.6 Cumulative Effects

Chapter 3, “Considerations for Describing the Affected Environment and Environmental Consequences,” discusses overall cumulative impacts methodology related to the action alternatives, including the relationship to the CALFED Bay-Delta Program Programmatic EIS/EIR cumulative impacts analysis, qualitative and quantitative assessment, past and future actions in the study area, and significance criteria. Table 3-1, “Present and Reasonably Foreseeable Future Actions Included in the Analysis of Cumulative Impacts, by Resource Area,” in Chapter 3, lists the present and reasonably foreseeable future projects considered quantitatively and qualitatively within the cumulative impacts analysis. This cumulative impacts analysis accounts for potential project impacts combined with the impacts of existing facilities, conditions, land uses, and reasonably foreseeable actions expected to occur in the study area on a qualitative and quantitative level. None of the projects listed in Table 3-1 related to Quantitative Analysis would affect recreation resources in the primary study area. The following analysis is based on potential cumulative effects on the extended study area related to projects listed under the

Quantitative Analysis and in the primary and extended study area for those projects that are listed under Qualitative Analysis on Table 3-1. Example projects listed in Table 3-1 that may affect recreation resources in the primary and extended study area include, but are not limited to, Fish Passage Program at Shasta Dam, Trinity River Mainstem Fishery Restoration Program, Sacramento River Conservation Area Forum Program, Central Valley Flood Protection Plan, PG&E Hydroelectric Project License Implementation, and Antlers Bridge Replacement.

Past and present programs and projects that have affected recreation resources in the primary and extended study area relate to dam construction, water operations and flow schedules, flood management activities, land use changes, and construction projects.

A diverse variety of programs that have been developed or are under development by Federal, State, and local agencies–individually and in conjunction with other agencies–are among the reasonably foreseeable future projects that may affect environmental conditions in the primary and extended study areas and therefore may contribute to cumulative effects.

These projects include construction and operation of projects or implementation of programs that may have the potential to adversely affect both land- and water-based recreation and, in combination, to cause an existing significant cumulative effect. For example, construction of some projects or implementation of programs may temporarily constrain boat navigation. Some of these project facilities may displace recreation facilities or activities, or may cause a long-term impediment to navigation on waterways. Water-based recreation may also be indirectly affected because of changes in reservoir water storage or changes in river flows downstream from reservoirs attributable to these projects. To the extent possible, foreseeable actions included in Table 3-1 under the Quantitative Analysis, have been incorporated in the CalSim-II model and data developed for analysis of operational impacts on reservoir elevations and river flows under the project alternatives.

Several programs provide only general plans or frameworks for potential future projects or actions; no construction or other implementation of the programs has yet occurred, and no site-specific projects have been identified or undergone environmental analysis. Therefore, no effects of past or present projects are associated with these programs, and future projects that may occur are uncertain. Some of the programs or projects may result in temporary construction effects; however, the exact locations of these projects are unknown at this time. Many ongoing and future programs include public access or recreation objectives or measures, or would protect or enhance water quality, fisheries, wildlife habitat, and other biological resources that support recreation uses. These programs have the potential to result in beneficial effects on recreation, which could help reduce potentially significant cumulative effects.

The effects of climate change on operations at Shasta Lake could potentially affect water-based recreation opportunities both at the lake and downstream. As described in the Climate Change Modeling Appendix, climate change could result in higher reservoir releases in the future because of an increase in winter and early-spring inflow into the lake from high-intensity storm events. The change in reservoir releases could be necessary to manage for flood events resulting from these potentially larger storms. The potential increase in releases from the reservoir could lead to long-term changes in downstream channel equilibrium, which could affect the Sacramento River's ease of use for water-based recreation.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

As described in Section 18.3.4, "Direct and Indirect Effects," above, without mitigation CP1 could cause significant and potentially significant effects on recreation and public access. These effects consist of temporary construction-related disruption of recreation access and activities at and near Shasta Dam; increased hazards to boaters and other recreationists at Shasta Lake from standing timber and stumps remaining in untreated areas of the inundation zone; and increased difficulty for boaters and anglers in using the Sacramento River and rivers below CVP and SWP reservoirs as a result of decreased river flows. These contributing adverse effects from CP1 would be cumulatively considerable. With implementation of Mitigation Measures Rec-2 (CP1), Rec-4 (CP1), and Rec-15 (CP1), adverse effects from CP1 would be reduced to a less-than-significant level. These adverse effects would no longer result in a cumulatively considerable incremental contribution to significant cumulative effects on recreation and public access. This would not be a cumulatively significant effect.

As stated previously, effects of climate change on operations at Shasta Lake could include a higher frequency of high-flow events, potentially resulting in changes to water-based recreation opportunities downstream. As described in the Climate Change Modeling Appendix, climate warming could result in more intense rainstorms, an increased occurrence of high-intensity rainfall, earlier melting of seasonal snowpack, and more events of rain or snow. These expected consequences of climate change may create more frequent and severe flooding associated with lakes and rivers, and thus greater challenges to water-based recreation in the Sacramento River in the primary and extended study areas.

However, as noted in the Climate Change Modeling Appendix, studies also generally predict that climate change may cause Shasta Lake to be unable to stay above the 550,000 acre-feet dead pool in some critical years. With the lake at such a low level, an increase in adverse effects on recreation on the lake could result in critical years.

Implementation of CP1 could potentially diminish the effects of increased flows and potential flooding on downstream recreation in the Sacramento River by

providing additional reservoir storage capacity after construction; however, it would not likely increase the anticipated adverse effects on recreation on Shasta Lake in critical years. When added to the anticipated effects of climate change, raising Shasta Dam would not have a significant cumulative effect on recreation.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

The cumulative effects of CP2 would be similar to those of CP1, but greater in magnitude. With implementation of Mitigation Measures Rec-2 (CP2), Rec-4 (CP2), and Rec-15 (CP2), adverse effects from CP2 would be reduced to a less-than-significant level. These adverse effects would no longer result in a cumulatively considerable incremental contribution to significant cumulative effects on recreation and public access. This would not be a cumulatively significant effect.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

The cumulative effects of CP3 would be similar to those of CP1, but greater in magnitude. With implementation of Mitigation Measures Rec-2 (CP3), Rec-4 (CP3), and Rec-15 (CP3), adverse effects from CP3 would be reduced to a less-than-significant level. These adverse effects would no longer result in a cumulatively considerable incremental contribution to significant cumulative effects on recreation and public access. This would not be a cumulatively significant effect.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply Reliability

The cumulative effects would be similar to those of CP1 for CP4, but greater in magnitude. The cumulative effects would be similar to those of CP2 for CP4A. With implementation of Mitigation Measures Rec-2 (CP4 and CP4A), Rec-4 (CP4 and CP4A), and Rec-15 (CP4 and CP4A), adverse effects from CP4 or CP4A would be reduced to a less-than-significant level. These adverse effects would no longer result in a cumulatively considerable incremental contribution to significant cumulative effects on recreation and public access. This would not be a cumulatively significant effect.

CP5 – 18.5-Foot Dam Raise, Combination Plan

The cumulative effects of CP5 would be similar to those of CP1, but greater in magnitude. With implementation of Mitigation Measures Rec-2 (CP5), Rec-4 (CP5), and Rec-15 (CP5), adverse effects from CP5 would be reduced to a less-than-significant level. These adverse effects would no longer result in a cumulatively considerable incremental contribution to significant cumulative effects on recreation and public access. This would not be a cumulatively significant effect.

Chapter 19
Aesthetics and Visual Resources

19.1 Affected Environment

This chapter describes the affected environment related to aesthetics and visual resources for the dam and reservoir modifications proposed under the SLWRI.

Because of the potential influence of the proposed modification of Shasta Dam on water deliveries over a large geographic area, the SLWRI includes both a primary study area and an extended study area. The primary study area has been further divided into Shasta Lake and vicinity and the upper Sacramento River (Shasta Dam to Red Bluff). The extended study area consists of the lower Sacramento River and Delta and the CVP/SWP service areas.

19.1.1 Visual Environment

Both natural and artificial landscape features contribute to perceived visual images and the aesthetic value of a view. The value is determined by contrasts, forms, and textures exhibited by the natural environment (e.g., geology, hydrology, vegetation, and wildlife), as well as human-made features. The aesthetic value of an area is a measure of its visual character and quality combined with the viewer's response to the area (DOT 1981). In general terms, the visual landscape is considered to be a vital component of an area's overall resource value. The ability of the landscape to undergo alteration without losing its visual character is considered important for the maintenance of high scenic value. As development deviates from the natural landscape, visual impacts increase. The visual impacts of a project are determined by a number of factors, including effects on the visual character and quality (e.g., form, line, color, and texture), visual exposure, viewer sensitivity, and the number of viewers who are expected to see the project.

People respond differently to changes in the physical environment, depending on their prior experiences and expectations, their proximity to the views, and the length of time the view is visible to them. Visual effects analyses tend to be highly subjective. For this reason, aesthetics and visual resources are addressed qualitatively rather than quantitatively.

This section focuses on the primary study area consisting of Shasta Lake and vicinity and the upper Sacramento River from Shasta Dam downstream to Red Bluff. The focus is on the primary study area because implementation of the project would have virtually no effect on aesthetic values and visual resources in the extended study area.

The visual environment, or character, is a function of both the natural and man-made landscape features that make up a view. The character of any given area is influenced by geologic, hydrologic, botanical, wildlife, recreational, and urban features. The perception of visual character can vary significantly as season, hour, light, shadow, weather, and the other elements of a view change. Form, line, color, and texture are the basic components used to describe visual character and quality for most visual assessments (DOT 1981). The dominance of each of these components on the landscape forms the viewer's impression of the landscape, and therefore, the aesthetic value of the landscape. The aesthetic value of an area is a measure of its visual character and scenic quality combined with the viewer response.

The overall sensitivity and response of a viewer to the quality of a view is based on a combination of viewer exposure and viewer sensitivity. "Viewer exposure" refers to the visibility of resources in the landscape, the proximity of the vantage point to the view, the elevation of the viewer relative to the view, the frequency and duration of the viewing, the number of observers, and the preconceived expectations of individual viewers or groups. "Viewer sensitivity" refers to the extent of the public's concern for particular landscapes. Judgments of visual quality and viewer response should be based on a regional frame of reference. The geographic setting and nature of the visual resource will significantly influence the degree of visual quality and sensitivity experienced by the viewer. For example, the presence of a small hill in an otherwise flat landscape may be considered a significant visual element, but a hill of the same size may have very little significance when located in mountainous terrain.

For purposes of this report, a viewshed is defined as the surface area visible from a particular location (e.g., a highway pull-out, campground, or marina) or sequence of locations (e.g., along a highway or trail). The scenic attractiveness and distance zones also influence the aesthetic value of a viewshed.

Scenic Attractiveness

Scenic attractiveness is classified as:

- **Class A "distinctive"** – Areas where landform, vegetation patterns, water characteristics, and cultural features combine to provide unusual, unique, or outstanding scenic quality. These landscapes have strong positive attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.

- **Class B "typical"** – Areas where landform, vegetation patterns, water characteristics, and cultural features combine to provide ordinary or common scenic quality. These landscapes generally have positive, yet common, attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.

- **Class C "indistinctive"** – Areas where landform, vegetation patterns, water characteristics, and cultural features have low scenic quality. Water and rock forms of any consequence are often missing in Class C landscapes. These landscapes have weak or missing attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.

Class A and B visual resources typically are found in State or Federal parks, recreation areas, and wilderness areas, including rivers and lakes. Class C resources generally are areas that have low scenic quality and consist of more common landscapes.

Distance Zones

In addition to scenic attractiveness, three primary distance zones are used, as appropriate, to characterize the viewsheds described in the following sections. These distance zones, described below, are foreground, middle ground, and background.

- **Foreground (0 to 0.5 mile)** – At a foreground distance, people can distinguish small boughs or leaf clusters, tree trunks and large branches, individual shrubs, clumps of wildflowers, medium-sized animals, and medium to large birds.

- **Middle ground (0.5 to 4 miles)** – At a middle ground distance, people can distinguish individual tree forms, large boulders, flower fields, small openings in the forest or tree line, and small rock outcrops. Form, texture, and color remain dominant and pattern is important.

- **Background (4 miles to horizon)** – At a background distance, people can distinguish groves or stands of trees, large openings in the forest, and large rock outcrops. Texture is not detectable and color has flattened, but large patterns of vegetation or rocks are still distinguishable, and landform ridgelines and horizon lines are the dominant visual characteristics.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

For purposes of the aesthetics and visual resources assessment, the primary study area encompasses Shasta Lake and vicinity and the upper Sacramento River in Northern California. Shasta Dam is located about 9 miles northwest of Redding, and the dam and the entire reservoir are in Shasta County. The Shasta Lake and vicinity portion of the primary study area is composed of Shasta Dam and Shasta Lake and the lower reaches of the tributaries draining into Shasta Lake. The upper Sacramento River portion includes dam-related infrastructure downstream from the dam, Keswick Reservoir, and watersheds that are tributary to the Sacramento River downstream to Red Bluff.

The terrain of the primary study area is extremely diverse and includes the mountainous terrain surrounding Shasta Lake as well as the landscapes of the Central Valley below Keswick Reservoir. Upstream from Keswick Reservoir, slopes are characterized by a mix of pine and oak forests and, to varying degrees, chaparral and rock outcrops. The landscape includes topographic features of the Klamath Mountains, the southern Cascade Range, and the Central Valley. Two volcanic features – Mount Shasta and Mount Lassen – can be seen from numerous vantage points throughout the area.

Shasta Lake is the central visual attraction of the portion of the primary study area upstream from Shasta Dam. It is the largest lake in the Whiskeytown-Shasta-Trinity National Recreation Area (NRA). The Shasta and Trinity Units of the NRA are managed by the USFS Shasta-Trinity National Forest (STNF) to provide high-quality recreational experiences and visual perceptions to the public. Shasta Lake offers the public a variety of outdoor recreational experiences and activities, including boating, water-skiing, swimming, fishing, camping, picnicking, hiking, hunting, and mountain biking. Recreation at the lake is managed by USFS consistent with the STNF *Land and Resource Management Plan* (LRMP) (USFS 1995b) and guidelines established for the Shasta and Trinity units of the NRA.

Shasta Lake has a surface area of 29,500 acres, with a shoreline of about 420 miles. Currently, there are 9 marinas on Shasta Lake, most of which are located in coves. Although numerous campgrounds provide facilities for land-based recreation, the primary recreational use of the lake is water-based. Many types of boats use the lake, including private and commercial houseboats, powerboats, and personal watercraft.

The construction of Shasta Dam inundated the canyons of the Sacramento, Pit, and McCloud rivers, as well as numerous tributaries. The diversity of visual experiences at Shasta Lake and the surrounding slopes is influenced by fluctuating water levels, compounded by human-made features such as Interstate 5 (I-5), the Union Pacific Railroad (UPRR), and electrical transmission facilities. A variety of commercial and residential uses occurs in, on, or near Shasta Lake.

Shasta Lake is crossed from north to south by I-5 via the Pit River Bridge at the western end of the Pit Arm and the Antlers Bridge near the northern end of the Sacramento Arm. Views from both of these bridges are dominated by Shasta Lake and the surrounding landscapes; the views encompass minimal development, although Bridge Bay Resort can be clearly seen from the southbound lanes of the Pit River Bridge and some commercial and residential development can be seen from the Antlers Bridge.

The STNF LRMP classifies National Forest System (NFS) lands based on visual quality objectives (VQO). VQOs identify how much a management activity can contrast visually with the character of the landscape. The Shasta

and Trinity units of the NRA include lands managed by the STNF to meet the following VQOs: modification, partial retention, and retention. Areas designated as "modification" are typically developed areas, such as campgrounds, marinas, and boat launch ramps, with management activities in the foreground and a natural appearance in the middle ground. "Partial retention" refers to those areas where management activities remain visually subordinate on the landscape. "Retention" areas are those where management activities are not visually evident. The "Preservation" VQO designation allows for ecological changes only. Management activities, except for very low visual impact recreation facilities are prohibited. The "Maximum Modification" VQO applies to areas in which changes in the landscape are strong and would be obvious to the average viewer. These changes stand out as a dominating impression of the landscape, yet they are shaped so that they might resemble natural patterns when viewed from a distance of 3 miles to 5 miles or more. These areas visually appear to be major disturbances.

The LRMP defines three principal criteria to classify VQOs: (1) sensitivity levels, (2) scenic quality of the landscape, and (3) distance from the main viewing areas. Table 19-1 compares the acreage of VQOs (as defined in the LRMP) to the total area of NFS lands managed by USFS in the Shasta and Trinity units of the NRA.

Table 19-1. Shasta-Trinity National Forest Inventoried Visual Quality Objectives

Inventoried VQO	NFS Lands (2,705,234 acres)		NRA Lands (Shasta and Trinity Units) (121,505 acres)	
	Acres[1]	Percent[2]	Acres[3]	Percent[4]
Preservation	498,700	18	28,095	23
Retention	175,000	6	92,387	76
Partial Retention	590,600	22	0	0
Modification	597,600	22	1,112	1
Maximum Modification	259,100	10	0	0

Sources: USFS 1995b, 2007

Notes:

[1] Number of acres of lands of the VQO type in the LRMP management area (NFS land only)

[2] Percentage of lands of the VQO type in the LRMP management area (NFS land only)

[3] Number of acres of land by VQO type in the NRA (Shasta and Trinity Units) management area (NFS land only)

[4] Percentage of lands by VQO type in the LRMP management area (NFS land only)

Key:

LRMP = *Land and Resource Management Plan*

NFS = National Forest System

NRA = National Recreation Area

VQO = visual quality objective

In the NRA, Shasta Dam and Shasta Lake are the dominant components of the visual environment. The lake, combined with constructed facilities (e.g., Shasta Dam, Pit River Bridge, Bridge Bay Resort) and natural features (e.g.,

mountains, rivers, canyons, vegetation) observable from various locations have a substantial influence on the visual character of the existing landscape.

The remaining parts of this section describe the visual resources in the primary study area. Much of the content of these descriptions was taken from reconnaissance-level data gathered during the SLWRI by Reclamation and its consultants. The STNF also provided information used to characterize these visual resources. Visual resources are described in terms of visual sensitivity and viewer response.

Viewsheds A number of factors can influence the aesthetic value of viewsheds in the primary study area, which are dominated by constructed features and natural landscapes. Although exposed surfaces associated with grading and barren shoreline may be obvious, factors such as vegetation, lighting, and glare can also substantially influence these viewsheds both spatially and temporally. The viewshed types that occur in the primary study area are listed below and described in the following sections:

- Panoramic views
- Vista points
- Landscape features
- Distinctive built features
- Built features (detractions)
- Exposed shoreline of Shasta Lake
- External views

Panoramic Views A panoramic view is defined as the unbroken view of an entire surrounding area. In the Shasta Dam and Shasta Lake area, panoramic viewing opportunities are governed by the elevation, aspect, and location of the viewer. The steep, mountainous topography around Shasta Lake largely influences the degree to which any given area can be seen from a particular vantage point. Vegetation, lighting, and glare also influence a panoramic view. For example, panoramic views as seen from the lake level vary greatly from those seen from the I-5 corridor higher up the slope.

The contrast between Shasta Lake and the surrounding mountains affords visitors a diversity of views from various locations around the lake. The length and configuration of the shoreline of Shasta Lake coupled with the mountainous terrain represent an important visual and scenic resource in the region.

Panoramic viewsheds are plentiful throughout the primary study area. Among the most dramatic and high-quality views is that of the so-called "Three Shastas," consisting of Shasta Dam, Shasta Lake, and Mount Shasta. The photograph in Figure 19-1, taken from the State Route (SR) 151 vista point above the Shasta Dam Visitor Center, illustrates the Three Shastas with the dam in the foreground, the lake in the middle ground, and Mount Shasta in the background. This view is a widely publicized panorama that draws large numbers of visitors to the area annually. Class A and B views extend for miles to the north, east, and west from the SR 151 vista point.

For purposes of this assessment, panoramic viewsheds consist primarily of views visible from locations immediately adjacent to or above Shasta Dam that are subject to heavy use (e.g., Bridge Bay Resort, Shasta Dam Visitor Center, the I-5 corridor). However, some less accessible, but nonetheless important, locations such as residences, campgrounds, marinas, and other facilities may also provide opportunities for panoramic views and thus have been included in the assessment of potential impacts on panoramic views.

Figure 19-1. Panoramic view of the Three Shastas (Shasta Dam, Shasta Lake, and Mount Shasta) as seen from the State Route 151 Vista Point

Vista Points Vista points differ from panoramic views in the level of visible expanse. Panoramic views encompass an entire surrounding area, whereas views from vista points are limited by what can be seen through an opening, such as between rows of trees or buildings. Shasta Lake and the surrounding area offer almost limitless viewing opportunities. Viewsheds have been assessed based on

Figure 19-2. Typical View of Shasta Lake from a Lakeside Campsite (taken from the Dekkas Rock Campground, McCloud Arm)

sites that are representative of popular use areas such as marinas, residences, and other recreational features.

Most of the shoreline around the lake (above the ordinary high-water line) is heavily vegetated and its topography varies significantly. Views from most onshore recreation areas are limited by stands of trees and undulating banks. Figure 19-2 shows a view of the lake from a typical lakeside campsite, in this case the Dekkas Rock Campground located on the McCloud Arm. Views of the shoreline from the water are also influenced by topography and vegetation. Although large expanses of the shoreline may be visible to boaters, lake elevation and bank topography ultimately determine what can be seen by boaters.

Figure 19-3. Some of the Distinctive Landscape Features Visible from the Bridge Bay Resort, Including a Portion of the Bridge Bay Resort

Landscape Features "Landscape feature" is a term used to describe the land characteristics of a particular area, such as a forested or mountainous site. Several landscape features characterize the primary study area, including forest, rocky outcrops, and urban development. Well-known landscape features in the primary study area include Shasta Dam, Mount Shasta, the Sundial Bridge, and the Sacramento River. The distance of the feature upstream from Shasta Dam, coupled with variations in lake levels, influences the view of landscape features. As the lake level falls, the various arms look more like rivers (e.g., channelized, boulder-strewn) and less like a lake. Figure 19-3 illustrates some of the distinctive landscape features visible from a portion of the Bridge Bay Marina, the Pit River Bridge, and limestone outcrops located along the McCloud Arm.

Figure 19-4. Shasta Dam and Infrastructure

Distinctive Built Features The aesthetic quality of a distinctive built feature is subject to individual interpretation. This subjective interpretation is influenced by the contrast of these features with their setting. For example, engineered features such as Shasta Dam and its infrastructure (Figure 19-4) can be considered to detract from the "natural" character of the setting, because some viewers might argue that the natural character of the features inundated by Shasta Lake is its greatest strength. The dam, which was completed in 1945, is a curved concrete gravity-type dam containing 6.5 million cubic yards of concrete weighing 15 million tons. It is the second largest dam in mass in the United States. (Grand Coulee Dam on the Columbia River in Washington State is the largest.)

The 3,460-foot-long dam is 602 feet high, 543 feet thick at the bottom, and 30 feet thick at the top (Reclamation 2005). The face of the dam covers 31 acres, equal to 6 football fields and their stadiums, and the 487-foot spillway is the largest built waterfall in the world – three times the height of Niagara Falls. The spillway, as seen from the west, measures 375 feet in width with 3 drum gates, each 110 feet wide, 28 feet tall, and weighing 500 tons. There are 18 outlets on the face of the dam, each 8½ feet in diameter (large enough to drive a pickup truck through) with a maximum spillage capacity of 186,000 cubic feet per second.

With more than 400 miles of shoreline, Shasta Lake is the largest human-made lake in California. The water storage capacity is more than 4.5 million acre-feet. The surface area of the lake is 29,740 acres, and the lake drains 6,665 square miles (Reclamation 2005). The lake is one of the major landmarks in Northern California.

Built Features (Detractions) An opinion concerning the attractiveness of a built feature is formed by the viewer's perception, biases, and personal preferences. A feature seen as an eyesore by one viewer may very well be considered attractive by another. Built features such as bridges, structures, roads, power transmission lines, and water storage tanks are generally visible only from site-specific locations (e.g., the visitor center, marinas, sections of I-5) in the primary study area. Figure 19-5 shows an example of built features found in the primary study area (in this case, a railroad bridge in the foreground and the Antlers/I-5 Bridge in the background, as seen from Lakeshore Drive).

Figure 19-5. Examples of Built Features in the Primary Study Area

Additional built features of interest in the primary study area include bridges, roads, utilities, and commercial, administrative, and residential structures.

Figure 19-6. The "Bathtub Ring" Effect

Exposed Shoreline of Shasta Lake Currently, Shasta Lake reaches or nearly reaches full pool levels about once every 5 years. Because it is a reservoir, water levels fluctuate in response to climatic conditions and operational requirements. Typical operational scenarios involve drawing the reservoir down during the demand period (May through October) and storing runoff during the winter/spring period. By its nature, the amount of shoreline exposed below the full pool level elevation fluctuates daily. In extremely dry years, more than 200 vertical feet of shoreline may be exposed for extended periods through the fall.

Figure 19-7. View of Shasta Lake from a Residence Located off Northwoods Road, Lakehead, California

Unlike bodies of water that are influenced by tides or other natural fluctuations, Shasta Lake does not support habitats that can adapt to large changes in environmental conditions. Therefore, the exposed shoreline below the full pool level is essentially devoid of vegetation (Figure 19-6). As illustrated in this figure, the relatively gradual slope to the lake bottom results in a greater area of exposed shoreline with lower water levels, resulting in the "bathtub ring" effect common to California reservoirs (Reclamation 2006). As the elevation of the water surface decreases, the viewing quality changes spatially and temporally. Erosional processes, primarily wave erosion, exacerbate this situation. The seasonal fluctuations in water levels and, consequently, the amount of exposed shoreline greatly affect the visual quality of Shasta Lake.

External Views A number of factors may affect the viewsheds described in the preceding section. Exposed surfaces associated with barren shoreline and

activities such as grading may be obvious, but factors such as vegetation, lighting, and glare could also substantially affect these viewsheds both spatially and temporally.

Topography and property boundaries influence the public's external views of the primary study area. Views of the lake from private property are infrequent. Most private parcels are located some distance from the lake, and views of the lake are buffered by vegetation and the topography of NFS lands surrounding the lake. Nevertheless, some of the private parcels in the vicinity of Shasta Lake have views of the lake, although the quality of these views varies. Figure 19-7 shows a view of Shasta Lake from a nearby residence (the McCloud Arm is seen in the middle ground and the Pit Arm in the background).

Light and Glare A majority of the lands surrounding Shasta Lake are densely vegetated and undeveloped. As a result, there are relatively few sources of artificial light and glare in the Shasta Lake and vicinity portion of the primary study area. The reaches of the upper Sacramento River that pass through developed communities, such as Redding and Anderson, do have substantial sources of light and glare, and, to a lesser degree, light and glare are observable between the City of Shasta Lake and Lakehead. Vehicle traffic and roadway lighting along the I-5 corridor, scattered residential and commercial development, and reflective surfaces such as boats and marinas are among the primary sources of light and glare. The Shasta Dam compound has a variety of sources of light and glare. The backdrop of Shasta Dam at night is nonetheless an attraction for visitors and residents.

Exposed bare mineral soils, which characterize the "bathtub ring" around the perimeter of the lake during periods of drawdown, are a potential source of glare (Figure 19-6). The chroma of these soils is generally light, and the contrast of the bathtub ring with upslope vegetation and downslope water is readily apparent from various distances.

Vegetation Vegetation is an important variable in characterizing visual conditions. The type, location, diversity, and distribution of vegetation influence form and texture, depending on the vantage point of the viewer. The diverse assemblage of vegetation and barren areas in and adjacent to the primary study area varies seasonally. As mentioned previously, forestlands surround Shasta Lake. The transition from chaparral/montane hardwood–dominated habitat at the southern end of the lake to a conifer-dominated forest to the north and east is apparent to travelers on I-5 as well as to people viewing the area from the lake level or a vista point.

Typically, vegetation extends from the ordinary high-water line of Shasta Lake into the adjacent uplands. Changes in vegetation type are apparent as the viewer's eye is drawn upward from lake level to surrounding ridgelines. Because there is no vegetation below the ordinary high-water line, a distinct

demarcation is visible between upland vegetation and water levels as the reservoir fluctuates.

Viewer Groups The perceptions of viewers are influenced by their location, specific activities in which they are engaged, personal degree of awareness, and individual values and goals. Activities associated with the project could affect three distinct viewer groups: motorists, residents, and recreationists.

Motorists For the purposes of this report, motorists are people who view the primary study area from a moving vehicle. Motorists can be drivers or passengers. This group typically consists of commuters, local residents, business travelers, and tourists.

Tourists are often acutely aware of viewsheds. Business travelers, commuters, and local residents who travel the same routes frequently may become inured to a view but, at the same time, are more likely to be aware of visual changes than occasional passersby. In general, views of Shasta Lake from motorists on I-5 are of short duration but relatively frequent from Bridge Bay north to Lakehead. The longest duration and most expansive panoramic view of Shasta Lake from I-5 occurs as the roadway approaches and crosses Shasta Lake over the Pit River Bridge from both the north and the south. Traveling this route at a speed of 55 miles per hour, the viewer would be able to observe the lake and its vicinity for approximately 1 minute. Other I-5 views may vary from 4 to 16 seconds, depending on the direction and speed of travel.

Less traveled roads in the vicinity of Shasta Lake, such as SR 151, Salt Creek Road, and Gilman Road, also offer views of the lake. Most views of the lake from these roads are limited to vistas (views framed by trees or structures) and are therefore of short duration. However, one of the best vantage points from which to view the Three Shastas is at an overlook along SR 151, a State scenic highway (Figure 19-1). Motorists traveling north who do not stop at the overlook also see a spectacular view of the Three Shastas while traveling, although the view is of short duration.

Residents For the purposes of this report, residents are people whose homes, businesses, and/or property are near, and have a view of, a portion of the primary study area. The sensitivity of residents to aesthetic values and changes to a viewshed is highly individual. In addition, the sensitivity of residents to changes in a viewshed is influenced, in part, by the location and the length of time that the view from a particular location appears altered from its previous condition (e.g., temporary changes during construction or long-term modifications to the landscape).

Views of Shasta Lake from private properties are limited by land ownership patterns; most of the lands surrounding Shasta Lake are managed by Federal agencies. Views from these lands are influenced by access, vegetation, and topography. Homes on nearby ridges, such as those on the ridgeline between

Packers Bay and Turntable Bay, typically have partial views of Shasta Lake. Similarly, homes clustered along the Sacramento Arm near Lakehead have views upstream and downstream from the arm, although the views are limited by the steep topography.

Recreationists For the purposes of this report, recreationists are people who use the lands in the NRA for recreation. Like residents, recreational users of Shasta Lake are highly sensitive to the visual character of Shasta Lake and the surrounding environment.

Recreationists are people who participate in land-based activities, such as hiking along the shoreline, camping in the NRA's many campgrounds, or water-based activities, such as boating, fishing, or rafting. In addition to four recreational residence tracts permitted by the STNF (e.g., Silverthorn Tract), several commercial facilities offer overnight accommodations adjacent to the shoreline. Recreational users often have a unique perspective on the surrounding environment.

Visual Assessment Units and Key Observation Points Visual assessment units (VAU) are areas of distinct visual character in a viewshed that provide a framework for comparing the visual effects of alternatives. Key observation points (KOP) are commonly traveled routes or other likely observation points in a VAU from which a representative group (motorists, residents, and recreationists) can observe a viewshed.

VAUs are defined by areas where the features or activities associated with the project would occur in the line of sight of a KOP and represent foreground or middle ground views (i.e., within 4 miles of a KOP in the VAU). KOPs were established at locations from which portions of the primary study area can clearly be seen by members of the various viewer groups. Table 19-2 lists the KOPs established in the primary study area. Locations of VAUs and KOPs are shown in Figures 19-8a through 19-8h. Photographs taken from each KOP are provided after each figure.

Table 19-2. Key Observation Points

VAU	Figure	KOP #	Photo #	Description of Key Observation Point
Shasta Dam	19-8a	1	1a	View of the Three Shastas (Shasta Dam, Shasta Lake, and Mount Shasta) from the SR 151 overlook above the Shasta Dam Visitor Center and downstream from Shasta Dam
		1	1b	View of the upper Sacramento River below Shasta Dam from the SR 151 overlook above the Shasta Dam Visitor Center and downstream from Shasta Dam
		2	2a	View of the Main Body of Shasta Lake from Shasta Dam
		2	2b	View of the Shasta Dam spillway and the upper Sacramento River from Shasta Dam
		2	2c	View of the Centimudi Boat Ramp from Shasta Dam
		3	3a	View from the Chappie-Shasta OHV Area staging area looking northeast
		3	3b	View from the Chappie-Shasta OHV Area staging area looking south
		4	4a	View from the Chappie-Shasta OHV Area campground looking northeast
		4	4b	View from the Chappie-Shasta OHV Area campground looking southwest
		5	5a	View from the Coram Ranch River House looking northeast
		5	5b	View from the Coram Ranch River House looking southeast
		6	6a	View from the Coram Ranch Dogwood House looking northeast
		6	6b	View from the Coram Ranch Dogwood House looking southeast
		7	7a	View from the Coram Ranch Residence looking northeast
		7	7b	View from the Coram Ranch residence looking east
		7	7c	View from the Coram Ranch residence looking southeast
		8	8	View from the Coram Ranch Guest Quarters looking northeast
		9	9a	View from the road above the Chappie-Shasta OHV Area staging area looking northeast
		9	9b	View from the road above the Chappie-Shasta OHV Area staging area looking southwest
		10	10a	View of Shasta Dam from pullout east of the dam on Lake Boulevard looking northwest
		10	10b	View of Shasta Lake from pullout east of the dam on Lake Boulevard looking northeast
		11	11	View of Shasta Dam from the Main Body of Shasta Lake

Table 19-2. Key Observation Points (contd.)

VAU	Figure	KOP #	Photo #	Description of Key Observation Point
Dry Creek Trail	19-8b	1	1	View of Dry Creek Trail northwest of Shasta Dam looking west from the Main Body of Shasta Lake
Little Backbone Inlet	19-8b	1	1a	View of the mouth of Little Backbone inlet looking northeast from the Main Body of Shasta Lake
		1	1b	View of the mouth of Little Backbone inlet looking northwest from the Main Body of Shasta Lake
Digger Bay	19-8b	1	1	View of the Main Body of Shasta Lake from the upper parking area west of the Digger Bay Boat Ramp
		2	2	View of the upper parking area at Digger Bay Marina looking east
		3	3a	View of Digger Bay Marina looking northwest from boat ramp
		3	3b	View of Digger Bay Marina shoreline looking west from boat ramp
		3	3c	View of Digger Bay Boat Ramp and parking area looking south from marina
Packers Bay	19-8c	1	1	View of Packers Bay from the Packers Bay Boat Ramp
Bridge Bay	19-8c	1	1a	View of Bridge Bay looking north from the Bridge Bay store
		1	1b	View of Bridge Bay looking northwest from the parking lot of the Bridge Bay store
		2	2	View of the I-5/Pit River Bridge from Bridge Bay
		3	3a	View of the Union Pacific Railroad train tunnel looking south from the Bridge Bay Resort maintenance area
		3	3b	View of the Union Pacific Railroad train tunnel looking north from the Bridge Bay Resort maintenance area
		3	3c	View of Bridge Bay Marina 4 from the Bridge Bay Resort maintenance parking area
		4	4a	View of the south shoreline from Bridge Bay Marina 4 stairway
		4	4b	View looking northwest from Bridge Bay Marina 4 stairway
Sacramento Arm	19-8d	1	1	View of the Sacramento Arm from Riverview Drive southbound near the community of Pollock
		2	2	View of the Sacramento Arm from Riverview Drive southbound near the community of Pollock
		3	3	View of the Sacramento Arm looking east from the Doney Creek Bridge on Lakeshore Drive near the community of Lakehead
		4	4a	View of the Sacramento Arm from Lakeshore East Campground near the community of Lakeshore
		4	4b	View of the Sacramento Arm looking southeast from Lakeshore East Campground

Table 19-2. Key Observation Points (contd.)

VAU	Figure	KOP #	Photo #	Description of Key Observation Point
Sacramento Arm (contd.)	19-8d (contd.)	5	5a	View of the inlet looking northwest from Charlie Creek Bridge on Lakeshore Drive
		5	5b	View of the Sacramento Arm looking south from Charlie Creek Bridge on Lakeshore Drive
		6	6a	View of the Sacramento Arm from the Beehive Campground access road near Lakeshore
		6	6b	View of Sugarloaf Creek inlet/Sacramento Arm from Beehive Campground near Lakeshore
		6	6c	View of Sugarloaf Creek inlet/Sacramento Arm from Beehive Campground near Lakeshore
		7	7a	View of Sugarloaf Cove near Lakeshore from north shore looking south
		7	7b	View of Sugarloaf Cove from north shore looking northwest
		8	8	View of Sugarloaf Marina from the end of Daisy Lane
		9	9a	View looking south from Sugarloaf Resort Marina access
		9	9b	View toward the Salt Creek inlet from Sugarloaf Resort Marina access
		9	9c	View of Sugarloaf Marina from Sugarloaf Resort
		10	10a	View looking south toward Sugarloaf Marina from the Sugarloaf Boat Ramp
		10	10b	View looking southeast at the Sacramento Arm from the Sugarloaf Boat Ramp
		10	10c	View looking northeast at the Sacramento Arm from the Sugarloaf Boat Ramp entrance
		11	11a	View looking east from the Tsasdi Resort Marina
		11	11b	View looking south from the Tsasdi Resort Marina
		12	12a	View looking east toward I-5 from the Lakeshore Resort Campground
		12	12b	View looking southeast from the Lakeshore Resort Campground
		13	13	View of the Salt Creek Inlet looking south from the Oak Grove Day Use Area
		14	14a	View looking northeast from Lower Salt Creek Road at the Salt Creek Resort
		14	14b	View looking northwest from Lower Salt Creek Road at the Salt Creek Resort
		15	15a	View of the Salt Creek Inlet from Lower Salt Creek Road
		15	15b	View of the Salt Creek Inlet from Lower Salt Creek Road

Table 19-2. Key Observation Points (contd.)

VAU	Figure	KOP #	Photo #	Description of Key Observation Point
Sacramento Arm (contd.)	19-8d (contd.)	16	16	View of Antlers Bridge/I-5 looking southwest from Antlers Public Boat Ramp
		17	17a	View of Antlers Public Boat Ramp/Picnic Area parking lot from picnic area looking north
		17	17b	View of Sacramento Arm from Antlers Public Boat Ramp/Picnic Area from picnic area looking south
		18	18a	View from typical campsite at Antlers Resort looking north
		18	18b	View from typical campsite at Antlers Resort looking east
		18	18c	View from typical campsite at Antlers Resort looking southwest
McCloud Arm	19-8e	1	1	View of the McCloud Arm, Turntable Bay, and vicinity from a residence located off of Northwoods Road, west of I-5
		2	2	View of Turntable Bay from the McCloud Arm of Shasta Lake
		3	3	View of the Bailey Cove Boat Ramp from the Bailey Cove parking lot
		4	4	View of Holiday Harbor from the Bailey Cove Day Use Area
		5	5	View of Holiday Harbor from the Holiday Harbor Campground entrance
		6	6	View looking south toward the McCloud Arm from the Shasta Caverns parking lot
		7	7	View from the former Lakeview Resort caretaker residence
		8	8a	View of the McCloud Arm looking south from the former Lakeview Resort boat ramp
		8	8b	View of the McCloud Arm looking northeast from the former Lakeview Resort boat ramp
		8	8c	View of the Lakeview Resort Marina from the former Lakeview Resort boat ramp
		9	9	View of the former Lakeview Resort from the McCloud Arm of Shasta Lake
		10	10	View of Shasta Caverns dock on east side of lake from the McCloud Arm of Shasta Lake
		11	11a	View of the McCloud Arm downstream from the Hirz Bay Boat Ramp
		11	11b	View of the McCloud Arm upstream from the Hirz Bay Boat Ramp

Table 19-2. Key Observation Points (contd.)

VAU	Figure	KOP #	Photo #	Description of Key Observation Point
McCloud Arm (contd.)	19-8e (contd.)	12	12	View of Hirz Bay from the McCloud Arm of Shasta Lake
		13	13a	View of Campbell Creek inlet looking southeast from the McCloud Arm of Shasta Lake
		13	13b	View of Campbell Creek inlet looking east from the McCloud Arm of Shasta Lake
		14	14a	View of the McCloud Arm downstream, from the Dekkas Rock Campground
		14	14b	View of the McCloud Arm upstream, from the Dekkas Rock Campground
		15	15a	View of the McCloud River upstream, from the McCloud River Bridge
		15	15b	View of the McCloud River downstream, from the McCloud River Bridge
		16	16	View of the McCloud River Bridge, from the eastern approach
		17	17	View of the McCloud Arm from Space 10, McCloud Bridge Campground
		18	18a	View of the McCloud Arm from open area west of Space 1, McCloud Bridge Campground
		18	18b	View of the McCloud Arm from open area west of Space 1, McCloud Bridge Campground
		18	18c	View looking west from the open area west of Space 1, McCloud Bridge Campground
Pit Arm	19-8f	1	1a	View of the Pit Arm from the Jones Valley parking area, looking northwest
		1	1b	View of the Pit Arm from the Jones Valley parking area, looking northeast
		2	2	View of the Pit Arm from the Jones Valley parking area (west end), looking west
		3	3	View of the Pit Arm from the entrance to the Jones Valley Campground
		4	4	View of the Pit Arm looking north from the Jones Valley Resort Boat Ramp
		5	5	View of the Pit Arm from Juniper Drive, Silverthorn Resort

Table 19-2. Key Observation Points (contd.)

VAU	Figure	KOP #	Photo #	Description of Key Observation Point
Pit Arm (contd.)	19-8f (contd.)	6	6a	View of the Silverthorn Marina from the top of the boat ramp looking east
		6	6b	View of the Silverthorn Marina from the top of the boat ramp looking northeast
		6	6c	View of the Silverthorn Marina from the top of the boat ramp looking north
		7	7	View of the Silverthorn Marina looking south from the Pit Arm of Shasta Lake
		8	8	View of the west side of Ski Island looking east from Shasta Lake
Squaw Arm	19-8g	1	1	View of Bully Hill looking north from the Squaw Arm of Shasta Lake
		2	2	View of Monday Flat looking north from the Squaw Arm of Shasta Lake
I-5 Corridor	19-8h	1	1a	View of the Pit Arm (right) and the McCloud Arm (left) from the Pit River Bridge, as seen from I-5 northbound
		1	1b	View of Bridge Bay Resort from the Pit River Bridge, as seen from I-5 southbound
		2	2	View of the Pit River Bridge looking west from the Pit Arm of Shasta Lake
		3	3a	View of the Sacramento Arm looking toward the Antlers Campground from the Antlers Bridge, as seen from I-5 northbound
		3	3b	View of the Antlers Public Boat Ramp from the Antlers Bridge, as seen from I-5 northbound
		4	4	View of the Sacramento Arm west of the Antlers Bridge, as seen from I-5 southbound
		5	5	View of the McCloud Arm and vicinity at Turntable Bay, as seen from I-5 northbound

Key:
I-5 = Interstate 5
KOP = key observation point
OHV = off-highway vehicle
SR = State Route
VAU = visual assessment unit

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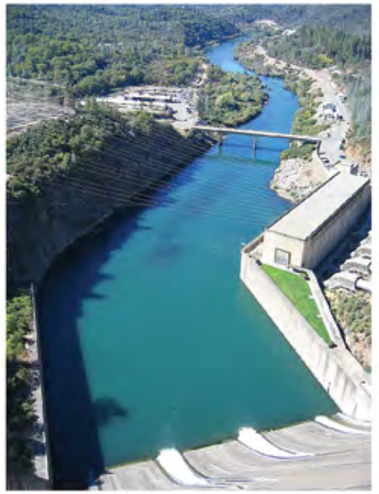
Figure 19-8a. Visual Assessment Unit and Key Observation Points

Shasta Dam VAU, KOP 1, Photo 1a
View of the Three Shastas (Shasta Dam, Shasta Lake, and Mount Shasta) from the SR 151 overlook above the Shasta Dam Visitor Center and downstream of Shasta Dam.

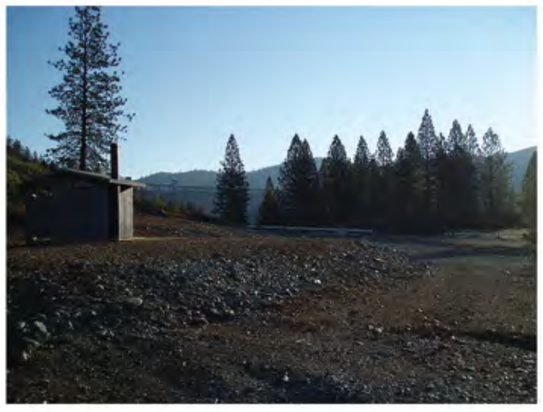
Shasta Dam VAU, KOP 1, Photo 1b
View of the upper Sacramento River below Shasta Dam from the SR 151 overlook above the Shasta Dam Visitor Center and downstream of Shasta Dam.

Shasta Dam VAU, KOP 2, Photo 2a
View of the main body of Shasta Lake from Shasta Dam.

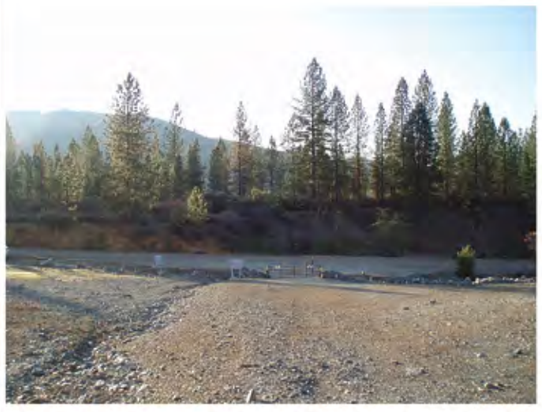


Shasta Dam VAU, KOP 2, Photo 2b
View of the Shasta Dam spillway and the upper Sacramento River from Shasta Dam.

Shasta Dam VAU, KOP 2, Photo 2c
View of the Centimudi Boat Launch from Shasta Dam.



Shasta Dam VAU, KOP 3, Photo 3a
View from the Chappie - Shasta Off-Highway Vehicle (OHV) Area staging area looking northeast.



Shasta Dam VAU, KOP 3, Photo 3b
View from the Chappie - Shasta OHV Area staging area looking south.

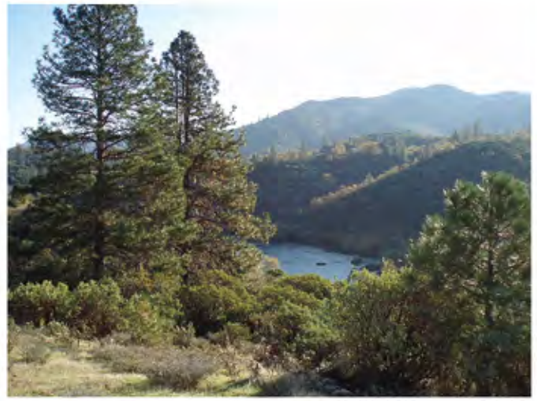
Shasta Dam VAU, KOP 4, Photo 4a
View from the Chappie - Shasta OHV Area campground looking northeast.

Photographs for Figure 19-8a, Plate 1

Shasta Dam VAU, KOP 4, Photo 4b
View from the Chappie - Shasta OHV Area campground looking southwest.

Shasta Dam VAU, KOP 5, Photo 5a
View from the Coram Ranch River House looking northeast.

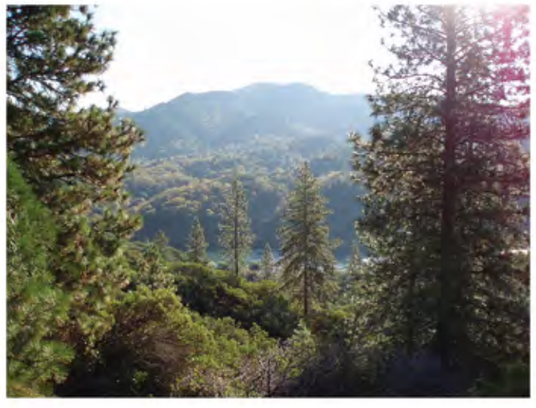
Shasta Dam VAU, KOP 5, Photo 5b
View from the Coram Ranch River House looking southeast.



Shasta Dam VAU, KOP 6, Photo 6a
View from the Coram Ranch Dogwood House looking northeast.

Shasta Dam VAU, KOP 6, Photo 6b
View from the Coram Ranch Dogwood House looking southeast.

Shasta Dam VAU, KOP 7, Photo 7a
View from the Coram Ranch Residence looking northeast.



Shasta Dam VAU, KOP 7, Photo 7b
View from the Coram Ranch Residence looking east.

Shasta Dam VAU, KOP 7, Photo 7c
View from the Coram Ranch Residence looking southeast.

Photographs for Figure 19-8a, Plate 2

Shasta Dam VAU, KOP 8, Photo 8
View from the Coram Ranch Guest Quarters looking northeast.

Shasta Dam VAU, KOP 9, Photo 9a
View from the road above the Chappie - Shasta OHV Area staging area looking northeast.

Shasta Dam VAU, KOP 9, Photo 9b
View from the road above the Chappie - Shasta OHV Area staging area looking southwest.

Shasta Dam VAU, KOP 10, Photo 10a
View of Shasta Dam from pullout east of the dam on Lake Boulevard looking northwest.

Shasta Dam VAU, KOP 10, Photo 10b
View of Shasta Lake from pullout east of the dam on Lake Boulevard looking northeast.

Shasta Dam VAU, KOP 11, Photo 11
View of Shasta Dam from the main body of Shasta Lake.

Photographs for Figure 19-8a, Plate 3

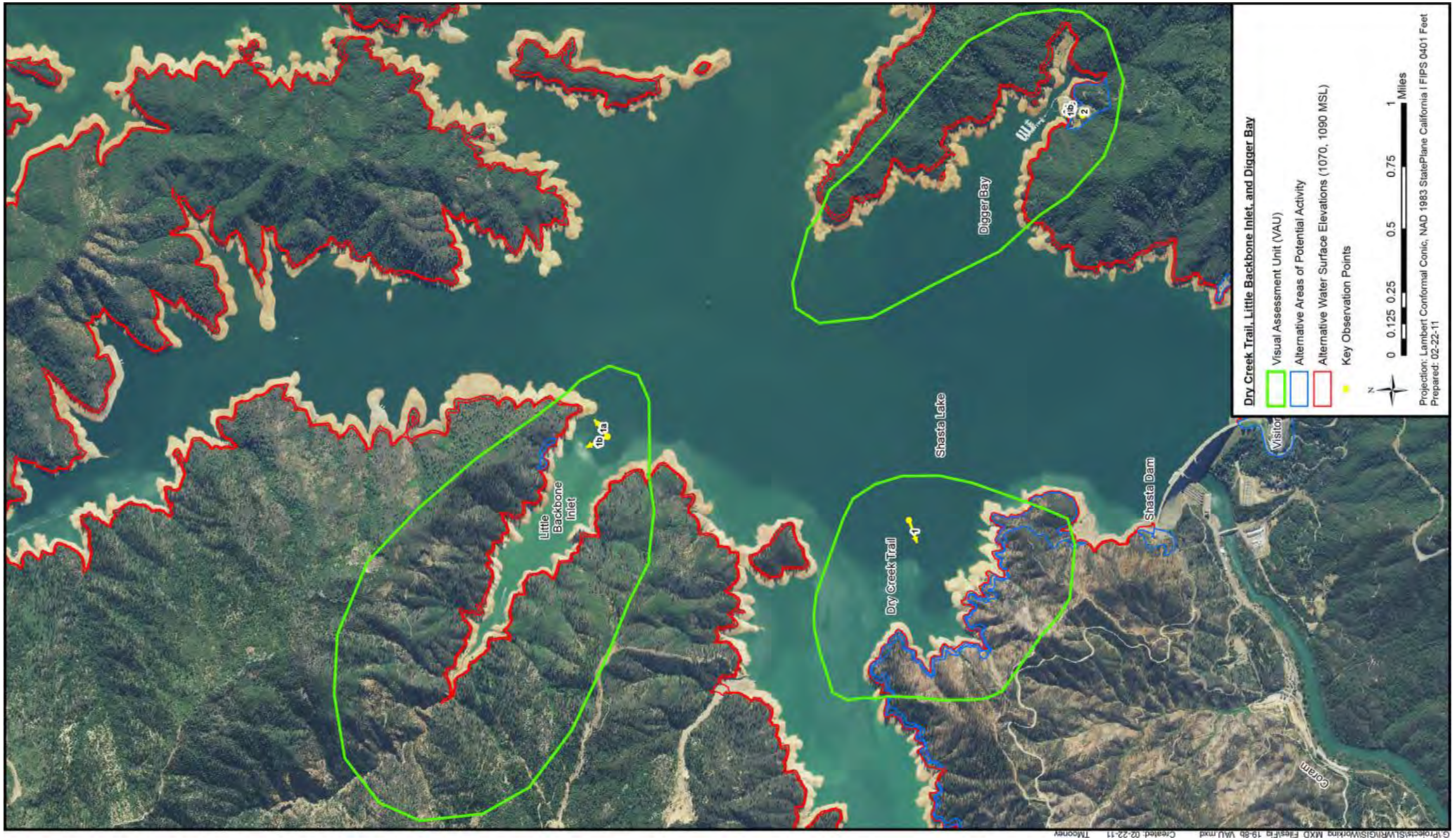


Figure 19-8b. Visual Assessment Unit and Key Observation Points

Dry Creek Trail VAU, KOP1, Photo 1
View of Dry Creek Trail northwest of Shasta Dam looking west from the main body of Shasta Lake.

Little Backbone Inlet VAU, KOP 1, Photo 1a
View of the mouth of Little Backbone inlet looking northeast from the main body of Shasta Lake.

Little Backbone Inlet VAU, KOP 1, Photo 1b
View of the mouth of Little Backbone inlet looking northwest from the main body of Shasta Lake.

Digger Bay VAU, KOP 1, Photo 1
View of the main body of Shasta Lake from the upper parking area west of the Digger Bay Boat Ramp.

Digger Bay VAU, KOP 2, Photo 2
View of the upper parking area at Digger Bay Marina looking east.

Digger Bay VAU, KOP 3, Photo 3a
View of Digger Bay Marina looking northwest from boat ramp.

Digger Bay VAU, KOP 3, Photo 3b
View of Digger Bay Marina shoreline looking west from boat ramp.

Digger Bay VAU, KOP 3, Photo 3c
View of Digger Bay Boat Ramp and parking area looking south from marina.

Photographs for Figure 19-8b, Plate 1

Figure 19-8c. Visual Assessment Unit and Key Observation Points

Packers Bay VAU, KOP 1, Photo 1
View of Packers Bay from the Packers Bay Boat Ramp.

Bridge Bay VAU, KOP 1, Photo 1a
View of Bridge Bay looking north from the Bridge Bay store.

Bridge Bay VAU, KOP 1, Photo 1b
View of Bridge Bay looking northwest from the parking lot of the Bridge Bay store.

Bridge Bay VAU, KOP 2, Photo 2
View of the I-5/Pit River Bridge from Bridge Bay.

Bridge Bay VAU, KOP 3, Photo 3a
View of the Union Pacific Railroad train tunnel looking south from the Bridge Bay Resort maintenance area.

Bridge Bay VAU, KOP 3, Photo 3b
View of the Union Pacific Railroad train tunnel looking north from the Bridge Bay Resort maintenance area.

Bridge Bay VAU, KOP 3, Photo 3c
View of Bridge Bay Marina 4 from the Bridge Bay Resort maintenance parking area.

Bridge Bay VAU, KOP 4, Photo 4a
View of the south shoreline from Bridge Bay Marina 4 stairway.

Photographs for Figure 19-8c, Plate 1

Bridge Bay VAU, KOP 4, Photo 4b
View looking northwest from Bridge Bay Marina 4 stairway.

Photographs for Figure 19-8c, Plate 2

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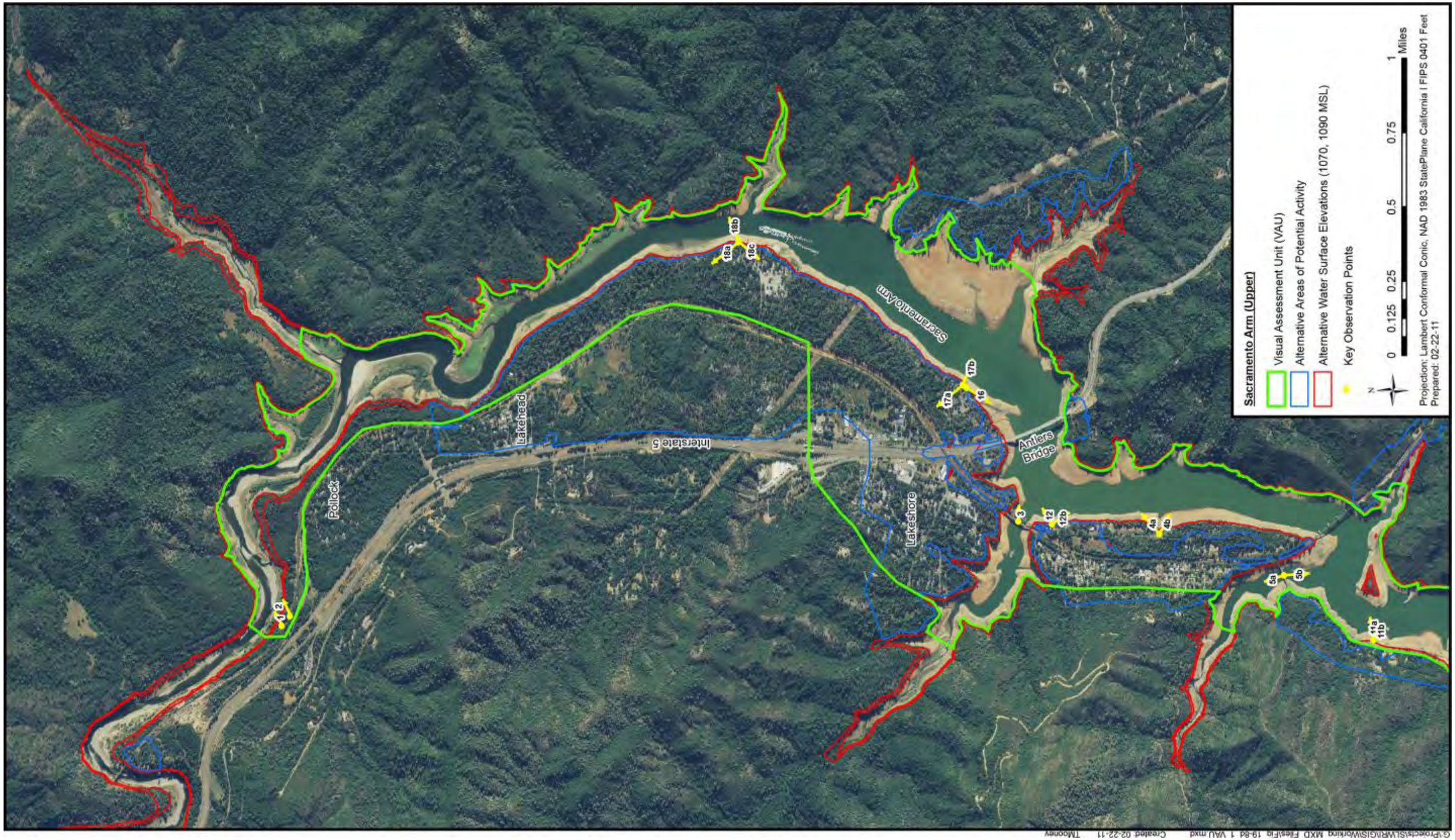


Figure 19-8d. Part 1 – Visual Assessment Unit and Key Observation Points

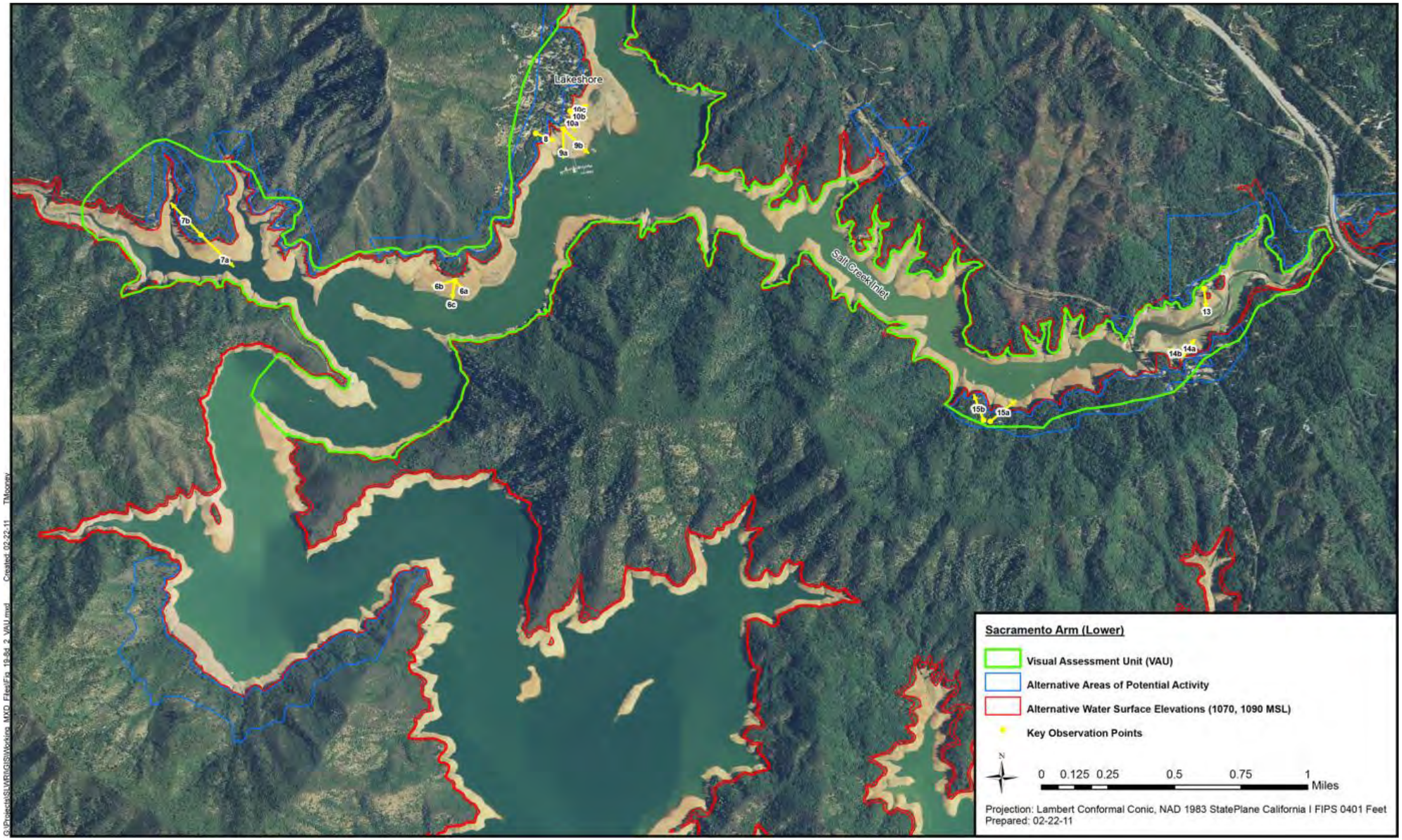


Figure 19-8d. Part 2 – Visual Assessment Unit and Key Observation Points

Sacramento Arm VAU, KOP 1, Photo 1
View of the Sacramento Arm from Riverview Drive southbound near the community of Pollock.

Sacramento Arm VAU, KOP 2, Photo 2
View of the Sacramento Arm from Riverview Drive southbound near the community of Pollock.

Sacramento Arm VAU, KOP 3, Photo 3
View of the Sacramento Arm looking east from the Donley Creek Bridge on Lakeshore Drive near the community of Lakehead.

Sacramento Arm VAU, KOP 4, Photo 4a
View of the Sacramento Arm from Lakeshore East Campground near the community of Lakeshore.

Sacramento Arm VAU, KOP 4, Photo 4b
View of the Sacramento Arm looking southeast from the Lakeshore East Campground.

Sacramento Arm VAU, KOP 5, Photo 5a
View of the inlet looking northwest from Charley Creek Bridge on Lakeshore Drive.

Sacramento Arm VAU, KOP 5, Photo 5b
View of the Sacramento Arm looking south from Charley Creek Bridge on Lakeshore Drive.

Sacramento Arm VAU, KOP 6, Photo 6a
View of the Sacramento Arm from the Beehive Campground access road near Lakeshore.

Photographs for Figure 19-8d, Plate 1

Sacramento Arm VAU, KOP 6, Photo 6b
View of Sugarloaf Creek inlet/Sacramento Arm from Beehive Campground near Lakeshore.

Sacramento Arm VAU, KOP 6, Photo 6c
View of Sugarloaf Creek/Sacramento Arm from Beehive Campground near Lakeshore.

Sacramento Arm VAU, KOP 7, Photo 7a
View of Sugarloaf Cove near Lakeshore from north shore looking south.

Sacramento Arm VAU, KOP 7, Photo 7b
View of Sugarloaf Cove from north shore looking northwest.

Sacramento Arm VAU, KOP 8, Photo 8
View of Sugarloaf Marina from the end of Daisy Lane.

Sacramento Arm VAU, KOP 9, Photo 9a
View looking south from Sugarloaf Resort Marina access.

Sacramento Arm VAU, KOP 9, Photo 9b
View toward the Salt Creek Inlet from Sugarloaf Resort Marina access.

Sacramento Arm VAU, KOP 9, Photo 9c
View of Sugarloaf Marina from Sugarloaf Resort.

Photographs for Figure 19-8d, Plate 2

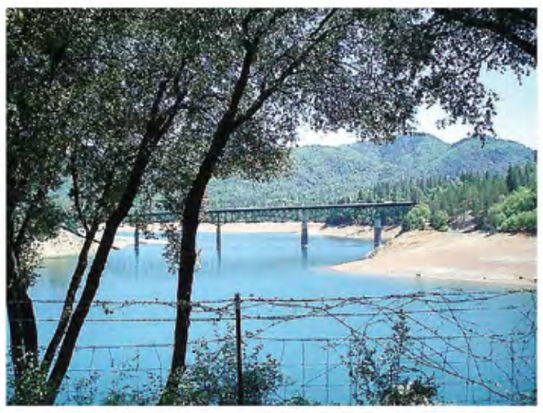
Sacramento Arm VAU, KOP 10, Photo 10a
View looking south toward Sugarloaf Marina from the Sugarloaf Boat Ramp.

Sacramento Arm VAU, KOP 10, Photo 10b
View looking southeast at the Sacramento Arm from the Sugarloaf Boat Ramp.

Sacramento Arm VAU, KOP 10, Photo 10c
View looking northeast at the Sacramento Arm from the Sugarloaf Boat Ramp entrance.

Sacramento Arm VAU, KOP 11, Photo 11a
View looking east from the Tsasdi Resort Marina.

Sacramento Arm VAU, KOP 11, Photo 11b
View looking south from the Tsasdi Resort Marina.



Sacramento Arm VAU, KOP 12, Photo 12a
View looking east toward I-5 from the Lakeshore Resort Campground.

Sacramento Arm VAU, KOP 12, Photo 12b
View looking southeast from the Lakeshore Resort Campground.

Sacramento Arm VAU, KOP 13, Photo 13
View of the Salt Creek Inlet looking south from the Oak Grove Day Use Area.

Photographs for Figure 19-8d, Plate 3

Sacramento Arm VAU, KOP 14, Photo 14a
View looking northeast from Lower Salt Creek Road at the Salt Creek Resort.

Sacramento Arm VAU, KOP 14, Photo 14b
View looking northwest from Lower Salt Creek Road at the Salt Creek Resort.

Sacramento Arm VAU, KOP 15, Photo 15a
View of the Salt Creek Inlet from Lower Salt Creek Road.

Sacramento Arm VAU, KOP 15, Photo 15b
View of the Salt Creek Inlet from Lower Salt Creek Road.

Sacramento Arm VAU, KOP 16, Photo 16
View of Antlers Bridge/I-5 looking southwest from Antlers Public Boat Ramp.

Sacramento Arm VAU, KOP 17, Photo 17a
View of Antlers Public Boat Ramp/Picnic Area parking lot from picnic area looking north.

Sacramento Arm VAU, KOP 17, Photo 17b
View of Sacramento Arm from Antlers Public Boat Ramp/Picnic Area from picnic area looking south.

Sacramento Arm VAU, KOP 18, Photo 18a
View from typical campsite at Antlers Resort looking north.

Photographs for Figure 19-8d, Plate 4

 **Sacramento Arm VAU, KOP 18, Photo 18b** View from typical campsite at Antlers Resort looking east.	 **Sacramento Arm VAU, KOP 18, Photo 18c** View from typical campsite at Antlers Resort looking southwest.		

Photographs for Figure 19-8d, Plate 5

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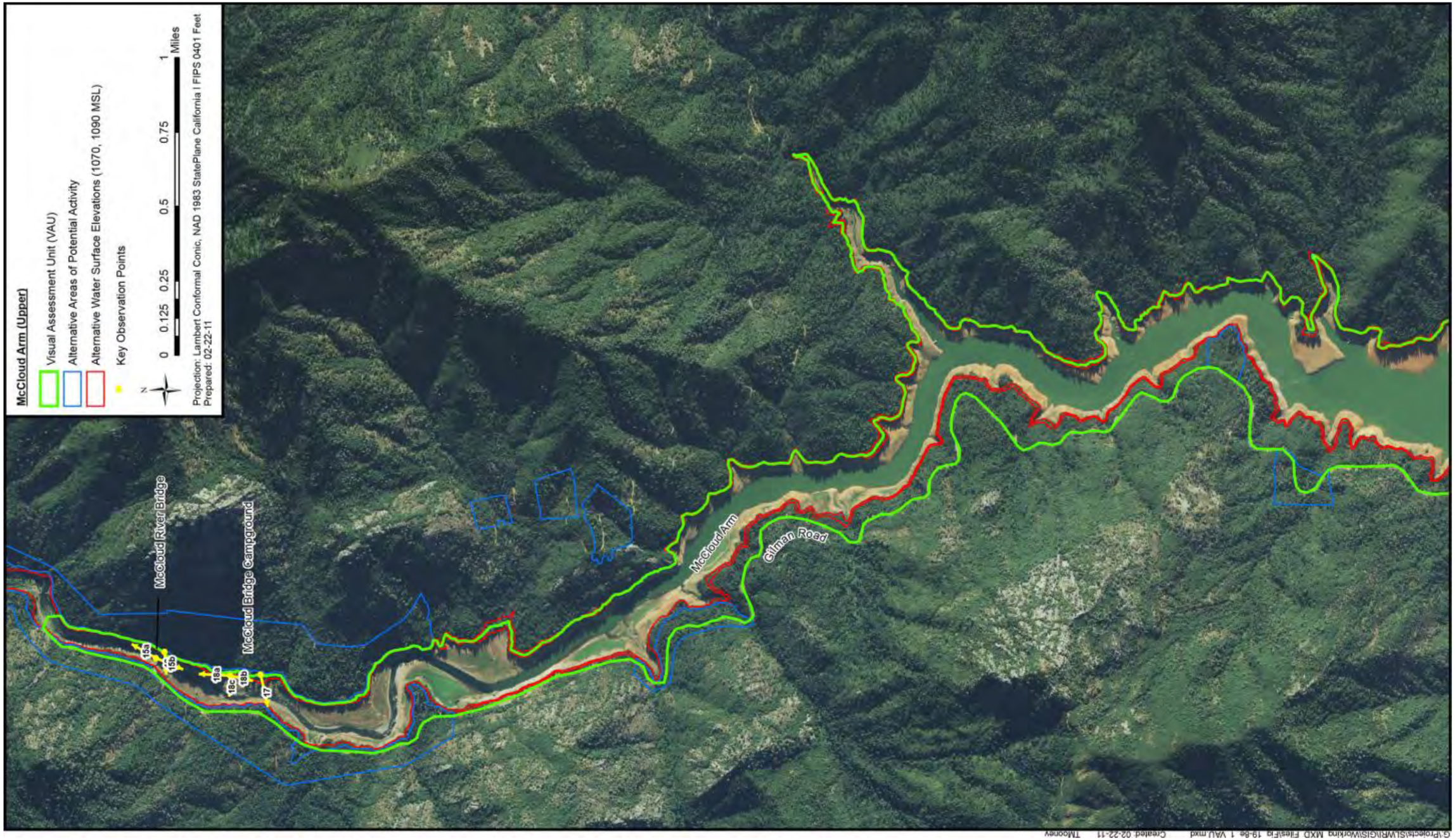

Figure 19-8e. Part 1 – Visual Assessment Unit and Key Observation Points

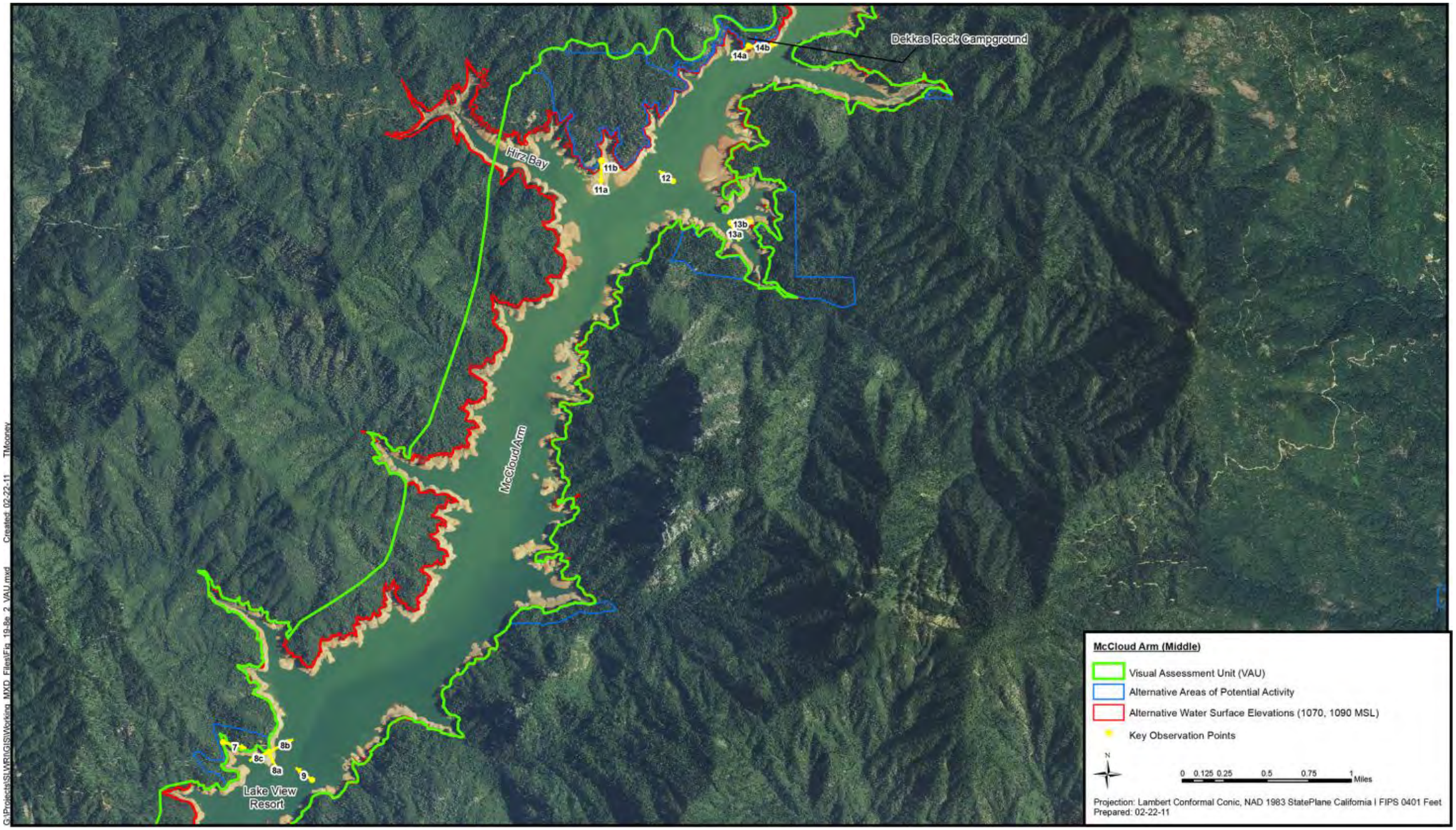

Figure 19-8e. Part 2 – Visual Assessment Unit and Key Observation Points

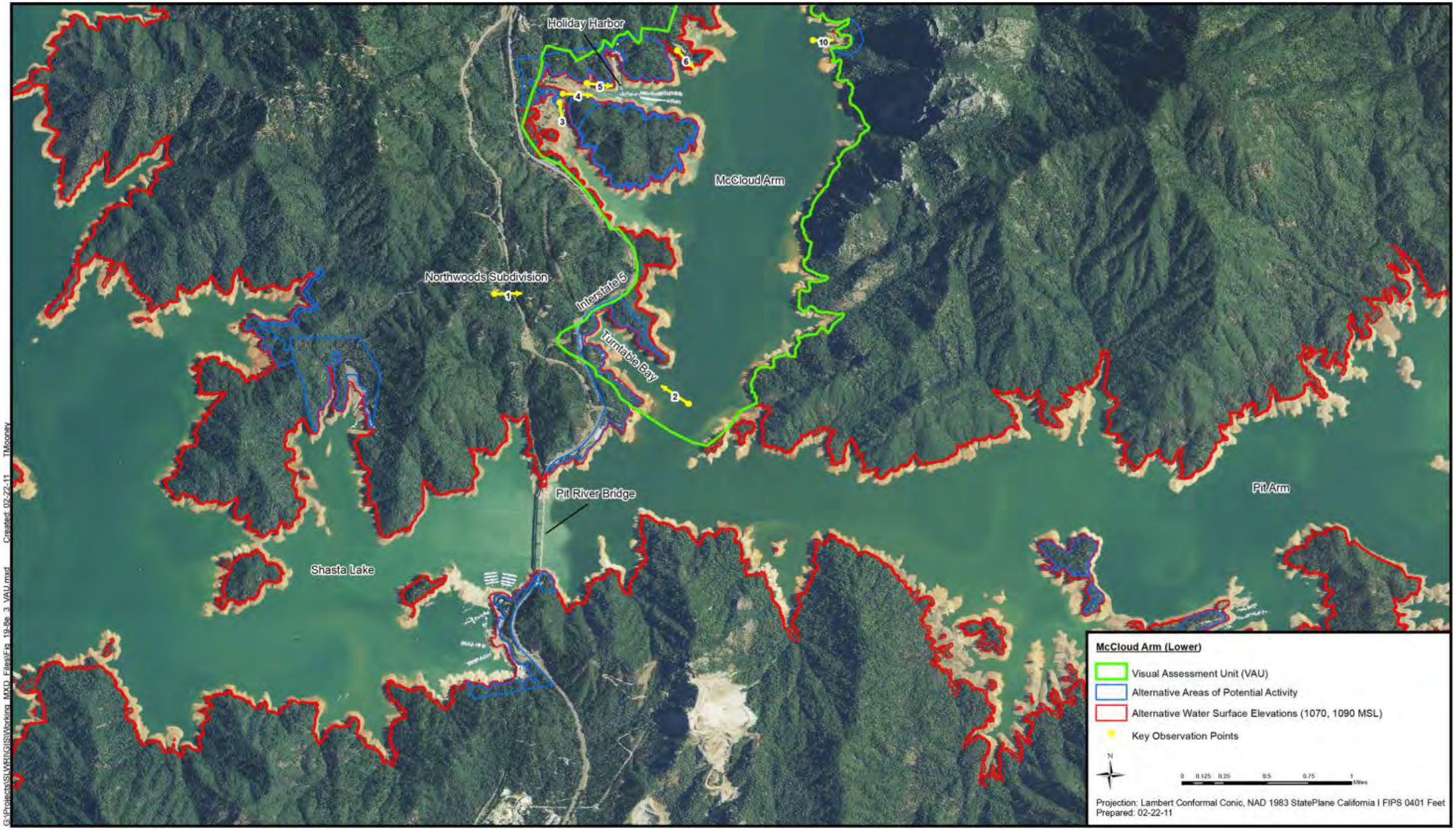

Figure 19-8e. Part 3 – Visual Assessment Unit and Key Observation Points

McCloud Arm VAU, KOP 1, Photo 1
View of the McCloud Arm, Turntable Bay and vicinity from a home located off of Northwoods Road, west of I-5.

McCloud Arm VAU, KOP 2, Photo 2
View of Turntable Bay from the McCloud Arm of Shasta Lake.

McCloud Arm VAU, KOP 3, Photo 3
View of the Bailey Cove Boat Ramp from the Bailey Cove parking lot.

McCloud Arm VAU, KOP 4, Photo 4
View of Holiday Harbor from the Bailey Cove Day Use Area.

McCloud Arm VAU, KOP 5, Photo 5
View of Holiday Harbor from the Holiday Harbor Campground entrance.

McCloud Arm VAU, KOP 6, Photo 6
View looking south toward the McCloud Arm from the Shasta Caverns parking lot.

McCloud Arm VAU, KOP 7, Photo 7
View from the Lake View Resort caretaker residence.

McCloud Arm VAU, KOP 8, Photo 8a
View of the McCloud Arm looking south from the Lake View Resort Boat Ramp.

Photographs for Figure 19-8e, Plate 1

McCloud Arm VAU, KOP 8, Photo 8b
View of the McCloud Arm looking northeast from the Lake View Resort Boat Ramp.

McCloud Arm VAU, KOP 8, Photo 8c
View of the Lake View Resort Marina from the Lake View Resort Boat Ramp.

McCloud Arm VAU, KOP 9, Photo 9
View of Lake View Resort from the McCloud Arm of Shasta Lake.

McCloud Arm VAU, KOP 10, Photo 10
View of Shasta Caverns dock on east side of lake from the McCloud Arm of Shasta Lake.

McCloud Arm VAU, KOP 11, Photo 11a
View of the McCloud Arm downstream from the Hirz Bay Boat Ramp.

McCloud Arm VAU, KOP 11, Photo 11b
View of the McCloud River Arm upstream, from the Hirz Bay Boat Ramp.

McCloud Arm VAU, KOP 12, Photo 12
View of Hirz Bay from the McCloud Arm of Shasta Lake.

McCloud Arm VAU, KOP 13, Photo 13a
View of Campbell Creek inlet looking southeast from the McCloud Arm of Shasta Lake

Photographs for Figure 19-8e, Plate 2

McCloud Arm VAU, KOP 13, Photo 13b
View of Campbell Creek inlet looking east from the McCloud Arm of Shasta Lake

McCloud Arm VAU, KOP 14, Photo 14a
View of the McCloud Arm downstream, from the Dekkas Rock Campground.

McCloud Arm VAU, KOP 14, Photo 14b
View of the McCloud Arm upstream, from the Dekkas Rock Campground.

McCloud Arm VAU, KOP 15, Photo 15a
View of the McCloud River upstream, from the McCloud River Bridge.

McCloud Arm VAU, KOP 15, Photo 15b
View of the McCloud River downstream, from the McCloud River Bridge.

McCloud Arm VAU, KOP 16, Photo 16
View of the McCloud River Bridge, from the eastern approach.

McCloud Arm VAU, KOP 17, Photo 17
View of the McCloud Arm from the McCloud Bridge Campground - Space 10.

McCloud Arm VAU, KOP 18, Photo 18a
View of the McCloud Arm from open area west of Space 1, McCloud Bridge Campground.

Photographs for Figure 19-8e, Plate 3

McCloud Arm VAU, KOP 18, Photo 18b
View of the McCloud Arm from open area west of Space1, McCloud Bridge Campground.

McCloud Arm VAU, KOP 18, Photo 18c
View looking west from the open area west of Space 1, McCloud Bridge Campground.

Photographs for Figure 19-8e, Plate 4

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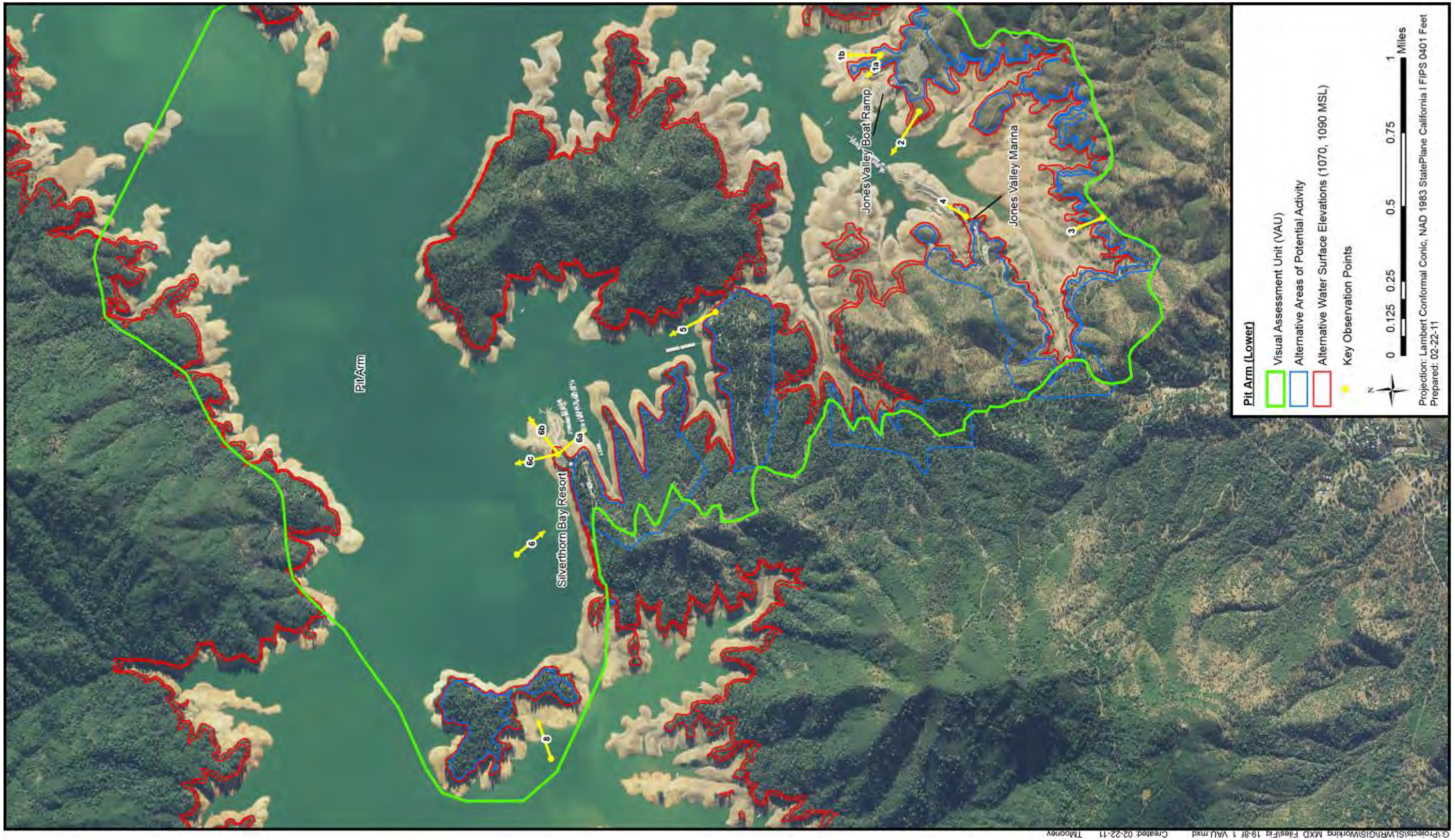

Figure 19-8f. Part 1 – Visual Assessment Unit and Key Observation Points

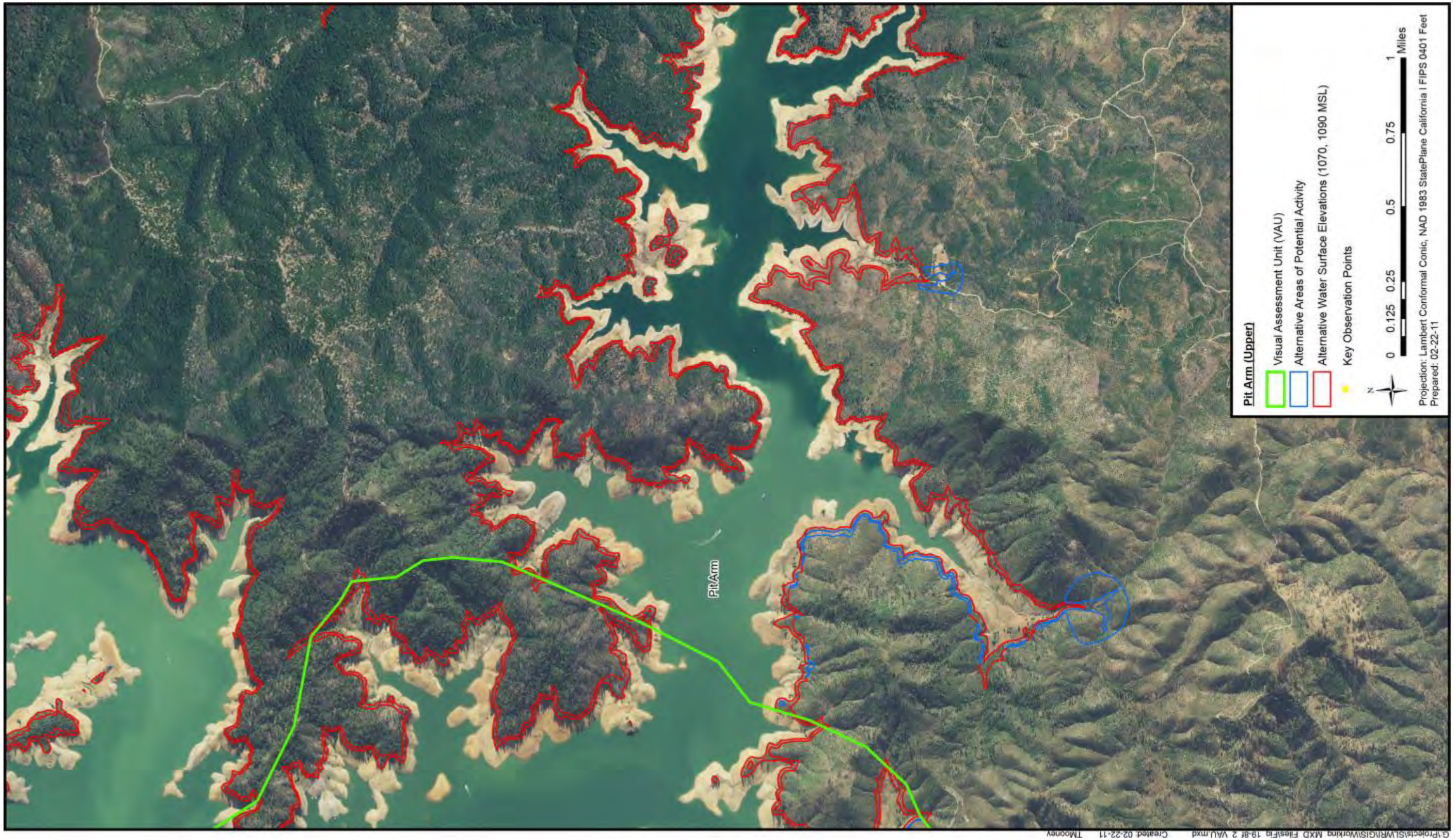

Figure 19-8f. Part 2 – Visual Assessment Unit and Key Observation Points

Pit Arm VAU, KOP 1, Photo 1a
View of the Pit Arm from the Jones Valley parking area, looking northwest.

Pit Arm VAU, KOP 1, Photo 1b
View of the Pit Arm from the Jones Valley parking area, looking northeast.

Pit Arm VAU, KOP 2, Photo 2
View of the Pit Arm from the Jones Valley parking area (west end), looking west.

Pit Arm VAU, KOP 3, Photo 3
View of the Pit Arm from the entrance to the Jones Valley Campground.

Pit Arm VAU, KOP 4, Photo 4
View of the Pit Arm looking north from the Jones Valley Resort Boat Ramp.

Pit Arm VAU, KOP 5, Photo 5
View of the Pit Arm from Juniper Drive, Silverthorn Resort.

Pit Arm VAU, KOP 6, Photo 6a
View of the Silverthorn Marina from the top of the boat ramp looking east.

Pit Arm VAU, KOP 6, Photo 6b
View of the Silverthorn Marina from the top of the boat ramp looking northeast.

Photographs for Figure 19-8f, Plate 1

 **Pit Arm VAU, KOP 6, Photo 6c** View of the Silverthorn Marina from the top of the boat ramp looking north.	 **Pit Arm VAU, KOP 7, Photo 7** View of Silverthorn Marina looking south from the Pit Arm of Shasta Lake.	 **Pit Arm VAU, KOP 8, Photo 8** View of the west side of Ski Island looking east from Shasta Lake.	

Photographs for Figure 19-8f, Plate 2

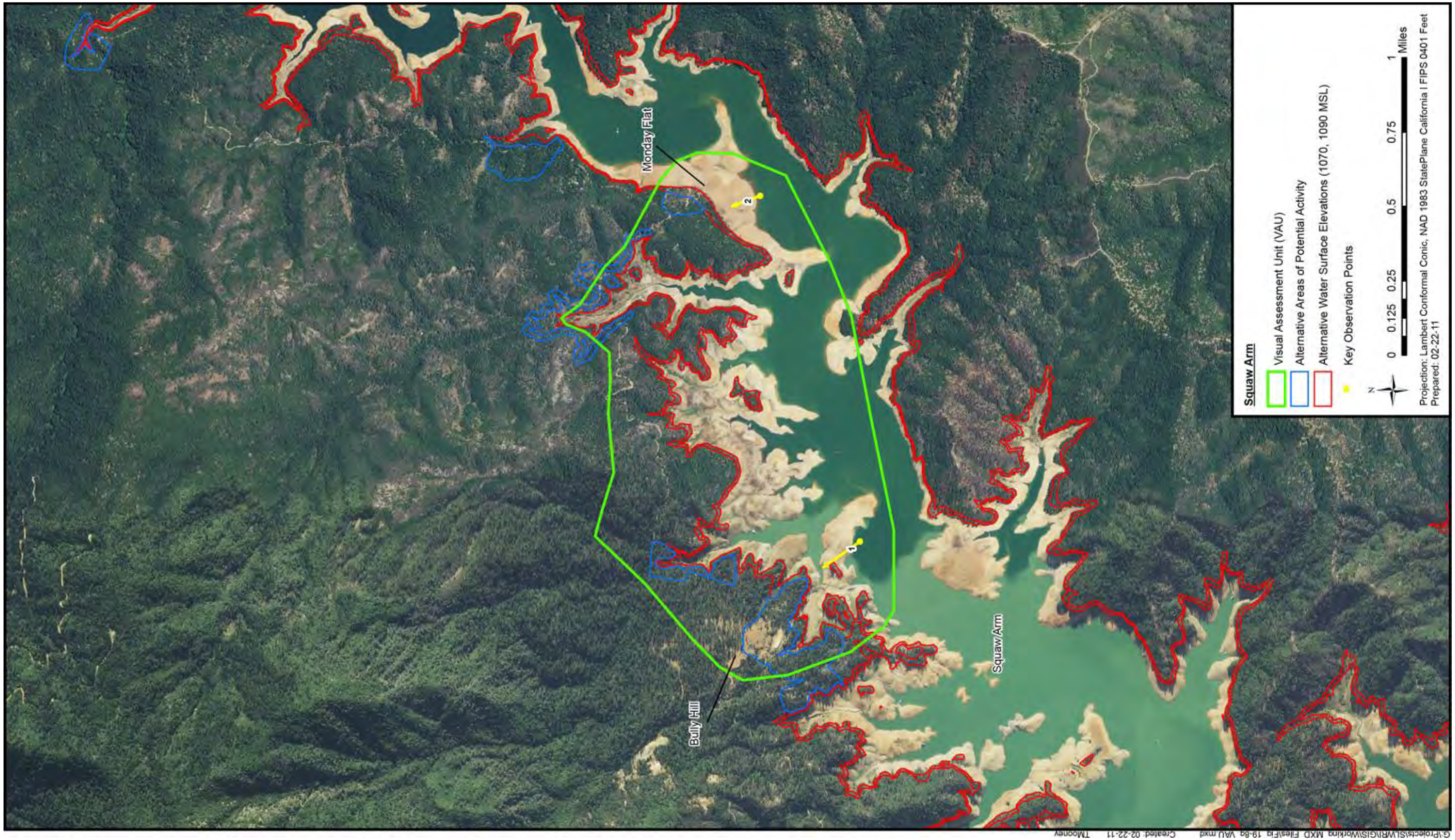

Figure 19-8g. Visual Assessment Unit and Key Observation Points

 **Squaw Arm VAU, KOP 1, Photo 1** View of Bully Hill looking north from the Squaw Arm of Shasta Lake.	 **Squaw Arm VAU, KOP 2, Photo 2** View of Monday Flat looking north from the Squaw Arm of Shasta Lake.		

Photographs for Figure 19-8g, Plate 1

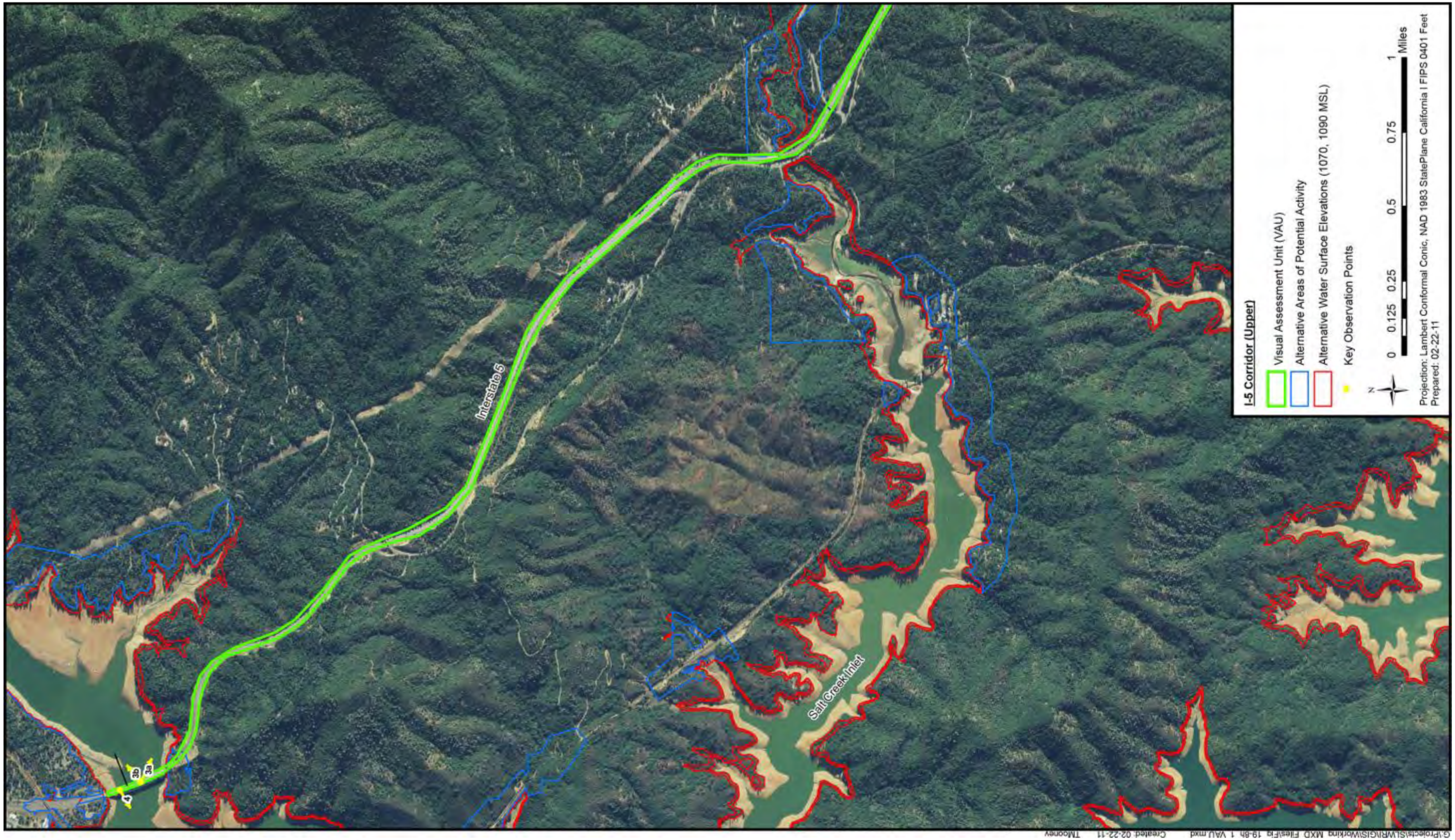

Figure 19-8h. Part 1 – Visual Assessment Unit and Key Observation Points

Figure 19-8h. Part 2 – Visual Assessment Unit and Key Observation Points

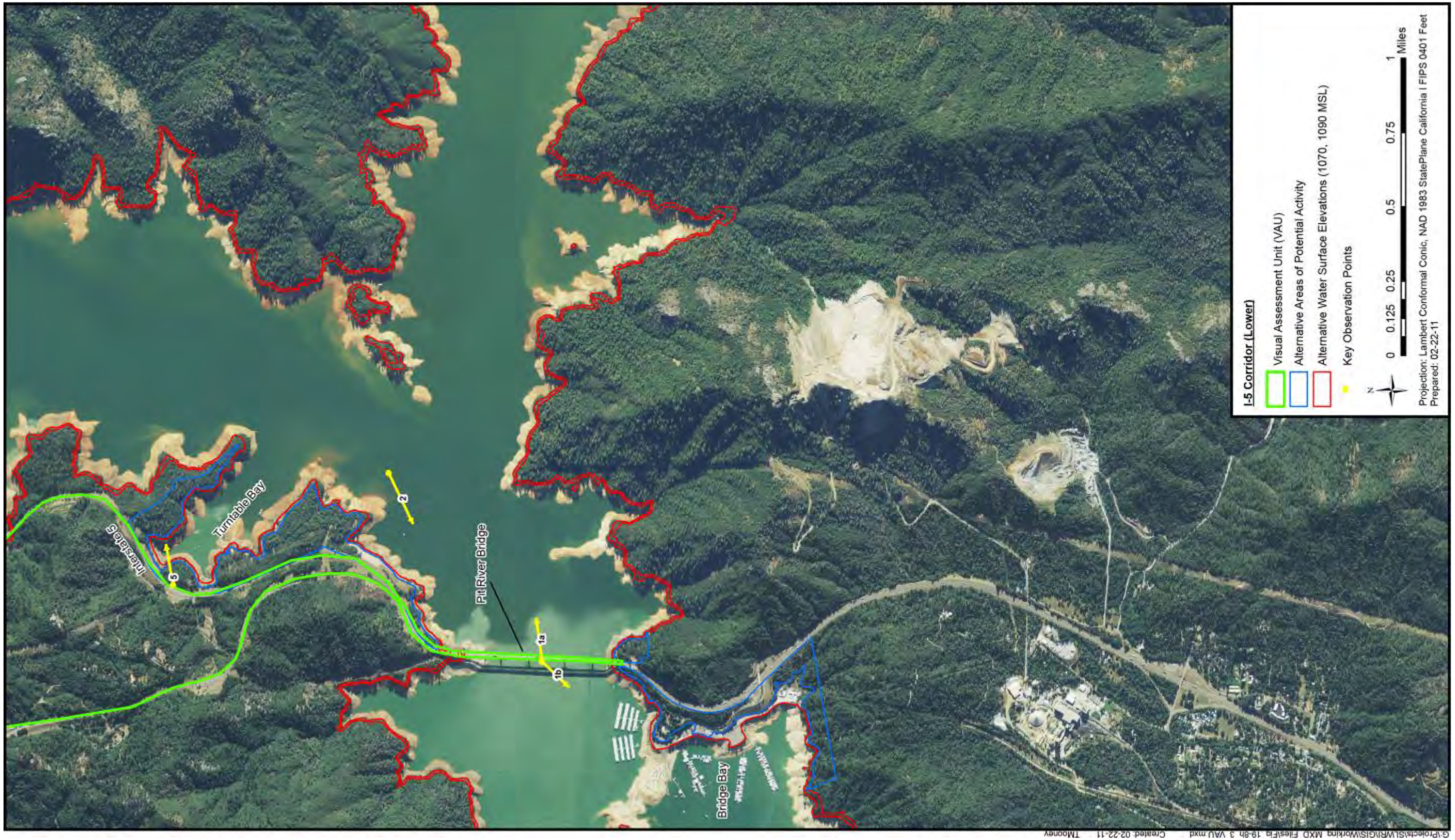

Figure 19-8h. Part 3 – Visual Assessment Unit and Key Observation Points

I-5 Corridor VAU, KOP 1, Photo 1a
View of the Pit Arm (right) and the McCloud Arm (left) from the Pit River Bridge, as seen from I-5 northbound.

I-5 Corridor VAU, KOP 1, Photo 1b
View of Bridge Bay Resort from the Pit River Bridge, as seen from I-5 southbound.

I-5 Corridor VAU, KOP 2, Photo 2
View of the Pit River Bridge looking west from the Pit Arm of Shasta Lake.

I-5 Corridor VAU, KOP 3, Photo 3a
View of the Sacramento Arm looking toward the Antlers Campground from the Antlers Bridge, as seen from I-5 northbound.

I-5 Corridor VAU, KOP 3, Photo 3b
View of the Antlers Public Boat Launch from the Antlers Bridge, as seen from I-5 northbound.

I-5 Corridor VAU, KOP 4, Photo 4
View of the Sacramento Arm west of the Antlers Bridge, as seen from I-5 southbound.

I-5 Corridor VAU, KOP 5, Photo 5
View of the McCloud Arm and vicinity at Turntable Bay, as seen from I-5 northbound.

Photographs for Figure 19-8h, Plate 1

The locations of VAUs were determined using the following steps:

- **Identification of Visually Sensitive Areas** – A determination of sensitivity was made by considering the level of use that a particular view receives by the public. Driving routes, recreational areas, and designated scenic corridors subject to heavy to moderate use represented the numerous sites in the primary study area that could be considered visually sensitive. Examples of visually sensitive areas include the I-5 corridor over the Pit River Bridge, the Shasta Dam Visitor Center, and Bridge Bay Resort.

- **Definition of the Landscape Character** – The landscape character is shaped by the physical, biological, and cultural attributes that combine to make a landscape identifiable or unique. The diverse terrain of the region coupled with the unique attributes of Shasta Lake and the Sacramento River are examples of the landscape character of the primary study area.

- **Identification of Visually Sensitive Observation Points** – This step was used to identify visually sensitive observation points throughout the primary study area that could be adversely affected by changes to the visual environment resulting from project implementation. Important examples of visually sensitive observation points include the vista point located on SR 151 and residences overlooking portions of Shasta Lake. Views from such points would be affected by changes in water levels, as well as the changes to infrastructure associated with raising Shasta Dam and enlarging Shasta Lake.

- **Identification of Visually Affected KOPs** – KOPs are determined by the extent of observable visual impacts from a specific location, and would depend on the location and distance of the affected area relative to the visually sensitive observation point. The analysis of impacts at such sites considered whether or not project activities would be in the direct line of sight or would occur in the foreground (0 to 0.5 mile) or middle ground (0.5 to 4 miles) view. The distinctiveness of features begins to diminish beyond 3 miles. KOPs represent observation points in the primary study area having a direct line of sight to, or a view of, the foreground or middle ground of affected areas. The KOPs selected for the analysis of project impacts are identified in Table 19-2 and are further described in the following section.

- **Classification of Scenic Attractiveness** – Scenic attractiveness refers to a classification system used to distinguish unique or remarkable views from those that are more mundane. As described previously, the classification system consists of the following categories: Class A, “distinctive”; Class B, “typical”; and Class C “indistinctive.”

Following is a discussion of the VAUs and associated KOPs that were identified for the primary study area. Because the primary study area is so large and much of it is remote, VAUs were established at locations subject to relatively high levels of use where changes to the visual environment would be most apparent.

Shasta Dam VAU The Shasta Dam VAU was established to illustrate the views of Shasta Dam from the SR 151 overlook, the Shasta Dam Visitor Center, and the Main Body of Shasta Lake. All of these locations draw numerous visitors annually and receive widespread publicity in regional tour guides. Shasta Dam and the adjacent visitor center provide a unique setting from which the public's visual impression of the overall impact of the project (i.e., raising of water levels, increased dam elevation) would be made. A popular attraction in the Shasta Dam VAU is to walk across the dam. Unregulated vehicle traffic is restricted because of homeland security concerns. However, since 2010, visitors have been allowed to drive across the dam between 6 a.m. and 10 p.m. after producing a valid driver's license and vehicle registration and subjecting their vehicle and any trailer to inspection. In addition, boaters and other water-based recreationists have expansive views of the waterside face of the dam.

Shasta Dam VAU – KOP 1 Views from the Shasta Dam overlook on SR 151 capture the essence of the region by offering unobstructed views of the Three Shastas (Shasta Dam in the foreground, Shasta Lake in the middle ground, and Mount Shasta in the background). Situated on the mountainside above the southeast side of the dam, the overlook offers viewers the opportunity to observe not only the Three Shastas, but also the upper Sacramento River as it flows from the dam spillway and miles of mountainous, forested terrain in most directions. The unique and outstanding scenic quality of this view makes it a Class A visual resource that also contains components of the more typical Class B views (e.g., forest, ridgelines).

KOP 1, Photo 1a, illustrates the Class A panoramic views from the SR 151 overlook to the north/northeast. The dam, the southern end of the Main Body of the lake, and the forested landscape are prominent; Mount Shasta, about 50 miles away, is dominant in the background. Also clearly visible, but less remarkable than the dam, is the dam's infrastructure, including the powerhouse and maintenance roads. The uniqueness of the dam and its infrastructure set against a dramatic landscape of forest and mountains makes this view a Class A visual resource.

KOP 1, Photo 1b, illustrates the limited Class B views of the upper Sacramento River channel downstream from the spillway from the SR 151 overlook. The Sacramento River, regulated by Keswick Reservoir, flows through a steep canyon and is obscured from view by topography and vegetation. The Chappie-Shasta Off-Highway Vehicle (OHV) Area, managed by the U.S. Department of the Interior, Bureau of Land Management (BLM), along with sections of County Road 5G011 (which is accessed via the dam) and an abandoned railroad

line, are visible on the north side of the river, but the river channel itself is not visible from this KOP.

Shasta Dam VAU – KOP 2 KOP 2, Photo 2a, illustrates the Class A and B views of the southern end of the lake as seen from the center of the roadway crossing over Shasta Dam. A panoramic view of the southern end of the lake, which occupies the foreground and the middle ground with Mount Shasta on the horizon, is seen from this area. The Centimudi Boat Ramp is clearly visible in the middle ground to the east (KOP 2, Photo 2c).

Turning to the west (KOP 2, Photo 2b), the Shasta Dam compound and the Sacramento River below the dam form the primary focal point from this viewpoint. The river meanders out of sight about 1 mile downstream from the dam. This spectacular view of the spillway is a Class A visual resource.

Shasta Dam VAU – KOP 3 Downstream from the dam, on the right (north) side of the Sacramento River, BLM maintains the Chappie-Shasta OHV Area. KOP 3 was established to illustrate the limited views of the downstream face of Shasta Dam from the OHV main staging area. As shown in Photo 3a, the middle ground of the view is dominated by a Class B view of the upper part of Shasta Dam. Vegetation and topography limit the extent of views of the dam from this location and, as illustrated by Photo 3b, also effectively block views of the river channel south toward the river from the staging area.

Shasta Dam VAU – KOP 4 A public campground at the OHV staging area provides views for OHV recreationists. Although Shasta Dam is not visible from the campground, the Sacramento River dominates the middle ground view to the north, east, and south. KOP 4, Photos 4a and 4b, respectively, show the Class B views of the river upstream and downstream.

Shasta Dam VAU – KOPs 5, 6, 7, and 8 Approximately 0.25 mile downstream from the OHV staging area, south of the boundary of the Shasta Unit of the NRA, are the historic mining community of Coram and the Coram Ranch, a privately owned recreation resort. KOPs 5, 6, 7, and 8 were established to illustrate the varying degrees of river views (and at one location (KOP 7, Photo 7a), a view of Shasta Dam) from the Coram Ranch cabins. Views from the River House (KOP 5, Photos 5a and 5b), the Dogwood House (KOP 6, Photos 6a and 6b), and the modular cabins (KOP 8, Photo 8) are considered Class B, offering views of the Sacramento River approximately 1 mile downstream from the dam. The most remarkable view of the primary study area from the ranch is the view of Shasta Dam from the ranch's main house (KOP 7, Photo 7a). Although distance places the dam in the middle ground, as seen from the main house, the view of the dam is nonetheless impressive. Foreground vegetation serves to frame the dam and draw the viewer's focus to the feature. KOP 7, Photos 7b and 7c, illustrate the views of the Sacramento River from the main ranch house. The views from KOP 7 of Shasta Dam and the Sacramento River are considered to be Class A.

Shasta Dam VAU – KOP 9 KOP 9 was established to demonstrate the view of Shasta Dam and the Sacramento River from Coram Road, upslope of the OHV staging area. The Class A view of the river and dam from KOP 9 (Photo 9a) shows the foreground, middle ground, and background landscape. Although most of the dam is visible, its base and a portion of the right abutment (north end) are obscured by topography. The narrowing of the river channel toward the background draws the viewer's eye toward the dam and the mountains in the background. The Class B view looking downstream (Photo 9b) offers partial views of the river, limited by vegetation and topography.

Shasta Dam VAU – KOP 10 KOP 10 was established to illustrate the view afforded motorists traveling on Lake Boulevard. Coming into the NRA from the south, approximately 0.5 mile of the extreme northern end of Lake Boulevard follows the shoreline of Shasta Lake before ending at the Shasta Lake Visitor Center. Similar to views from SR 151 (KOP 1), the elevation of the roadway above the lake allows for expansive vistas from pullouts along the route. Photo 10a shows the Class A vista point view of the lakeside face of Shasta Dam, the Main Body of Shasta Lake in the middle ground, and the forested mountain terrain that dominates the background. Vegetation and topography in the foreground frame the view but also restrict it. The full extent of the view from KOP 10 cannot be fully appreciated by viewers unless they stop at a roadside pullout; otherwise, they will quickly pass it by when traveling on Lake Boulevard.

Views of Shasta Lake, the surrounding mountains, and Mount Shasta (in the distant background) looking north from KOP 10 (Photo 10b) are impressive but more typical of views around Shasta Lake. The Class B view of the lake and its vicinity from this location would be most noticed by motorists traveling east on Lake Boulevard, but the view would be of short duration because the road turns abruptly south away from the lake a short distance beyond this point.

Shasta Dam VAU – KOP 11 KOP 11, Photo 11, illustrates the panoramic view that boaters and other water-based recreationists in the Main Body of the lake have of Shasta Dam. The attractiveness of a distinctive built feature, such as the dam, in contrast to the natural character of its surroundings (e.g., water and mountains) is subjective; nonetheless, it is an impressive sight. The uniqueness of the dam set against a dramatic landscape of water and mountains makes this view a Class A visual resource.

Dry Creek Trail VAU The proximity of the Dry Creek Trail area to Shasta Dam makes it a prominent part of the landscape when viewed from the Main Body of Shasta Lake. Most of the Dry Creek Trail shoreline is not visible from the dam, the Chappie-Shasta OHV Area staging area and campground, or other areas frequented by the public because it is obstructed by topography and has limited public access. Although the Dry Creek Access Road meanders through the uplands adjacent to the shoreline, the road is primitive and used only by OHV recreationists, mountain bikers, and the occasional hiker.

Dry Creek Trail VAU – KOP 1 Most views of the shoreline from the road are obstructed by vegetation and distance. KOP 1 (Photo 1) shows the lakeside view, which is the most common vantage point from which visitors to Shasta Lake would see the Dry Creek Trail shoreline. This Class B view is common throughout the Shasta Lake portion of the primary study area.

Little Backbone Inlet VAU The Little Backbone Inlet VAU was established to illustrate the more typical views that boaters and other water-based recreationists would have of the western side of Shasta Lake. Much of this area has been previously disturbed by mining, wildfire, and OHV activities. Because most of the western shoreline is remote and undeveloped, few people visit the area.

Little Backbone Inlet VAU – KOP 1 As with much of the western shoreline, the distance from the more populated parts of the primary study area makes it difficult to discern specific details of the landscape. KOP 1, Photos 1a and 1b, illustrate the Class B views in this part of the lake.

Digger Bay VAU The Digger Bay Marina is one of the most difficult marinas on Shasta Lake to access by car. Although it is only 3 miles from the City of Shasta Lake, the road is narrow and extremely winding and the surrounding terrain is very steep. Nonetheless, this USFS-permitted marina offers a variety of amenities that make it a popular destination, including the only source of gas on the western part of the lake, a small store, and boat rentals.

Digger Bay VAU – KOPs 1, 2, and 3 Views of Shasta Lake from the upper parking area are limited by vegetation and topography (KOP 1, Photo 1, and KOP 2, Photo 2). Similarly, views of Shasta Lake (KOP 3, Photo 3a) and the uplands adjacent to the marina (KOP 3, Photos 3b and 3c) are also extremely limited by vegetation and topography. These views are a Class C, indistinctive visual resource.

Packers Bay VAU

Packers Bay VAU – KOP 1 Although smaller than nearby Bridge Bay Resort, Packers Bay is a popular destination for water-based recreationists. In addition to a boat ramp managed by USFS, the Packers Bay Marina (permitted by USFS) features amenities such as gas, houseboat rentals, and a small store that is open on a seasonal basis in a less congested environment than at other recreational facilities around the lake. Scenery in and around the Packers Bay Marina is not terribly dramatic, but rather is typical of the region. KOP 1, Photo 1, shows the Class B view from the Packers Bay Boat Ramp.

Bridge Bay VAU The Bridge Bay Resort and Marina, permitted by USFS, is the largest and one of the most popular marinas on the lake. Its close proximity to I-5 and amenities such as a restaurant, lodging, a store, and a full-service boat marina with houseboat rentals draw a large number of visitors annually. Tourists and motorists, particularly those traveling along the I-5 corridor, are

attracted to Bridge Bay by its accessibility. It is from Bridge Bay that most visitors to the region are likely to derive their initial visual perception of Shasta Lake and the surrounding area.

Bridge Bay VAU – KOP 1 KOP 1, Photos 1a and 1b, illustrate the view of Shasta Lake from the main parking area adjacent to the Bridge Bay store. During full pool or nearly full pool periods, this parking area is used heavily by visitors, boat owners, and other recreationists accessing the lake from Bridge Bay. As the water recedes, marina users and other recreationists tend to follow it downslope, thus lessening the level of use received by this parking area and subsequently altering the viewing perspective. Photo 1a illustrates the Class B view of the Bridge Bay Marina as seen from KOP 1. Landscape features in this photo as well as Photo 1b, taken from the same KOP but from a slightly different perspective, are generally typical for the area – that is, positive yet common.

Bridge Bay VAU – KOP 2 KOP 2, Photo 2, illustrates the striking view of the I-5 Pit River Bridge and the UPRR trestle that is located on the lower deck of the bi-level bridge structure, as seen from the northern part of the Bridge Bay Marina. This view is available not only from the parking lot and northern marina, but from the resort's restaurant and hotel as well. As a result of its strong positive attributes (e.g., uniqueness, pattern, balance, mystery), the bridge, which is a Class A visual resource, dominates the middle ground of the scene.

Bridge Bay VAU – KOP 3 South of Bridge Bay's Marina 4, which is located in the extreme southeast corner of the main body of the lake adjacent to the UPRR tracks, is the Bridge Bay Marina maintenance area. From this location there is a view of the train tunnels adjacent to the east side of the maintenance area. KOP 3, Photo 3a, shows the northern end of the southernmost tunnel, and Photo 3b (taken from the same location) shows the southern end of the northernmost tunnel. Both perspectives would be apparent only to people working in the maintenance area or those who purposely access the area to view the trains. The track and its features are set back against the hillside; therefore, distance, shadow, and topography would obscure most views of this location from the lake, and viewers passing through the primary study area on the train would not have much opportunity to view the lake. Photo 3c, taken from the same location as the previous two photos, demonstrates the distance of the tracks from the Main Body of the lake and illustrates the site's Class B view.

Bridge Bay VAU – KOP 4 KOP 4 was established to document the initial impression that visitors accessing Bridge Bay's Marina 4 would experience from the stairway. Similar to the photos showing views from KOP 1, KOP 4, Photos 4a and 4b, show the Class B views of the lake from this location.

Sacramento Arm VAU The Sacramento Arm is the busiest and most developed arm of Shasta Lake. For purposes of this assessment, the Sacramento Arm VAU consists of the northern portion of the Sacramento Arm from the Sugarloaf Creek inlet north.

Sacramento Arm VAU – KOPs 1 and 2 In the Pollock area, the Sacramento Arm begins to display characteristics of a river channel more than a lake. Banks on either side of the channel become increasingly narrow as one travels upstream. KOPs 1 and 2 were established to illustrate the limited views from Riverview Drive, a local road running parallel to the east side of I-5 that is primarily used by residents and recreationists to access Shasta Lake. Photos 1 and 2 illustrate views available to motorists traveling along Riverview Drive. Despite being less than 350 feet from the lake, the elevation of Riverview Drive and adjacent vegetation obscure most views that motorists would have from this roadway. The indistinctive views from both of these KOPs are best characterized as Class C, having low scenic quality.

Sacramento Arm VAU – KOP 3 The community of Lakeshore, which stretches along the west (right) side of the Sacramento Arm, is composed primarily of permanent and vacation homes and a few commercial resorts. Proceeding south on Lakeshore Drive, along the western (right) shoreline, the first inlet that is crossed (Doney Creek) allows for extended views upstream and a complex view of the Sacramento Arm downstream (Photo 3). The complexity of the latter view stems from the presence of a UPRR trestle, which parallels the roadway in the foreground, and the Antlers Bridge in the middle ground. Although these structures contribute to an interesting view, neither is unique; therefore, both aspects from this KOP are best characterized as having a Class B scenic quality. Assuming a speed of 45 miles per hour (mph), motorists passing over the Doney Creek inlet would be exposed to the views on either side of the roadway for approximately 9 seconds.

Sacramento Arm VAU – KOP 4 Continuing south on Lakeshore Drive, USFS's Lakeshore East Campground offers views of the Sacramento Arm. Although these views are somewhat obscured by trees, views both upstream and downstream from the campground's main entrance are fairly broad (KOP 4, Photos 4a and 4b, respectively). Photo 4a illustrates the distance upstream that can be seen from this KOP. The features in this view, such as the Antlers Bridge in the background, are not unique or remarkable. Similarly, the downstream view (Photo 4b) is typical for the area. Thus, views of the lake from the campground entrance are best characterized as having a Class B scenic quality.

Sacramento Arm VAU – KOP 5 Lakeshore Drive crosses the lake for the second time to the south of I-5 at the Charlie Creek inlet. Similar to the views described for KOP 3 and KOP 4 views from the Charlie Creek Bridge, both to the northwest (KOP 5, Photo 5a) and to the southeast (Photo 5b), are expansive, but common to the area (Class B scenic quality): the lake in the foreground, vegetation in the middle ground, and mountains in the background. Assuming a

speed of 45 mph, motorists passing over the Charlie Creek inlet would be exposed to the views on either side of the roadway for approximately 8 seconds.

Sacramento Arm VAU – KOP 6 The Beehive Campground, managed by USFS as a dispersed campground, typifies the nature of the views afforded visitors to the parts of the lake west of I-5. As shown by KOP 6, Photos 6a, 6b, and 6c, views are expansive but generally unremarkable. There are no features unique to the area to distinguish it from other nearby Class B vantage points.

Sacramento Arm VAU – KOP 7 Sugarloaf Cove is located in one of the most remote parts of the Sacramento Arm. Aside from a narrow road in the uplands that leads into the rugged Backbone Ridge region, there are no recreational improvements in the cove. Photos 7a and 7b illustrate the narrowness of the cove, where a broad bathtub ring of soils is exposed during periods of drawdown. Views in the Sugarloaf Cove area are indistinctive and are best characterized as Class C, having low scenic quality.

Sacramento Arm VAU – KOPs 8, 9, and 10 Sugarloaf Resort Marina is situated adjacent to a residential and commercial area. KOPs 8, 9, and 10 were established to show the view of the marina and its features from several aspects including homes (KOP 8, Photo 8), the marina access road (KOP 9, Photos 9a–9c), and the public boat ramp (KOP 10, Photo 10). The broad expanse of views from the Sugarloaf shoreline, coupled with the attributes of the marina's structure (e.g., pattern, balance, intactness), is somewhat unusual in the area but typical for Shasta Lake (thus, a Class B distinction).

Sacramento Arm VAU – KOP 11 The Tsasdi Resort, a privately owned recreation facility located on Lakeshore Drive, offers guests a variety of outdoor activities, including hiking, fishing, and boating. Cabins and other resort buildings are situated on the hillside overlooking the lake. The resort maintains its own boat dock, which is accessed from a small parking area immediately adjacent to Lakeshore Drive. The view shown in Photo 11a, looking east from this parking area, is somewhat distinctive but not unique. A railroad trestle crossing the lake in the middle ground creates diversity of pattern in the view, but because the feature is not unique, it is best characterized as having a Class B scenic quality. Similarly, the view to the south from the same KOP is fairly typical for the area and is also best described as having a Class B scenic quality.

Sacramento Arm VAU – KOP 12 Located on the uplands above the east (right) side of the lake is the Lakeshore Resort Campground. This privately owned resort is near the community of Lakeshore (less than 0.25 mile) and I-5 (approximately 0.5 mile), which makes it a popular recreation destination. Although scenic, neither the upstream view (to the east) (Photo 12a) nor the downstream view (to the southeast) (Photo 12b) is unique for the area (thus, Class B). The Antlers Bridge in the middle ground of the upstream view is prominent and creates a sense of balance between the foreground and background, but the view is not distinct (i.e., unusual, unique, or outstanding) in

the context of the project area and is best characterized as having a Class B scenic quality.

Sacramento Arm VAU – KOP 13 One of the most significant inlets branching off of the Sacramento Arm is the Salt Creek Inlet. USFS campgrounds (Nelson Point and Oak Grove) and a day use area (Oak Grove) on the north (right) side of this inlet are inaccessible by boat because the water in the inlet is shallow. As shown in Photo 13, taken from the Oak Grove Day Use Area, land-based recreation facilities are a fair distance from water (this photo was taken in May 2008). Steep topography below the ordinary high-water line significantly restricts the view from this KOP. The lake's bathtub ring dominates the Class C, indistinctive view. The quality of the view during periods in which the lake is full or nearly full would be more typical of the project area and would thus be better characterized as having a Class B scenic quality.

Sacramento Arm VAU – KOP 14 The south (left) shore of the Salt Creek Inlet supports a variety of residences, including privately owned cabins on NFS lands. Access via Salt Creek Lodge Road parallels much of the inlet's shoreline. KOP 14, established at the intersection of Salt Creek Lodge Road and Lower Salt Creek Road, illustrates the Class A views available to motorists, residents, and recreationists passing through the area. Features that set views from this KOP apart from the more typical views previously described for many of the KOPs in the primary study area are the presence of Mount Shasta in the background (although the mountain is difficult to distinguish because of haze present at the time Photo 14a was taken) and the distinctiveness of the UPRR trestle in the middle ground of Photo 14b. As viewed from KOP 14, the trestle imparts a sense of mystery; its northern end draws the viewer's eye to the background, where the trestle seemingly disappears into the mountainside.

Sacramento Arm VAU – KOP 15 KOP 15 illustrates a typical view from the residential development along Lower Salt Creek Road. The area is relatively steep and densely forested. The dominance of vegetation in the foreground of Photos 15a and 15b is indicative of the nature of views from residences, which have scenic quality (Class B) that is common for the region.

Sacramento Arm VAU – KOP 16 The Antlers Public Boat Ramp is located immediately east of I-5 and directly faces the Antlers Bridge, which spans the Sacramento Arm. As seen from the boat ramp, vegetation frames the bridge in the middle ground of the view (Photo 16). Built features (the boat ramp, Antlers Bridge, I-5) dominate the view, whereas unique landscape features, such as the river that meanders through the foreground and middle ground and the rugged mountains in the background, add to the uniqueness, pattern, and mystery of the view. The scenic quality of this view make it a Class A visual resource that also includes components of the more typical Class B views (e.g., forest, ridgelines).

Sacramento Arm VAU – KOP 17 KOP 17 was established to illustrate views from the Antlers Picnic Area located at the top of the Antlers Public Boat Ramp. Several picnic tables and benches allow the public the opportunity to sit and view both the upland parking area (Photo 17a) and the lake (Photo 17b). As shown by Photo 17a, the view of the public parking area is indistinctive, and thus, a Class C view. The view of the lake from the picnic area (Photo 17b) is somewhat more distinctive than the view toward the parking lot, but it is fairly typical of views from the Shasta Lake shoreline. Vegetation and topography often limit views of the water. This view would be a Class B, typical visual resource.

Sacramento Arm VAU – KOP 18 KOP 18 (Photos 18a–18c) was established to illustrate the views that campers staying at one of the public resorts or campgrounds around Shasta Lake would typically see (in this case, the Antlers Resort). Visual resources associated with the uplands (Photo 18a), lake (Photo 18b), and campground facilities (Photo 18c) are a combination of Class C indistinctive and Class B typical.

McCloud Arm VAU The McCloud Arm of Shasta Lake is notable for the towering gray limestone mountains that line the eastern shore of the arm. Large, naturally formed caverns in the limestone are popular tourist and spelunking destinations. Lake Shasta Caverns, a commercial operation, operates out of Bailey Cove and ferries visitors across the lake. In fact, boats provide the only access to the right bank of most of the McCloud Arm. Although parts of the lower reach of the McCloud Arm are visible from I-5, topography, including a gradual narrowing of the arm toward its upstream end and heavily forested uplands, limits most views to areas immediately surrounding the scattered residences, campgrounds, boat ramps, and small resorts along the arm.

McCloud Arm VAU – KOP 1 Located near the confluence of the McCloud and Pit arms, Turntable Bay currently houses administrative facilities, including USFS boat docks. As demonstrated by KOP 1 (Photo 1), Turntable Bay and vicinity can be seen by ridgeline homes overlooking the lake. Transitory views from the area in and around Turntable Bay (such as those available to motorists and boaters) are dependent on water levels, which in turn would determine the quality of the view (i.e., Class B or, subjectively, Class C).

McCloud Arm VAU – KOP 2 KOP 2 (Photo 2) was established near one of the most heavily used and visible areas on Shasta Lake: the confluence of the McCloud and Pit arms, on the east side of the I-5 Pit River Bridge. Boaters accessing the various arms of the lake east of Bridge Bay will pass through this area. As seen from the lake, views of the shoreline are panoramic; however, the quality of the view varies widely depending on the middle ground and background features (e.g., the presence of a distinctive built feature such as the Pit River Bridge or a snow-covered Mount Shasta). Photo 2 showing Turntable Bay is an example of the Class B typical view that is predominant around

Shasta Lake. This photo also illustrates the conspicuous bathtub ring that is seen along the entire perimeter of the lake as water levels draw down.

McCloud Arm VAU – KOPs 3 and 4 Bailey Cove is a USFS recreational facility that includes a public picnic area, campground, and boat ramp easily accessible from I-5. KOP 3, Photo 3, shows the narrow inlet in which the boat ramp is located. From the south-facing perspective of the boat ramp and its adjoining parking lot, little of the main body of the McCloud Arm can be seen. Class B views are typical for the area. North of the boat ramp, Bailey Cove, including a portion of Holiday Harbor, can be seen from the Bailey Cove Day Use/Picnic Area. Although Bailey Cove proper is separated from the inlet into which the boat ramp extends by the peninsular shape of the area, the quality of the views is similar. KOP 4, Photo 4, shows the limited Class B view to the east from the picnic area.

McCloud Arm VAU – KOP 5 Farther upstream is the Holiday Harbor Resort and Marina. This facility includes a campground, a marina, and a small store. KOP 5 (Photo 5) shows the distinctive, Class A view of the Holiday Harbor Marina as viewed from the Holiday Harbor Campground. Although the marina is nested in a small inlet, the view from this location draws the viewer's eye to the main body of the McCloud Arm framed by the limestone outcrops and the mountains in the background.

McCloud Arm VAU – KOP 6 Lake Shasta Caverns is a popular regional tourist destination located approximately 1.5 miles east of I-5. The west (right) shore public reception area includes a parking area, a store, restrooms, a play area, and a boat dock, which houses the privately owned ferry used to transport visitors across the lake to the caverns. With the exception of the boat dock, all public areas are located in uplands, and, as shown by KOP 6, Photo 6, the lake and eastern limestone outcrops are not readily apparent from the caverns parking lot. The aesthetic value of the lake and surrounding scenery is an important component of the experience offered by the Lake Shasta Caverns tour, which exposes visitors to a variety of Class A and B views during its various tours. The proprietor has expanded the sightseeing tour options to include dinner cruises during the summer that depart from the Lake Shasta Caverns reception center.

McCloud Arm VAU – KOPs 7 and 8 KOP 7, Photo 7, was established to show the view of the lake and the former Lakeview Marina from the former Lakeview Resort's caretaker residence. This destination is one of the most remote marinas and boat ramps on the McCloud Arm, located about 3 miles east of I-5. The dramatic background of mountains and limestone outcrops rising out of the lake makes the view from KOP 7 a Class A view, although the view available to the general public from this location is somewhat blocked by the caretaker's house and surrounding vegetation. Better opportunities for public views of the lake and vicinity from the former Lakeview Resort property are available farther up the shoreline at the boat ramp. As viewed from KOP 8, the

boat ramp extends south into the main body of the McCloud Arm, where people are exposed to expansive views looking south toward the Pit Arm (Photo 8a). The contrast and landscape features of the foreground, middle ground, and background create Class A views of the lake from this location. Turning to the north (Photo 8b), the Class A views continue. Views from the boat ramp looking west toward the former Lakeview Marina and caretaker's residence (Photo 8c) are somewhat more common (i.e., Class B) for Shasta Lake.

McCloud Arm VAU – KOPs 9 and 10 KOPs 9 and 10 were established to illustrate shoreline views midway along the McCloud Arm. The north/south alignment of the arm results in noticeable changes in vegetation and terrain. Although the southerly parts of the arm tend to support a more shrub-dominated habitat, views begin to become more scenic moving north up the arm as conifers and significant rocky outcrops become more evident. The conspicuous bathtub ring that is visible along the entire perimeter of the lake as water levels draw down is just as evident in this part of the lake as it is elsewhere, and the forested mountains in the uplands in the middle ground and background settings (KOP 9, Photo 9) are relatively common Class B visual resources. However, vivid rock outcrops, such as those around Shasta Caverns (KOP 10, Photo 10), add a level of mystery to the upper part of the McCloud Arm. KOP 10, Photo 10, shows an example of the distinctive Class A visual resources found along the McCloud Arm.

McCloud Arm VAU – KOP 11 The McCloud Arm's trend toward the north/northeast routes it away from the I-5 corridor and into largely undeveloped, publicly managed and privately owned lands. Visually, a majority of the views of the upper reach of the McCloud Arm are limited primarily to boaters on the lake, a few homes scattered throughout the uplands adjacent to Gilman Road, and an assortment of USFS campgrounds and day use areas that extend along the increasingly narrow channel.

Hirz Bay is a boat launch and group camping facility managed by USFS on the McCloud Arm. Although Hirz Bay is approximately 10 miles from I-5, it is a popular destination for campers, boaters, and hikers. The Hirz Bay Trail, a gently sloping walking trail that extends from Hirz Bay to Dekkas Rock, is mentioned in regional travel guides as offering views of the lake and spectacular limestone outcrops (Soares 1992; Trails.com 2007).

Although views of the lake from the campground and surrounding lakeshore are limited by topography and vegetation, the boat ramp, closer to the shoreline, affords a wider expanse of views of the water. Progressive narrowing of the channel is apparent when looking from downstream to upstream (KOP 11, Photos 11a and 11b, respectively). The expansiveness of the views from Hirz Bay, although somewhat typical for the region, could be characterized as Class A bordering on Class B.

McCloud Arm VAU – KOP 12 KOP 12 was established to illustrate views of the Hirz Bay and vicinity shoreline from Shasta Lake. As shown by Photo 12, the view looking west from the lake evokes a sense of wilderness beyond the shoreline and does not hint at the level of development that lies between the middle ground and background (i.e., I-5). Although this view is somewhat typical for the northern part of the McCloud Arm, it could be considered a Class A visual resource because of the sense of intactness it conveys.

McCloud Arm VAU – KOP 13 Campbell Creek, located on the east shore of the McCloud Arm directly across from Hirz Bay, is a residential recreation tract consisting of 28 privately owned cabins on NFS lands. The only practicable access to the area is by boat. Overland access is via a primitive (at best) jeep trail. Therefore, visitors to the area would form their initial impression of the visual resources afforded by the Campbell Creek inlet from the lake. Photo 13a looks toward the south bank of the inlet, where most of the cabins are located beyond the tree line. In many cases, the cabins are difficult to see from the lake because of their colors, which are meant to blend with the natural environment, and the dense forest that surrounds them. Similarly, a few cabins are also located on the eastern shore, but these cabins also have been designed to be unobtrusive to the natural environment (Photo 13b). The expansiveness of the views from the Campbell Creek inlet, although somewhat typical for the region, could be characterized as Class A bordering on Class B.

McCloud Arm VAU – KOP 14 Similar to views of the lake from Hirz Bay, Class B views from Dekkas Rock Campground widen downstream and narrow upstream (KOP 14, Photos 14a and 14b, respectively). Unlike the Hirz Bay camping facilities, which are located some distance from the actual shoreline, the Dekkas Rock Campground offers sites overlooking the lake and near the ordinary high-water line. KOP 14 was established to illustrate views of the progressively narrowing channel from Dekkas Rock Campground (Photos 14a and 14b, respectively). Similar to views from Hirz Bay (KOP 11), views from KOP 14 could also be characterized as Class A bordering on Class B.

McCloud Arm VAU – KOP 15 The McCloud River Bridge is located at the extreme north end of the McCloud Arm approximately 19 miles east of I-5. Despite its relative remoteness, the bridge has frequent traffic, primarily created by recreationists fishing the river, staying in the nearby campground, or exploring the back roads. KOP 15 shows that unobstructed views of the McCloud Arm are available both upstream and downstream from the bridge (Photos 15a and 15b, respectively). Although topography eventually interrupts these Class A views, a relatively long stretch of the entire channel width is visible from either direction.

McCloud Arm VAU – KOP 16 Views of the McCloud River Bridge from the west approach are partially obscured by seasonal roadside vegetation, and the alignment of the eastern approach (KOP 16, Photo 16) prevents any views of the reservoir or the bridge until the road turns onto the bridge. Thus, the

indistinctive or low scenic quality of the view from this KOP is characteristic of a Class C designation.

McCloud Arm VAU – KOPs 17 and 18 Immediately south of the McCloud River Bridge on the east side of the McCloud Arm is the USFS McCloud River Campground. Scenic views from the campground are, in general, remarkable as a result of the surrounding topography and landscape features, such as the bridge, mountains, and the upper end of the McCloud Arm. KOP 17, which is located in Campsite 10, is typical of the Class A views available from campsites in the campground. As demonstrated by KOP 18 (Photos 18a–18c), views from areas around the campsites broaden as the viewer moves closer to the river channel.

Pit Arm VAU

Pit Arm VAU – KOPs 1, 2, 3, and 4 KOPs 1–4 were established to illustrate the gentle shoreline topography of the Pit Arm in the vicinity of Jones Valley, upstream from Silverthorn Resort. Beyond the Jones Valley inlet, there is only one developed campsite accessible by boat. The increasing narrowness of the arm and the potential hazard to boats posed by the remnants of standing dead trees (snags) below the lake's ordinary high-water line make the Jones Valley area a popular destination for people who want to fish or who seek a quieter, more secluded recreational experience than activities such as waterskiing offer.

Expansive views of the lake and surrounding mountains (as viewed from KOP 1, Photos 1a and 1b; KOP 2, Photo 2; KOP 3, Photo 3; and KOP 4, Photo 4) are somewhat typical and common to the area and thus would be characterized as having a Class B scenic quality. Although it is not apparent because of weather conditions at the time the photo was taken (October 26, 2007) (Photo 1b), on a clear day Mount Shasta is visible in the background. This factor would enhance the quality of the view from the Jones Valley Public Boat Ramp parking lot looking north, making it a Class A scenic designation.

Pit Arm VAU – KOP 5 KOP 5 illustrates a typical view from the houses and cabins in the residential development adjacent to the Silverthorn Resort. The dominance of vegetation in the foreground of Photo 5 is indicative of the nature of views from area homes and cabins. The neighborhood is built on a densely vegetated and steep peninsula with residences on the north side of the ridge facing the Silverthorn Marina and Resort; however, topography and dense vegetation obscure most views of the marina and resort facilities (Photo 5). Views from KOP 5 are typical Class B. Houses and cabins on the south side of the ridge face toward undeveloped areas around Jones Valley.

Pit Arm VAU – KOP 6 KOP 6, Photos 6a–6c, show views of the lake from the Silverthorn Resort boat ramp. Silverthorn Resort is a full-service commercial development offering cabin rentals, restaurants, houseboat rentals, a boat ramp, and a marina. Photo 6a illustrates the Class B view of the Silverthorn

Marina as seen from KOP 6. Landscape features in this photo and in Photos 6b and 6c, taken from the same KOP (but from a different aspect), are generally typical for the area—that is, positive yet common.

Pit Arm VAU – KOP 7 As seen from Shasta Lake, it is difficult to determine the level of development associated with the Silverthorn Resort and marina (KOP 7, Photo 7). A peninsula obscures most of the marina and boat ramp from view, as is apparent from KOP 7. Silverthorn Resort is an example of a built feature that may not be considered particularly attractive by viewers. The surrounding environment (i.e., vegetation, topography) is fairly typical for this part of the Pit Arm and would be considered a Class B, and possibly even a Class C, visual resource.

Pit Arm VAU – KOP 8 Ski Island is one of the most popular destinations in the Pit Arm. Close to Silverthorn Resort, Ski Island offers primitive campsites and easy access. KOP 8, Photo 8, was established to illustrate the view that boaters have as they approach the island from the west. The presence of mature conifers adds to the scenic attractiveness of Ski Island, making it a Class B visual resource.

Squaw Creek Arm VAU

Squaw Creek Arm VAU – KOPs 1 and 2 The Bully Hill (KOP 1, Photo 1) and Monday Flat (KOP 2, Photo 2) areas in the Squaw Creek Arm of Shasta Lake are among the flatter, more easily accessible areas of the lake for boaters looking for a place to land. The bathtub-ring effect is exacerbated by the relatively flatter topography of the area. As water levels drop, a greater expanse of unvegetated shoreline is exposed than appears in many other parts of the lake, and the distance to vegetated uplands is greater than in steeper areas. Although the middle ground and background of the views in this part of the lake include a variety of patterns (water, exposed bright soils, vertical vegetation), the view is typical for the Squaw Creek Arm, making it a Class B visual resource.

I-5 Corridor VAU The Pit River Bridge (also known as the Veterans of Foreign Wars Memorial Bridge) is a nearly 3,600-foot-long bi-level structure that conveys I-5 traffic over the Pit Arm of Shasta Lake, northeast of the Bridge Bay Resort. Vehicle traffic passes across the top level of the structure, and a UPRR track is located on the lower level. Views from the bridge are restricted to motorists or those traveling via train; pedestrians are not authorized to use the bridge for safety reasons.

I-5 Corridor VAU – KOP 1 Class A views experienced by motorists from the Pit River Bridge are of relatively long duration from either direction (up to a minute at normal highway speeds of 55 mph). From the I-5 northbound lanes, the lower ends of both the Pit and McCloud arms east of the bridge are clearly visible in the foreground to middle ground, with mountains in the background (KOP 1, Photo 1a). Views from the southbound lanes look west of the bridge

toward the Sacramento Arm. Some features of Bridge Bay Marina can be seen from I-5 southbound (Photo 1b). The elevation of the Pit River Bridge above the existing surface elevation of the lake (full pool and lower) makes it difficult for parts of the lake that are visible from the northbound lanes to be seen from the southbound lanes, and vice versa. Views from either lane may also be partially obstructed by the bridge railing (depending on the height of the vehicle).

I-5 Corridor VAU – KOP 2 KOP 2 was established near one of the most heavily used and visible areas on Shasta Lake: the confluence of the McCloud and Pit arms, on the east side of the I-5 Pit River Bridge. Boaters accessing the various arms of the lake east of Bridge Bay pass through this area. The panoramic view of the lake, bridge, and surrounding mountains is distinctive and unique to the area. The balance and harmony of the patterns (i.e., water in the foreground leads the viewer's eye to the bridge in the middle ground, and from there to the mountains in the background) make this a Class A visual resource.

I-5 Corridor VAU – KOPs 3 and 4 Although not as readily visible, and of far less extent and shorter in duration than those seen from I-5 over the Pit River Bridge, additional views of Shasta Lake (specifically the Sacramento Arm) are available to motorists traveling on I-5 over the Antlers Bridge, located in the community of Lakehead at the north end of the lake. The lake is constricted by topography and is considerably narrower at this point (KOP 3, Photo 3a). Consequently, Class B views from I-5 are of fairly short duration (approximately 15 seconds assuming a speed of 65 mph). Northbound motorists will notice the Antlers Public Boat Ramp, which extends from the north shore downslope into the lake (KOP 3, Photo 3b). Southbound motorists have a limited view of the portion of the lake located on the west side of the bridge (KOP 4, Photo 4). Steep topography to the south of the Antlers Bridge makes it difficult to see much more than a small, open body of water and the adjacent forested shoreline.

I-5 Corridor VAU – KOP 5 Located near the confluence of the McCloud and Pit arms, Turntable Bay currently houses administrative facilities, including USFS boat docks. As demonstrated by KOP 5, Photo 5, transitory views of Turntable Bay and vicinity can be seen from I-5 by northbound motorists. The panoramic extent of the views, although of short duration as vehicles typically pass through this part of I-5 at high speeds, is typical for the Shasta Lake area but nonetheless impressive. As seen from KOP 5, the view would be a Class B or, subjectively, a Class A visual resource.

Visual Quality Objectives The Shasta and Trinity units of the NRA include lands classified as modification, partial retention, and retention. Areas designated as "modification" in the LRMP are typically developed areas, such as campgrounds, marinas, and boat launch ramps; management activities in the foreground and middle ground in these areas have a natural appearance. "Partial retention" refers to those areas in which management activities remain visually

subordinate on the landscape. “Retention” areas are those where management activities are not visually evident. The acres of lands categorized under each of these classifications are provided in Table 19-1.

The LRMP also includes a series of management prescriptions for various land allocations. The primary prescription for lands adjacent to Shasta Lake in the NRA is “Roaded Recreation.” The objective of this prescription is to provide for an area where there are moderate evidences of the sights and sounds of humans. Modifications are evident and may appear moderate to observers in the area, but will be unnoticed or visually subordinate from sensitive travel routes. This prescription emphasizes recreational opportunities associated with developed road systems and dispersed and developed camp sites (USFS 1995a).

Scenic Highways Many State highways are located in areas of outstanding natural beauty. California’s Scenic Highway Program was created by the Legislature in 1963 to preserve and protect scenic highway corridors from changes that would diminish the aesthetic value of lands adjacent to highways. The State laws governing the Scenic Highway Program are found in the Streets and Highways Code Section 260 et seq. A highway may be designated as “scenic,” depending on how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes on the traveler’s enjoyment of the view. The State Scenic Highway System consists of a list of highways that are either eligible for designation as scenic highways or have been so designated. Shasta County scenic highways are listed in the California Department of Transportation’s list of eligible and officially designated California Scenic Highways (Caltrans 1992).

In Shasta County, and more specifically in the primary study area, I-5 north of the City of Shasta Lake is recognized as a corridor in which the natural environment is dominant. In the primary study area, both I-5 and SR 151 are designated as State routes eligible for official scenic highway designation, although they contain contrasting elements of the natural and built environment (Shasta County 1994). I-5 between Redding (at the SR 299 East intersection) and Anderson is also designated as a corridor in which natural and human-made environments contrast; however, this section of roadway is not eligible for scenic highway designation (Shasta County 1994).

Wild and Scenic River Segments of the McCloud River have been determined eligible for listing under the Federal Wild and Scenic Rivers Act and are protected under the State Public Resources Code. The river has not been formally listed as wild and scenic under either the Federal Wild and Scenic Rivers Act or State Public Resources Code. Public views from area roads of the segments potentially eligible for listing are limited to the relatively short reach that can be seen looking upstream from the McCloud River Bridge on Fender’s Ferry Road. Flows in the lower McCloud River are highly regulated, and annual flows in the river below McCloud Dam do not follow a pattern typical of an

unimpaired mountain river in northern California. The effects of the dam and reservoir modifications proposed under the SLWRI on the wild and scenic river values of the lower McCloud River are discussed in Chapter 25, "Wild and Scenic River Considerations for McCloud River," of this EIS.

Lower Sacramento River and Delta and CVP/SWP Service Areas

The extended study area offers a wide and diverse array of landscapes and features that constitute visual resources. None of these landscapes and features would be affected by activities associated with the project.

19.2 Regulatory Framework

19.2.1 Federal

Aesthetic values and scenic resources in the NRA are managed for the conservation of scenic values that contribute to public enjoyment of the NRA. The USFS Manual (Sections 2380.11 through 2380.19) addresses the management of landscape aesthetics and scenery in the NFS, as well as the NRA (36 Code of Federal Regulations, part 292, subpart B). Included in this directive are standards for the protection of the natural scenic qualities of public travel routes and shoreline protections.

Aesthetic values and visual resources are also generally addressed in the environmental review of Federal projects through NEPA. Some Federal agencies, such as USFS, provide guidelines for the management of visual resources in larger management areas. In response to increasing environmental concerns, USFS developed the Visual Management System to inventory, classify, analyze, and manage its visual resources. The primary objective of the system is to maintain and enhance the natural appearance of the characteristic landscape while actively managing various resources such as timber, grazing, wildlife, and recreation. The Visual Management System measures and evaluates two main elements: the natural and built features of the land and the public's concern for scenic quality. It is important to note that the STNF LRMP will need to be amended to include VQOs specific to Turntable Bay, should an action be implemented that includes development at Turntable Bay. Amendments to the LRMP may also be required for other areas that may be inconsistent with these VQOs if the project is authorized. At this point in the planning process, it is premature to identify these areas specifically.

The following describes the regulatory setting for lands managed by USFS.

Shasta-Trinity National Forest Land and Resource Management Plan

The STNF LRMP contains goals, standards, and guidelines designed to guide the management of the STNF. The following goals, standards, and guidelines related to aesthetic issues associated with the primary study area were excerpted from the LRMP (USFS 1995a).

Visual Quality
Goals (LRMP, p. 4-5):

- Develop or expand opportunities for scenic drives and vista points.

- Maintain a diversity of scenic quality throughout the forest, particularly along major travel corridors, in popular dispersed recreation areas, and in highly developed areas.

Standards and Guidelines (LRMP, pp. 4-27 through 4-28):

- Manage activities and projects to meet adopted VQOs of (1) preservation, (2) retention, (3) partial retention, (4) modification, or (5) maximum modification. On rare occasions, the adopted VQO may not meet management's objectives (e.g., as a result of catastrophic events). Any proposed modification to an adopted VQO must go through the NEPA process and be approved by the Forest Supervisor.

  - Visual Quality Objectives for management activity affecting the shoreline of Lake Shasta are to meet the Retention VQO. Within shoreline areas managed for developed recreation sites, the VQO of Modification is to be met.

- In the following sensitive travel corridors, the foreground portions (areas located up to ¼ to ½ mile from the road viewer) will be managed primarily to meet the adopted VQO of Retention:

  - I-5

- In the following sensitive travel corridors, the middle ground portions (areas between 0.5 miles and 4 miles from the road viewer) will be managed primarily to meet the adopted VQO of Partial Retention:

  - I-5

- In the following sensitive travel corridors, the foreground portions (areas located from ¼ to ½ mile from the road viewer) will be managed primarily to meet the adopted VQO of Partial Retention:

  - Gilman Road (35N60/County 7HOI from I-5 East to McCloud River Bridge)

Management Guide for the Shasta and Trinity Units of the Whiskeytown-Shasta-Trinity National Recreation Area The management guide for the Whiskeytown-Shasta-Trinity NRA (USFS 2014) contains management guidance intended to achieve or maintain a desired condition. This guidance takes into account opportunities, management recommendations for specific projects, and mitigation measures needed to achieve specific goals. The

following guidance related to visual resources and aesthetics issues associated with the primary study area were excerpted from the management guide.

> All developments and long-term activities in the NRA will be designed with the intent of protecting scenic values. Currently, the Forest uses the Visual Management System to protect scenery and the Forest Plan adopted visual management objectives (VQO's)... [*New developments within the Shasta Unit of the NRA] will utilize concepts from the Built Environment Image Guide for the National Forests and Grasslands ([US]FS 2001). The term built environment, as used in this guide, refers to structures and signs installed or operated by the Forest Service, its cooperators and permittees. The built environment influences visitors' experience as much as the natural environments in the forests. The Built Environment Image Guide… advocates structures that will resonate in form, shape, scale, color, and materials with the natural environment.*

U.S. Bureau of Land Management Resource Management Plan BLM manages a number of parcels of public lands adjacent to the Sacramento River corridor downstream from Shasta Dam. BLM lands in the primary study area are managed by the Redding Field Office. BLM lands within the extended study area are managed by either the Ukiah or Mother Lode field office. The purpose of BLM's resource management plan is to provide overall direction for managing and allocating public resources in each planning area. All BLM management actions must conform to the objectives of the assigned Visual Resource Management (VRM) Class. Actions approved or authorized by BLM will meet these long-term objectives. VRM prescriptions, however, will be limited to only those areas assigned Class I or Class II. Prescriptions will not be assigned to areas where lower VRM classes have been determined. BLM is responsible for administering the following strategies related to visual resource issues common to the districts in the study area (BLM 1992, 2006b, 2008).

Goals

- Protect and enhance the scenic quality and visual integrity of the characteristic landscapes in the planning area.

- Manage public lands in a manner that would protect the quality of the visual resources while allowing management activities to occur.

Objectives (Sierra BLM Resource Management Plan, p. 21)

- Design surface-disturbing projects to meet VRM objectives. Mitigate or prohibit surface-disturbing actions that do not meet VRM objectives.

- Complete visual contrast ratings for new projects to ensure compliance with VRM objectives.

- Complete visual contrast ratings for existing roads and facilities, and identify opportunities to reduce visual impacts through modification or rehabilitation.

- Complete inventory of existing and potential key scenic vista points along road and trail corridors.

- Ensure developments do not detract from scenic integrity by working with counties, agencies, and other entities with management jurisdiction.

19.2.2 State

In 1963, the California Legislature created the Scenic Highway Program to preserve and protect scenic highway corridors from changes that would diminish the aesthetic value of lands adjacent to the highways. The State regulations and guidelines governing the Scenic Highway Program are found in the Streets and Highways Code, Section 260 et seq. A highway may be designated as scenic depending on how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes on the travelers' enjoyment of the view.

Currently, only a short section of I-5 extending from its intersection with SR 97 in the city of Weed to its intersection with SR 89 near the city of Mount Shasta is a designated scenic highway (a part of the Volcanic Legacy Scenic Byway/All American Road). However, there has been interest in obtaining official scenic highway designation for the stretch of I-5 north of Shasta Lake to the Oregon border. Continuing efforts may be made to incorporate this segment of I-5 into the State's Master Plan for officially designated highways.

19.2.3 Regional and Local

The Scenic Highways Element of the *Shasta County General Plan* (Shasta County 1994) is intended to establish and protect highways (including both State and county roads) with scenic value. A "scenic highway" is any freeway, highway, road, street, boulevard, or other vehicular right-of-way that traverses an area of unusual scenic quality. An "official scenic highway" is a scenic highway that has been so designated by the State of California. The visible land area outside the actual right-of-way is generally described as the "viewshed" or the "scenic corridor." The corridor encompasses the land easily visible from the highway. Virtually every highway in Shasta County is a scenic highway; however, some scenic highways are more important than others, based on the visual quality of their scenic corridors, the degree to which the highways are used, and the vulnerability of the corridors to degradation of visual quality (Shasta County 1994).

19.3 Environmental Consequences and Mitigation Measures

This section identifies potential environmental effects on aesthetics and visual resources that could result from the project. Examples of proposed activities common to all project action alternatives that could have an impact on visual resources and aesthetic values include changes to inundation levels, raising Shasta Dam, dike construction, creation of borrow areas, abandonment and relocation of infrastructure, and vegetation clearing.

19.3.1 Methods and Assumptions

Analysis of potential impacts on aesthetic and visual resources is based on guidance provided by USFS and the significance criteria described in the State CEQA Guidelines. To comply with CEQA, significance thresholds are used to evaluate the project's potential impacts on the visual character of the study area, particularly the visual character of areas observable from KOPs. All assessments are qualitative, evaluating potential impacts of the project on the viewshed in relation to the local aesthetic context.

The fact that USFS manages a high proportion of the Federal lands above the current full pool elevation of Shasta Lake supports use of the USFS Visual Management System for this assessment. Under the USFS Visual Management System, the landscape is composed of a diversified variety of landforms, rock forms, and vegetative colors and textures. The widely diversified and unique landscape, and the setting of the study area within the NRA – designated as such in part because of its scenic quality of national importance – makes the overall scenic attractiveness a variety Class "A." (See the description of the classes of scenic attractiveness at the end of the bulleted list below.) To provide some continuity with other Reclamation visual resources assessments, certain aspects of the USFS Scenery Management System are also used in this analysis, as appropriate, namely the concepts of scenic attractiveness and primary distance zones.

A field assessment of the primary study area was conducted to identify areas of visual sensitivity and scenic resources, and to assess the character and quality of the aesthetic resources associated with the primary study area. Because no changes are anticipated to the aesthetic values and visual resources in the extended study area, a field assessment was performed only in the primary study area. This assessment emphasizes the potential relationship between the project and sensitive receptors associated with recreation areas, roadways, and commercial and residential development. VAUs were mapped based on the distinct visual character of the landscape. KOPs were identified in each VAU and photograph points were established. Despite the NRA's Class A overall scenic attractiveness, the assessment of visual quality presented in this EIS is based on the quality of the scenic resources and the visual sensitivity of the most likely viewer group at a particular KOP. Assessment methods were applied to the project alternatives using the following steps:

- **Identify visually sensitive areas** – Areas rated highest for sensitivity are those having views seen by people driving to or from recreational activities or along routes designated as scenic corridors. Stationary views from relatively moderate- to high-use recreation areas and commercial/residential areas are also considered to be sensitive.

- **Define the landscape character** – Landscape character refers to the visual and cultural image of a geographic area. It is composed of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. Landscape character embodies distinct landscape attributes that exist throughout an area.

- **Identify visually sensitive observation points** – Analysis of the impacts on visual resources from the implementation of any project alternative should consider both construction and postconstruction views. This step identifies visually sensitive observation points in the primary study area. Identification of visually sensitive observation points allows a comparison of existing views and areas of potential visual impact resulting from one or more alternative.

- **Identify visually affected key observation points** – Based on the location and distance of potential visual impact areas from the visually sensitive observation points, only a portion of the observation points may be significantly affected. This analysis further evaluates observation points to determine whether visual impact areas would occur (1) in the direct line of sight (2) in the foreground (0 to 0.5 mile) and/or middle ground (0.5 to 4 miles) and/or (3) background (4 miles to horizon) views. Observation points with visual impact areas in the direct line of sight or in the foreground, middle ground, or background view are referred to as KOPs, which are described in Section 19.1, "Affected Environment."

- **Classify scenic attractiveness** – Scenic attractiveness classifications are used to categorize visual features as follows: Class A, "distinctive"; Class B, "typical"; and Class C, "indistinctive." These classifications are described in Section 19.1, "Affected Environment."

19.3.2 Criteria for Determining Significance of Effects

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by, or result from, the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. An environmental document prepared to comply with CEQA must identify the potentially significant environmental effects of a project. A "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions in the area affected by the project (State CEQA Guidelines Section 15382). CEQA also requires that the environmental

document propose feasible measures to avoid or substantially reduce significant environmental effects (State CEQA Guidelines Section 15126.4(a)).

The criteria used to determine the significance of impacts for this analysis are based primarily on the State CEQA Guidelines and other associated criteria, including regulatory agency standards. Federal criteria and NEPA guidance were also considered. The following significance criteria were developed based on guidance established in the State CEQA Guidelines, and consider the context and intensity of the environmental effects as required under NEPA. Impacts of an alternative on aesthetics and visual resources would be significant if project implementation would do any of the following:

- Would not comply with VQOs as defined in the STNF LRMP
- Have a substantial adverse effect on a scenic vista
- Substantially damage scenic resources, including trees, rock outcroppings, and historic buildings adjacent to a State scenic highway
- Substantially degrade the existing visual character or quality of the project site and its surroundings
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the project area

19.3.3 Topics Eliminated from Further Consideration

No significant topics related to aesthetics and visual resources have been eliminated from discussion.

19.3.4 Direct and Indirect Effects

The McCloud River upstream from the McCloud River Bridge is eligible for listing as a Wild and Scenic River under the Federal Wild and Scenic Rivers Act. In lieu of recommending Wild and Scenic designation, USFS and other stakeholders entered into a *Coordinated Resource Management Plan* with the primary objective of managing the river to protect its pristine resources. The California Public Resources Code Section 5093.542, established through enactment of the Wild and Scenic Rivers Act, as amended (Sections 5093.50 through 5093.70), provides protection to the reach between the McCloud Reservoir and the McCloud River Bridge. A detailed discussion of the importance of the Federal Wild and Scenic Rivers Act and California Public Resources Code protections for the McCloud River north of the McCloud River Bridge is presented in Chapter 25, “Wild and Scenic River Considerations for McCloud River.”

No-Action Alternative

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Vis-1 (No-Action): Consistency with Guidelines for Visual Resources in the STNF LRMP Under the No-Action Alternative, there would be no inconsistencies with the guidelines for visual resources provided in the STNF LRMP because the project would not be constructed. The visual setting would remain the same as under existing conditions. No impact would occur. Mitigation is not required for the No-Action Alternative.

Impact Vis-2 (No-Action): Degradation and/or Obstruction of a Scenic View from Key Observation Points Under the No-Action Alternative, scenic views would not be degraded and/or obstructed because the project would not be constructed. The visual setting would remain the same as under existing conditions. No impact would occur. Mitigation is not required for the No-Action Alternative.

Impact Vis-3 (No-Action): Generation of Increased Daytime Glare and/or Nighttime Lighting Under the No-Action Alternative, daytime and/or nighttime glare from temporary construction and permanently relocated roads, structures and other facilities would not increase because the project would not be constructed. The visual setting would remain the same as under existing conditions. No impact would occur. Mitigation is not required for the No-Action Alternative.

Impact Vis-4 (No-Action): Consistency with Federal and State Scenic Highway Requirements Under the No-Action Alternative, there would be no inconsistencies with Federal and State Scenic Byway requirements because the project would not be constructed. The visual setting would remain the same as under existing conditions. No impact would occur. Mitigation is not required for the No-Action Alternative.

Lower Sacramento River and Delta, and CVP/SWP Service Areas None of the landscapes and features in the extended study area would be affected by the No-Action Alternative. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Vis-1 (CP1): Consistency with Guidelines for Visual Resources in the STNF LRMP The effects of the construction-related and operational elements of CP1 would be inconsistent with some of the VQOs established by the STNF LRMP. The LRMP calls for management activities that would be visible from the I-5 corridor and SR 151 to remain visually subordinate on the landscape and not be noticeable to the casual observer (a VQO of “retention”). Foreground

views from KOPs most often used by the public, such as campgrounds and boat launches, are also managed according to the VQO of retention, whereas middle ground views are managed according to the "partial retention" VQO (management activities in the middle ground having a natural appearance). The construction-related and operational elements of CP1 would be more visible from some viewpoints than others. The operation of construction equipment and its presence on the landscape would be a visual distraction when visible from KOPs. In addition, what might be considered short-term impacts on visual resources and aesthetics for some viewer groups, such as tourists, might be considered long-term impacts for other viewer groups, such as residents. The LRMP does not distinguish between short-term and long-term VQOs or between classes of viewers, although for the purposes of this assessment, viewer groups were considered in the evaluation of impacts. This impact would be significant.

USFS VQOs for the Shasta and Trinity units of the NRA allow for some active land management. The LRMP calls for a VQO of retention along the Shasta Lake shoreline and modification in developed recreation sites. Vegetation removal along the shoreline and in some developed recreation sites under CP1 would exceed the definitions of retention and modification, better fitting the VQO of "maximum modification" (management activities are dominant, but appear natural when seen as background). Although affected areas could, over time, regain the attributes of the retention or modification VQOs, noticeable changes to aesthetic values and visual resources along the shoreline and in affected developed recreation sites resulting from CP1 would be apparent during and for an undetermined period after construction.

The LRMP calls for the foregrounds and middle grounds of State- and county-designated scenic highways that pass through the Shasta and Trinity units of the NRA, including portions of the I-5 corridor and SR 151, to be managed for the retention VQO. However, the effects of CP1 (i.e., clearing of vegetation at specific locations) on aesthetic values and visual resources as seen from the highways would be visible in some areas during and after project construction. The appearance of areas that are visible from these highways could become similar to existing conditions when the project is completed.

In some areas, implementation of CP1 would result in impacts on visual resources that are inconsistent with LRMP VQOs. This impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-2 (CP1): Degradation and/or Obstruction of a Scenic View from Key Observation Points Under CP1, the "bathtub ring" that is apparent during less than full pool conditions would become larger. Existing scenic views of areas where utilities and infrastructure would be relocated could be obstructed or degraded. Views from some KOPs, including those of the renowned "Three Shastas," would be obstructed or degraded during construction, and to varying

degrees, for several years post-construction. Throughout the primary study area, vegetation retention or removal activities (proposed activities would vary by relocation area) would also degrade scenic views. Although project-related changes to the landscape could become less visible over time, these changes would be highly visible during construction. This impact would be significant.

Under CP1, changes to the scenic views of Shasta Lake and the surrounding landscape would be most apparent when the lake is not full. From KOPs with panoramic views of Shasta Lake, the appearance of the expanded bathtub ring would be only minimally changed, given the overall size of the affected area. As the pool fluctuates, changes to the bathtub ring may not be apparent to transitory viewers. For some groups such as residents, however, changes to the size of the bathtub ring would be more apparent and of longer duration. For all viewer groups, leaving vegetation in place below the inundation level or removing vegetation from the shoreline would be visible in all VAUs.

Scenic views of areas where utilities and infrastructure would be relocated would be at least temporarily degraded or obstructed during and after construction. Changes to these views could be highly visible from some KOPs.

Construction activities and materials associated with CP1 could also be highly visible. In particular, views from KOPs in the Shasta Dam VAU (e.g., the SR 151 scenic overlook, the Shasta Dam Visitor Center, the Coram Ranch House, and the lake) would be highly affected by construction activities and materials, including the movement of heavy equipment and the construction of scaffolding and framing. The use of materials not consistent with the color, texture, and form of the surrounding landscape or that could generate glare would have a permanent impact on views from KOPs.

Implementation of CP1 would temporarily, and could permanently, degrade and obstruct scenic views from KOPs. This impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, “Mitigation Measures.”

Impact Vis-3 (CP1): Generation of Increased Daytime Glare and/or Nighttime Lighting The increased area of light-colored soils around the Shasta Lake shoreline that are exposed during periods of drawdown and, conversely, the increased area of water surface associated with CP1 would increase the potential for daytime glare. The relocation of roads and infrastructure could also create new sources of reflective daytime glare. In addition, construction equipment could be a temporary source of reflective daytime glare. Extensive construction activities at night requiring the use of vehicle and perimeter lighting, particularly in the vicinity of Shasta Dam, would be necessary for several years. New sources of permanent nighttime lighting would also be required for some locations, such as relocated roads and recreational facilities. This impact would be significant.

CP1 would increase the area of bare mineral soil exposed along the Shasta Lake shoreline during periods of drawdown. The light color of these soils is a significant source of unavoidable daytime glare. Water also serves as a source of substantial glare. The increased water surface area created by a 6.5-foot dam raise would increase the potential for unavoidable daytime glare being encountered by sensitive receptors around the lake. Changes in water surface elevations, particularly water level increases, would change the refractive angle of the water surface, thus potentially exposing sensitive receptors, such as campgrounds or residences, to a new source of significant glare. The intensity and duration of daytime glare would vary with changes in the angle of the sun and the elevation of the water surface.

Relocation of roads and infrastructure could create a source of both daytime and nighttime glare from temporary construction and permanently relocated roads, structures, and other facilities. Guardrails and other roadway fixtures, such as retaining walls, safety barriers, light standards, and other structures, have the potential to be reflective under natural and artificial light. In addition, nighttime lighting may be required at some locations, including roadways and recreation facilities, for safety purposes.

Construction activities associated with CP1 would generate daytime glare at various locations in the primary study area, most noticeably in areas where equipment would be operated, such as Shasta Dam. The potential for glare caused by light reflecting off construction equipment would vary with changes in the angle of the sun. This impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, “Mitigation Measures.”

Impact Vis-4 (CP1): Consistency with Federal and State Scenic Highway Requirements The distance to proposed construction/relocation areas around Shasta Lake from SR 151, the only State-designated Scenic Highway in the primary study area, would make changes resulting from CP1 very difficult to differentiate. There are no federally designated scenic roadways in the area. This impact would be less than significant.

SR 151 is the only State-designated Scenic Highway in the primary study area. There are no federally designated scenic roadways in the primary study area. Under CP1, project construction activities around Shasta Dam would be visible from SR 151. The distance between the SR 151 vista point, high on the mountainside overlooking Shasta Dam, and the other proposed construction/relocation areas around the lake would make it very difficult for most viewers to differentiate changes resulting from CP1. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas None of the landscapes and features in the extended study area would be affected by

activities associated with CP1. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Vis-1 (CP2): Consistency with Guidelines for Visual Resources in the STNF LRMP The effects of the construction-related and operational elements of CP2 would be inconsistent with some of the VQOs established by the STNF LRMP. The LRMP calls for management activities that would be visible from the I-5 corridor and SR 151 to remain visually subordinate on the landscape and not be noticeable to the casual observer (a VQO of "retention"). Foreground views from KOPs most often used by the public, such as campgrounds and boat launches, are also managed according to the VQO of retention, whereas middle ground views are managed according to the "partial retention" VQO (management activities in the middle ground having a natural appearance). The construction-related and operational elements of CP2 would be more visible from some viewpoints than others. The operation of construction equipment and its presence on the landscape would be a visual distraction when visible from KOPs. In addition, what might be considered short-term impacts on visual resources and aesthetics for some viewer groups, such as tourists, might be considered long-term impacts for other viewer groups, such as residents. The LRMP does not distinguish between short-term and long-term VQOs or between classes of viewers, although for the purposes of this assessment, viewer groups were considered in the evaluation of impacts. This impact would be significant.

This impact would be similar to Impact Vis-1 (CP1). Construction-related and operational elements of CP2 would be inconsistent with some of the VQOs established by the STNF LRMP. The larger inundation area proposed under CP2 would result in an increased opportunity for management activities to be visible from the I-5 corridor, SR 151, and other areas managed according to retention and modification VQOs. This impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-2 (CP2): Degradation and/or Obstruction of a Scenic View from Key Observation Points Under CP2, the "bathtub ring" that is apparent during less than full pool conditions would become larger. Existing scenic views of areas where utilities and infrastructure would be relocated could be obstructed or degraded. Views from some KOPs, including those of the renowned "Three Shastas," would be obstructed or degraded during construction and for several years post-construction. Throughout the primary study area, vegetation retention or removal activities (proposed activities would vary by relocation area) would also degrade scenic views. Although project-related changes to the landscape could become less visible over time, these changes would be highly visible during construction. This impact would be significant.

This impact would be similar to Impact Vis-2 (CP1). Under CP2, the "bathtub ring" that is apparent during less than full pool conditions would become larger than what would be exposed under CP1. CP2 would also require the relocation of more utilities and infrastructure and more vegetation retention or removal than CP1. In addition, the time frame for construction and implementation of the project would increase, which would prolong the period that scenic views are degraded by the project. Although project-related changes to the landscape could become less visible over time, these changes would be highly visible during construction. This impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-3 (CP2): Generation of Increased Daytime Glare and/or Nighttime Lighting The increased area of light-colored soils around the Shasta Lake shoreline that are exposed during periods of drawdown and, conversely, the increased area of water surface associated with CP2 would increase the potential for daytime glare. The relocation of roads and infrastructure could also create new sources of reflective daytime glare. In addition, construction equipment could be a temporary source of reflective daytime glare. Extensive construction activities at night requiring the use of vehicle and perimeter lighting, particularly in the vicinity of Shasta Dam, would be necessary for several years. New sources of permanent nighttime lighting would also be required for some locations, such as relocated roads and recreational facilities. This impact would be significant.

This impact would be similar to Impact Vis-3 (CP1). Under CP2, more light-colored soils would be exposed, which would expand the amount of daytime glare. Construction and implementation of the project would take place over a longer period of time, which would prolong the requirement for nighttime lighting during construction and daytime glare from construction equipment. More roads and other infrastructure would be relocated, which would increase the amount of related daytime glare and nighttime lighting. This impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-4 (CP2): Consistency with Federal and State Scenic Highway Requirements The distance to proposed construction/relocation areas around Shasta Lake from SR 151, the only State-designated Scenic Highway in the primary study area, would make changes resulting from CP2 very difficult to differentiate. There are no Federally designated scenic roadways in the area. This impact would be less than significant.

This impact would be similar to Impact Vis-4 (CP1). Although the scale of vegetation removal and other activities associated with the construction at the proposed relocation sites would be larger under CP2 than under CP1, the distance of most construction activities from SR 151 – the only designated scenic highway in the primary study area – would prevent CP2 from being inconsistent with State Scenic Highway requirements. This impact would be

less than significant. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas None of the landscapes and features in the extended study area would be affected by activities associated with CP2. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Vis-1 (CP3): Consistency with Guidelines for Visual Resources in the STNF LRMP The effects of the construction-related and operational elements of CP3 would be inconsistent with some of the VQOs established by the STNF LRMP. The LRMP calls for management activities that would be visible from the I-5 corridor and SR 151 to remain visually subordinate on the landscape and not be noticeable to the casual observer (a VQO of "retention"). Foreground views from KOPs most often used by the public, such as campgrounds and boat launches, are also managed according to the VQO of retention, whereas middle ground views are managed according to the "partial retention" VQO (management activities in the middle ground having a natural appearance). The construction-related and operational elements of CP3 would be more visible from some viewpoints than others. The operation of construction equipment and its presence on the landscape would be a visual distraction when visible from KOPs. In addition, what might be considered short-term impacts on visual resources and aesthetics for some viewer groups, such as tourists, might be considered long-term impacts for other viewer groups, such as residents. The LRMP does not distinguish between short-term and long-term VQOs or between classes of viewers, although for the purposes of this assessment, viewer groups were considered in the evaluation of impacts. This impact would be significant.

This impact would be similar to Impact Vis-1 (CP1). Construction-related and operational elements of CP3 would be inconsistent with some of the VQOs established by the STNF LRMP. The larger inundation area proposed under CP3 would result in an increased opportunity for management activities to be visible from the I-5 corridor, SR 151, and other areas managed according to retention and modification VQOs. This impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-2 (CP3): Degradation and/or Obstruction of a Scenic View from Key Observation Points Under CP3, the "bathtub ring" that is apparent during less than full pool conditions would become larger. Existing scenic views of areas where utilities and infrastructure would be relocated could be obstructed or degraded. Views from some KOPs, including those of the renowned "Three Shastas," would be obstructed or degraded during construction. Throughout the

primary study area, vegetation retention or removal activities (proposed activities would vary by relocation area) would also degrade scenic views. Although project-related changes to the landscape could become less visible over time, these changes would be highly visible during construction. This impact would be significant.

This impact would be similar to Impact Vis-2 (CP1). Under CP3, the "bathtub ring" that is apparent during less than full pool conditions would become larger than what would be exposed under CP1 or CP2. CP3 would also require the relocation of more utilities and infrastructure and more vegetation retention or removal than CP1 or CP2. In addition, the time frame for construction and implementation of the project would increase, which would prolong the period that scenic views are degraded by the project. Although project-related changes to the landscape could become less visible over time, these changes would be highly visible during construction. This impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-3 (CP3): Generation of Increased Daytime Glare and/or Nighttime Lighting The increased area of light-colored soils around the Shasta Lake shoreline that are exposed during periods of drawdown and, conversely, the increased area of water surface associated with CP3 would increase the potential for daytime glare. The relocation of roads and infrastructure could also create new sources of reflective daytime glare. In addition, construction equipment could be a temporary source of reflective daytime glare. Extensive construction activities at night requiring the use of vehicle and perimeter lighting, particularly in the vicinity of Shasta Dam, would be necessary for several years. New sources of permanent nighttime lighting would also be required for some locations, such as relocated roads and recreational facilities. This impact would be significant.

This impact would be similar to Impact Vis-3 (CP1). Under CP3, more light-colored soils would be exposed, which would expand the amount of daytime glare. Construction and implementation of the project would take place over a longer period of time, which would prolong the requirement for nighttime lighting during construction and daytime glare from construction equipment. More roads and other infrastructure would be relocated, which would increase the amount of related daytime glare and nighttime lighting. This impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-4 (CP3): Consistency with Federal and State Scenic Highway Requirements The distance to proposed construction/relocation areas around Shasta Lake from SR 151, the only State-designated Scenic Highway in the primary study area, would make changes resulting from CP3 very difficult to differentiate. There are no Federally designated scenic roadways in the area. This impact would be less than significant.

This impact would be similar to Impact Vis-4 (CP1). Although the scale of vegetation removal and other activities associated with the construction at the proposed relocation sites would be larger under CP3 than under CP1 or CP2, the distance of most construction activities from SR 151 – the only designated scenic highway in the primary study area – would prevent CP3 from being inconsistent with State Scenic Highway requirements. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas None of the landscapes and features in the extended study area would be affected by activities associated with CP3. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Vis-1 (CP4 and CP4A): Consistency with Guidelines for Visual Resources in the STNF LRMP The effects of the construction-related and operational elements of CP4 or CP4A would be inconsistent with some of the VQOs established by the STNF LRMP. The LRMP calls for management activities that would be visible from the I-5 corridor and SR 151 to remain visually subordinate on the landscape and not be noticeable to the casual observer (a VQO of "retention"). Foreground views from KOPs most often used by the public, such as campgrounds and boat launches, are also managed according to the VQO of retention, whereas middle ground views are managed according to the "partial retention" VQO (management activities in the middle ground having a natural appearance). The construction-related and operational elements of CP4 or CP4A would be more visible from some viewpoints than others. The operation of construction equipment and its presence on the landscape would be a visual distraction when visible from KOPs. In addition, what might be considered short-term impacts on visual resources and aesthetics for some viewer groups, such as tourists, might be considered long-term impacts for other viewer groups, such as residents. The LRMP does not distinguish between short-term and long-term VQOs or between classes of viewers, although for the purposes of this assessment, viewer groups were considered in the evaluation of impacts. This impact would be significant for CP4 or CP4A.

This impact would be similar to Impact Vis-1 (CP1) and Vis-1 (CP3). Construction-related and operational elements of CP4 would be inconsistent with some of the VQOs established by the STNF LRMP. This impact would be significant for CP4. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

This impact would be similar to Impact Vis-1 (CP1) and Vis-1 (CP3). Construction-related and operational elements of CP4A would be inconsistent with some of the VQOs established by the STNF LRMP. This impact would be significant for CP4A. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-2 (CP4 and CP4A): Degradation and/or Obstruction of a Scenic View from Key Observation Points Under CP4 or CP4A, the "bathtub ring" that is apparent during less than full pool conditions would become larger. Existing scenic views of areas where utilities and infrastructure would be relocated could be obstructed or degraded. Views from some KOPs, including those of the renowned "Three Shastas," would be obstructed or degraded during construction and for several years post-construction. Throughout the primary study area, vegetation retention or removal activities (proposed activities would vary by relocation area) would also degrade scenic views. Although project-related changes to the landscape could become less visible over time, these changes would be highly visible during construction. This impact would be significant for CP4 or CP4A.

This impact would be similar to Impact Vis-2 (CP1) and Impact Vis-2 (CP3) with the addition of measures for increasing habitat for anadromous fish. These measures include the placement of spawning-sized gravel at multiple locations and riparian, floodplain, and side channel habitat restoration activities along the Sacramento River between Keswick Dam and the Red Bluff Pumping Plant. Although the direct placement of gravel into the river channel would initially be noticeable to viewers in the immediate vicinity of such actions, project-related changes to the landscape would become less visible over time as gravels are dispersed by natural means. Similarly, habitat restoration activities would affect the existing views in parts of the river, but these changes would become increasingly less noticeable over time as any removed vegetation becomes reestablished.

This impact would be significant for CP4. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

This impact would be significant for CP4A. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-3 (CP4 and CP4A): Generation of Increased Daytime Glare and/or Nighttime Lighting The increased area of light-colored soils around the Shasta Lake shoreline that are exposed during periods of drawdown and, conversely, the increased area of water surface associated with CP4 or CP4A would increase the potential for daytime glare. The relocation of roads and infrastructure could also create new sources of reflective daytime glare. In addition, construction equipment could be a temporary source of reflective daytime glare. Extensive construction activities at night requiring the use of vehicle and perimeter lighting, particularly in the vicinity of Shasta Dam, would

be necessary for several years. New sources of permanent nighttime lighting would also be required for some locations, such as relocated roads and recreational facilities. This impact would be significant for CP4 or CP4A.

This impact would be similar to Impact Vis-3 (CP1) and Impact Vis-3 (CP3) with the exception of the proposed gravel augmentation and upper Sacramento River habitat restoration actions included in CP4 and CP4A. Gravel is typically light colored and reflective; therefore, gravel augmentation would create a temporary source of daytime glare. Over time, as the gravel disperses along the river channel, its potential to be a source of glare would diminish. The habitat restoration activities proposed under CP4 or CP4A could also create a source of temporary daytime glare by the removal of vegetation, exposure of soils, and expansion of water surface. However, the potential for vegetation removal and exposed soils to be a source of daytime glare would be temporary, fading as new vegetation becomes established.

The impact would be significant for CP4. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

The impact would be significant for CP4A. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-4 (CP4 or CP4A): Consistency with Federal and State Scenic Highway Requirements The distance to proposed construction/relocation areas around Shasta Lake from SR 151, the only State-designated Scenic Highway in the primary study area, would make changes resulting from CP4 or CP4A very difficult to differentiate. There are no Federally designated scenic roadways in the area. This impact would be less than significant for CP4 or CP4A.

This impact would be similar to Impact Vis-4 (CP1) and Impact Vis-4 (CP3). This impact would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be similar to Impact Vis-4 (CP1) and Impact Vis-4 (CP3). This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas None of the landscapes and features in the extended study area would be affected by activities associated with CP4 or CP4A. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

CP5 – 18.5-Foot Dam Raise Combination Plan, Anadromous Fish Survival and Water Supply Reliability

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Vis-1 (CP5): Consistency with Guidelines for Visual Resources in the STNF LRMP The effects of the construction-related and operational elements

of CP5 would be inconsistent with some of the VQOs established by the STNF LRMP. The LRMP calls for management activities that would be visible from the I-5 corridor and SR 151 to remain visually subordinate on the landscape and not be noticeable to the casual observer (a VQO of "retention"). Foreground views from KOPs most often used by the public, such as campgrounds and boat launches, are also managed according to the VQO of retention, whereas middle ground views are managed according to the "partial retention" VQO (management activities in the middle ground having a natural appearance). The construction-related and operational elements of CP5 would be more visible from some viewpoints than others. The operation of construction equipment and its presence on the landscape would be a visual distraction when visible from KOPs. In addition, what might be considered short-term impacts on visual resources and aesthetics for some viewer groups, such as tourists, might be considered long-term impacts for other viewer groups, such as residents. The LRMP does not distinguish between short-term and long-term VQOs or between classes of viewers, although for the purposes of this assessment, viewer groups were considered in the evaluation of impacts. This impact would be significant.

This impact would be similar to Impact Vis-1 (CP1) and Impact Vis-1 (CP3). Construction-related and operational elements of CP5 would be inconsistent with some of the VQOs established by the STNF LRMP. This impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-2 (CP5): Degradation and/or Obstruction of a Scenic View from Key Observation Points Under CP5, the "bathtub ring" that is apparent during less than full pool conditions would become larger. Existing scenic views of areas where utilities and infrastructure would be relocated could be obstructed or degraded. Views from some KOPs, including those of the renowned "Three Shastas," would be obstructed or degraded during construction and for several years post-construction. Throughout the primary study area, vegetation retention or removal activities (proposed activities would vary by relocation area) would also degrade scenic views. Although project-related changes to the landscape could become less visible over time, these changes would be highly visible during construction. This impact would be significant.

This impact would be similar to Impact Vis-2 (CP1) and Impact Vis-2 (CP4 and CP4A). Additional enhancements to relocation areas associated with CP5 could result in a slightly greater level of degradation and/or obstruction of a view from a particular KOP than might occur under CP3, CP4, or CP4A. This impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-3 (CP5): Generation of Increased Daytime Glare and/or Nighttime Lighting The increased area of light-colored soils around the Shasta Lake shoreline that are exposed during periods of drawdown and, conversely, the

increased area of water surface associated with CP5 would increase the potential for daytime glare. The relocation of roads and infrastructure could also create new sources of reflective daytime glare. In addition, construction equipment could be a temporary source of reflective daytime glare. Extensive construction activities at night requiring the use of vehicle and perimeter lighting, particularly in the vicinity of Shasta Dam, would be necessary for several years. New sources of permanent nighttime lighting would also be required for some locations, such as relocated roads and recreational facilities. This impact would be significant.

This impact would be similar to Impact Vis-3 (CP1) and Impact Vis-3 (CP4 or CP4A). Additional enhancements to relocation areas associated with CP5 could result in a slightly greater level of glare than might occur under CP3, CP4, or CP4A. The impact would be significant. Mitigation for this impact is proposed in Section 19.3.5, "Mitigation Measures."

Impact Vis-4 (CP5): Consistency with Federal and State Scenic Highway Requirements The distance to proposed construction/relocation areas around Shasta Lake from SR 151, the only State-designated Scenic Highway in the primary study area, would make changes resulting from CP5 very difficult to differentiate. There are no Federally designated scenic roadways in the area. This impact would be less than significant.

This impact would be similar to Impact Vis-4 (CP1) and Impact Vis-4 (CP3). This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas None of the landscapes and features in the extended study area would be affected by activities associated with CP5. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

19.3.5 Mitigation Measures

Table 19-3 presents a summary of mitigation measures for aesthetics and visual resources.

Table 19-3. Summary of Mitigation Measures for Aesthetics and Visual Resources

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact Vis-1: Consistency with Guidelines for Visual Resources in the STNF LRMP (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure Vis-1: Amend the STNF LRMP to Include Revised VQOs for developments at Turntable Bay area.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Vis-2: Degradation and/or Obstruction of a Scenic View from Key Observation Points (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure Vis-2: Minimize Construction-Related Visual Impacts on Scenic Views From Key Observation Points.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Vis-3: Generation of Increased Daytime Glare and/or Nighttime Lighting (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure Vis-3: Minimize or Avoid Visual Impacts of Daytime Glare and Nighttime Lighting.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact Vis-4: Consistency with Federal and State Scenic Highway Requirements (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS

Key:
CP = Comprehensive Plan
LOS = level of significance
LRMP = Land and Resource Management Plan
LTS = less than significant
NI = no impact
S = significant
STNF = Shasta-Trinity National Forest
SU = significant and unavoidable
VQO = visual quality objective

No-Action Alternative

No mitigation measures are required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impact Vis-4 (CP1). Impacts Vis-1 (CP1), Vis-2 (CP1), and Vis -3 (CP1) would remain significant and unavoidable despite the use of mitigation. Mitigation is provided below for other impacts of CP1 on aesthetics and visual resources.

Mitigation Measure Vis-1 (CP1): Amend the STNF LRMP to Include Revised VQOs for Newly Constructed Recreation Developments at All New Sites STNF could prepare an amendment to the STNF LRMP that would modify the management prescription for the area in which newly constructed

developed recreation sites are located from Roaded Recreation to Roaded, High-Density Recreation. The new prescription would allow the newly constructed areas to be characterized as a substantially modified natural environment in support of various recreational activities. In those locations, this amendment would serve to modify the VQOs from Retention to Modification. Implementation of this mitigation measure would ensure that the SLWRI will be consistent with the STNF LRMP, as amended. Impacts on visual resources at areas outside of the newly constructed recreation developments may be significant and unavoidable, depending on the designated VQO. Impact Vis-1 (CP1) would be significant and unavoidable in some areas.

Mitigation Measure Vis-2 (CP1): Minimize Construction-related Visual Impacts on Scenic Views from KOPs Reclamation will do the following to minimize potential impacts on visual resources during project construction:

- When not in use (e.g., after hours or when not required for the day's construction activities), construction equipment will remain in the designated contractor staging area.

- When practicable, construction materials that will remain permanently onsite should be consistent in color, texture, and pattern with the surrounding environment.

Implementation of this mitigation measure would reduce the visual impacts of the project related to the temporary operation of construction equipment and the permanent presence of project features on the landscape, but would not necessarily reduce them to a less-than-significant level. Impact Vis-2 (CP1) would be significant and unavoidable.

Mitigation Measure Vis-3 (CP1): Minimize or Avoid Visual Impacts of Daytime Glare and Nighttime Lighting Reclamation will do the following to minimize or avoid potential impacts on visual resources and aesthetics from daytime glare and nighttime lighting:

- Avoid constant nighttime lighting and overly bright lighting to the extent possible. The location of lighting will respond to the anticipated use and should not exceed the amount of light actually required by users.

- Lights will be screened and directed away from residences to the highest degree possible, and the amount of nighttime light used will be minimized to the highest degree possible. Lighting will include shielding to minimize offsite light spill and glare. In addition, the following measures will apply:

  - The spacing of luminaire lamps (or comparable vandal-resistant lighting) should be the maximum allowable for traffic safety.

  - Luminaires (or comparable vandal-resistant lighting) should be cutoff-type fixtures that cast low-angle illumination to minimize incidental spillover of light onto adjacent private properties and undeveloped open space. Fixtures that project upward or horizontally will not be used.

  - Luminaire lamps (or comparable vandal-resistant lighting) will be directed toward the roadway or lighted feature (e.g., campground restrooms, sidewalks) and away from adjacent residences and open space areas.

  - Luminaire lamps (or comparable vandal-resistant lighting) will provide good color rendering and natural light qualities. Low-pressure and high-pressure sodium fixtures that are not color corrected will not be used.

  - Luminaire lamps (or comparable vandal-resistant lighting) intensity will be the minimum allowable for traffic safety.

  - Luminaire lamp (or comparable vandal-resistant lighting) mountings will be downcast and the height of the poles will be minimized to reduce potential for backscatter into the nighttime sky and incidental spillover of light into adjacent private properties and open space.

  - Luminaire lamp (or comparable vandal-resistant lighting) mountings will have nonglare finishes.

- Guardrails and other roadway fixtures, including retaining walls, safety barriers, light standards, and other structures, will be limited to the minimum length, height, and bulk necessary to adequately provide for the safety of the roadway user. Earth tone colors in dark shades and flat finishes will be used on all roadway fixtures. New and replacement guardrails will not have a shiny, reflective finish. (These features are typically galvanized steel, which weathers naturally to a nonglare finish, typically within a year or so.) Retaining walls and other erosion control devices or structures will be constructed of natural materials whenever possible and will, to the maximum extent possible, be designed and sited to avoid detracting from the scenic quality of the corridor. Such structures will incorporate heavy texture or articulated plane surfaces that create heavy shadow patterns.

Implementation of this mitigation measure would reduce the impacts of the project related to daytime glare and nighttime lighting, but would not reduce them to a less-than-significant level. ImpactVis-3 (CP1) would be significant and unavoidable.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impact Vis-4 (CP2). Impacts Vis-1 (CP2), Vis-2 (CP2), and Vis -3 (CP2) would remain significant and unavoidable despite the use of mitigation. Mitigation is provided below to minimize impacts of CP2 on aesthetics and visual resources to the extent possible.

Mitigation Measure Vis-1 (CP2): Amend the STNF LRMP to Include Revised VQOs for Newly Constructed Recreation Developments at All New Sites This mitigation measure is identical to Mitigation Measure Vis-1 (CP1). Impacts on visual resources at areas outside of the newly constructed recreation developments may be significant and unavoidable, depending on the designated VQO. Impact Vis-1 (CP2) would be significant and unavoidable in some areas.

Mitigation Measure Vis-2 (CP2): Minimize Construction-related Visual Impacts on Scenic Views from KOPs This mitigation measure is identical to Mitigation Measure Vis-1 (CP1). Implementation of this mitigation measure would reduce the impacts of the project related to the temporary operation of construction equipment and the permanent presence of project features on the landscape, but would not necessarily reduce them to a less-than-significant level. Impact Vis-2 (CP2) would be significant and unavoidable.

Mitigation Measure Vis-3 (CP2): Minimize or Avoid Visual Impacts of Daytime Glare and Nighttime Lighting This mitigation measure is identical to Mitigation Measure Vis-3 (CP1). Implementation of this mitigation measure would reduce the impacts of the project related to daytime glare and nighttime lighting, but would not reduce them to a less-than-significant level. Impacts Vis-2 (CP2) and Vis-3 (CP2) would be significant and unavoidable.

CP3 – 18.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impact Vis-4 (CP3). Impacts Vis-1 (CP3), Vis-2 (CP3), and Vis -3 (CP3) would remain significant and unavoidable despite the use of mitigation. Mitigation is provided below to minimize impacts of CP3 on aesthetics and visual resources to the extent possible.

Mitigation Measure Vis-1 (CP3): Amend the STNF LRMP to Include Revised VQOs for Newly Constructed Recreation Developments at All New Sites This mitigation measure is identical to Mitigation Measure Vis-1 (CP1). Impacts on visual resources at areas outside of the newly constructed recreation developments may be significant and unavoidable, depending on the designated VQO. Impact Vis-1 (CP3) would be significant and unavoidable in some areas.

Mitigation Measure Vis-2 (CP3): Minimize Construction-related Visual Impacts on Scenic Views from KOPs This mitigation measure is identical to Mitigation Measure Vis-1 (CP1). Implementation of this mitigation measure would reduce the impacts of the project related to the temporary operation of

construction equipment and the permanent presence of project features on the landscape, but would not necessarily reduce them to a less-than-significant level. Impact Vis-2 (CP3) would be significant and unavoidable.

Mitigation Measure Vis-3 (CP3): Minimize or Avoid Visual Impacts of Daytime Glare and Nighttime Lighting This mitigation measure is identical to Mitigation Measure Vis-3 (CP1). Implementation of this mitigation measure would reduce the impacts of the project related to daytime glare and nighttime lighting, but would not reduce them to a less-than-significant level. Impacts Vis-2 (CP3) and Vis-3 (CP3) would be significant and unavoidable.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

No mitigation is required for Impact Vis-4 (CP4 and CP4A). Impacts Vis-1 (CP4 and CP4A), Vis-2 (CP4 and CP4A), and Vis -3 (CP4 and CP4A) would remain significant and unavoidable despite the use of mitigation. Mitigation is provided below to minimize impacts of CP4 or CP4A on aesthetics and visual resources to the extent possible.

Mitigation Measure Vis-1 (CP4 and CP4A): Amend the STNF LRMP to Include Revised VQOs for Newly Constructed Recreation Developments at All New Sites This mitigation measure is identical to Mitigation Measure Vis-1 (CP1). Impacts on visual resources at areas outside of the newly constructed recreation developments may be significant and unavoidable, depending on the designated VQO. Impact Vis-1 (CP4 and CP4A) would be significant and unavoidable in some areas.

Mitigation Measure Vis-2 (CP4 and CP4A): Minimize Construction-related Visual Impacts on Scenic Views from KOPs This mitigation measure is identical to Mitigation Measure Vis-1 (CP1). Implementation of this mitigation measure would reduce the impacts of the project related to the temporary operation of construction equipment and the permanent presence of project features on the landscape, but would not necessarily reduce them to a less-than-significant level. Impact Vis-2 (CP4 and CP4A) would be significant and unavoidable.

Mitigation Measure Vis-3 (CP4 or CP4A): Minimize or Avoid Visual Impacts of Daytime Glare and Nighttime Lighting This mitigation measure is identical to Mitigation Measure Vis-3 (CP1). Implementation of this mitigation measure would reduce the impacts of the project related to daytime glare and nighttime lighting, but would not reduce them to a less-than-significant level. Impacts Vis-2 (CP4 and CP4A) and Vis-3 (CP4 and CP4A) would be significant and unavoidable.

CP5 – 18.5-Foot Dam Raise, Combination Plan

No mitigation is required for Impact Vis-4 (CP5). Impacts Vis-1 (CP5), Vis-2 (CP5), and Vis -3 (CP5) would remain significant and unavoidable despite the

use of mitigation. Mitigation is provided below to minimize impacts of CP5 on aesthetics and visual resources to the extent possible.

Mitigation Measure Vis-1 (CP5): Amend the STNF LRMP to Include Revised VQOs for Newly Constructed Recreation Developments at All New Sites This mitigation measure is identical to Mitigation Measure Vis-1 (CP1). Impacts on visual resources at areas outside of the newly constructed recreation developments may be significant and unavoidable, depending on the designated VQO. Impact Vis-1 (CP5) would be significant and unavoidable in some areas.

Mitigation Measure Vis-2 (CP5): Minimize Construction-related Visual Impacts on Scenic Views from KOPs This mitigation measure is identical to Mitigation Measure Vis-1 (CP1). Implementation of this mitigation measure would reduce the impacts of the project related to the temporary operation of construction equipment and the permanent presence of project features on the landscape, but would not necessarily reduce them to a less-than-significant level. Impact Vis-2 (CP5) would be significant and unavoidable.

Mitigation Measure Vis-3 (CP5): Minimize or Avoid Visual Impacts of Daytime Glare and Nighttime Lighting This mitigation measure is identical to Mitigation Measure Vis-3 (CP1). Implementation of this mitigation measure would reduce the impacts of the project related to daytime glare and nighttime lighting, but would not reduce them to a less-than-significant level. Impact and Vis-3 (CP5) would be significant and unavoidable.

19.3.6 Cumulative Effects

Cumulative effects are the impacts on the environment that result from the incremental impacts of the project alternative when added to the impacts of other past, present, and reasonably foreseeable future actions (14 California Code of Regulations Section 15355(b), 40 Code of Federal Regulations Section 1508.7), regardless of what agency (Federal or non-Federal) or entity undertakes such other actions. These impacts can result from individually minor, but collectively significant, actions taking place over time.

The President's Council on Environmental Quality's NEPA regulations and the State CEQA Guidelines require that the cumulative impacts of a project be addressed in an environmental document when the cumulative impacts are expected to be significant (40 Code of Federal Regulations Section 1508.25(a)(2), 14 California Code of Regulations Section 15130(a)). When a lead agency assesses a project having an incremental effect that is not "cumulatively considerable," the lead agency need not consider that effect significant. However, the lead agency will briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

Methods and Assumptions

The analysis of cumulative impacts in this chapter addresses the cumulative impacts of the various project alternatives. The geographic scope of cumulative

impacts on aesthetics and visual resources includes the viewsheds that would be affected by implementation of the SWLRI alternatives, including views from public areas such as roadways, recreation areas, and scenic vistas. The temporal scope impacts would include construction, operation, and maintenance of the project. According to the State CEQA Guidelines, the cumulative impacts discussion "should be guided by the standards of practicality and reasonableness." The State CEQA Guidelines require that a cumulative impacts analysis identify related projects, summarize the expected environmental impacts of those related projects, and analyze the cumulative impacts of the proposed and related projects. Past, present, and reasonably foreseeable projects affecting the same viewsheds as those associated with the primary study area are described in Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences." Because no construction activities associated with the project would occur outside of the primary study area, the geographic scope of the area examined for cumulative impacts is the primary study area identified for this project.

The Antlers Bridge Replacement is an example of the type of project that may contribute to cumulative impacts associated with aesthetics and visual resources in the primary study area, and thus is summarized below.

The California Department of Transportation, in cooperation with the Federal Transit Administration, is in the process of replacing the I-5 Antlers Bridge over Shasta Lake (in the primary study area), near the community of Lakehead. This project includes construction of a 1,942-foot, 5-lane segmental bridge with deep pile foundations that are 12 feet in diameter. In addition, it includes realignment of a 0.4-mile-long segment of I-5, requiring hillside excavation, construction of a 5-lane freeway section and demolition of the existing 1,500 feet of steel deck truss bridge. The new bridge is being constructed next to the existing bridge, which remains open to traffic until the new bridge is completed. Although not considered to have a significant impact on visual resources and aesthetics (Caltrans and DOT 2007), the project is highly visible from surrounding public areas (I-5 corridor, Antlers Public Boat Ramp, and Lakehead). Construction is expected to be completed in 2014.

Cumulative Effects

Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," discusses overall cumulative impacts methodology related to the action alternatives, including the relationship to the CALFED Bay-Delta Program Programmatic EIS/EIR cumulative impacts analysis, qualitative and quantitative assessment, past and future actions in the study area, and significance criteria. Table 3-1, "Present and Reasonably Foreseeable Future Actions Included in the Analysis of Cumulative Impacts, by Resource Area," in Chapter 3, lists the present and reasonably foreseeable future projects considered quantitatively and qualitatively within the cumulative impacts analysis. This cumulative impacts analysis accounts for potential project impacts combined with the impacts of existing facilities, conditions,

land uses, and reasonably foreseeable actions expected to occur in the study area on a qualitative and quantitative level. None of the projects listed in Table 3-1 under Quantitative Analysis would have effects on aesthetic and visual resources in the primary study area or have effects in extended study area that contribute to cumulative impacts of the action alternatives since no impacts have been identified in the extended study area. This analysis is based on the projects listed in Table 3-1 under Qualitative Analysis.

Past and present programs projects that have contributed to cumulative impacts on aesthetic and visual resources include dam construction, reservoir operation, flood management projects, land use alterations, and other construction projects.

The impact of the proposed SLWRI alternatives on aesthetics and visual resources in the project study area would be largely significant and unavoidable, and would be collectively significant when included with other actions taking place over time. Past, present, and reasonably foreseeable projects described in Chapter 3, Table 3-1, such as bridge reconstructions (e.g., Antlers Bridge Replacement) and highway modifications along the I-5 corridor, changes to marinas and resorts, vegetation management, land use changes (e.g., Mountain Gate at Shasta Mixed-Use Area Plan), new quarries (e.g., Moody Flats Quarry), and mine reclamation on the surrounding hillsides could all affect the impression that viewers have of the region.

Under all SLWRI alternatives impacts Vis-1, Vis-2, and Vis-3 would be significant and unavoidable. Implementation of the SLWRI alternatives would contribute to cumulative adverse conditions where construction activities and/or permanent changes to the landscape, such as a wider bathtub ring and new recreation facilities, occupy the same field of view as other facilities or impacted landscapes that are in the viewsheds of sensitive viewers in the project study area. Implementation of the proposed SLWRI alternatives would result in impacts on visual resources that would be inconsistent with LRMP VQOs in some parts of the project study area, and would degrade or obstruct scenic views from KOPs. Glare from construction equipment and exposed soils, and the operation of equipment in active construction areas are significant and unavoidable impacts. Mitigation measures Vis-1 through Vis-3 would be implemented to buffer these impacts to the extent possible (e.g., storage of construction equipment in designated areas), although impacts would not be reduced to a less-than-significant level. When assessed with other projects that could change the character and quality of the aesthetics and visual resources in Shasta Lake and vicinity and the upper Sacramento River, impacts resulting from implementation of the proposed SLWRI alternatives would be cumulatively significant.

None of the project alternatives would have a cumulatively considerable effect on aesthetics and visual resources in the extended study area.

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Chapter 20
Transportation and Traffic

20.1 Affected Environment

This section describes the existing transportation network in the primary and extended study areas – specifically those roads, highways, bridges, railroads, ports, transit, navigation, and airports that could be affected by the SLWRI action alternatives.

20.1.1 Roadways

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

The primary study area comprises Shasta Dam, Shasta Lake, and the upper Sacramento River between Shasta Dam and the Red Bluff Pumping Plant in Shasta and Tehama counties. The surface transportation network in the primary study area consists of an interstate freeway, State highways, and smaller connector roads. Traffic in the area is generally moderate to light, except that heavy traffic in the Shasta Lake Unit of the Whiskeytown-Shasta-Trinity National Recreation Area is not unusual during weekends and holidays between May 1 and Labor Day (Reclamation 2004).

Figure 1-1 in Chapter 1, "Introduction," shows the highways in the primary study area. Interstate 5 (I-5) is the main north-south interstate freeway in the region. Several major arterials run north-south, generally parallel to the Sacramento River. State Route (SR) 99 and SR 70 run north-south; certain sections of both of these routes are expressways. SR 273 runs north-south from Redding, generally paralleling the Sacramento River before it intersects with I-5 several miles north of the Shasta/Tehama county line.

Roadways in the vicinity of Shasta Lake are shown in Figure 20-1a (see Section 20.3.1, "Methods and Assumptions"). Roadways and bridges in the primary study area that could be affected by the SLWRI include Lakeshore Drive, Lower Salt Creek Road, Silverthorn Road, Gillman Road, and Salt Creek Road. These roads are described in more detail below.

Lakeshore Drive is a two-lane paved road that begins in the Lakeshore Area, immediately west of I-5, and continues south to the Sugarloaf Creek. Some segments of Lakeshore Drive are owned and maintained by Shasta County and some segments are owned and maintained by USFS.

Lower Salt Creek Road is a two-lane paved road that provides access to the Lower Salt Creek Shoreline area and Campground. Lower Salt Creek Road is owned and maintained by Shasta County.

Silverthorn Road is a two-lane paved road and provides access to the Silverthorn Area. A portion of Silverthorn Road is owned and maintained by the USFS and a portion of Silverthorn Road is maintained by Shasta County.

Gillman Road is a two-lane paved road that runs along the west side of the McCloud River Arm portion of Shasta Lake. Gillman Road is owned and maintained by Shasta County.

Salt Creek Road is an unpaved road, ranging from 10 to 12 feet wide and runs along the west side of the Squaw Creek Arm portion of Shasta Lake. Salt Creek Road is owned and operated by USFS.

Bridges in the primary study area include Antlers Bridge and Pit River Bridge (also carries Union Pacific Railroad (UPRR)), which are located along I-5; Doney Creek Bridge and Charlie Creek Bridge, which are located along Lakeshore Drive; McCloud River Bridge, which is located along Gillman Road; and Didallas Creek Bridge, which is located along Salt Creek Road. A new Antlers Bridge is currently under construction and will accommodate raises of Shasta Dam up to 18.5 feet (Caltrans and Federal Highway Administration 2007).

Every 3 years, the California Department of Transportation (Caltrans) collects traffic at the I-5/Turntable Bay Road and I-5/Bridge Bay Road interchanges for an 8-day period between April and June. Table 20-1 shows the average daily traffic counts for these interchanges in 2003, 2006, and 2009. These data provide a general sense of the amount of traffic accessing the Shasta Lake area from I-5.

Table 20-1. Average Daily Traffic Volume at the I-5/Turntable Bay Road and I-5/Bridge Bay Road Interchanges

Location	Average Daily Traffic Volumes		
	2003	2006	2009
Turntable Bay Road northbound off-ramp	170	210	150
Turntable Bay Road northbound on-ramp	150	150	180
Turntable Bay Road southbound off-ramp	35	40	65
Turntable Bay Road southbound on-ramp	65	100	70
Bridge Bay Road northbound off-ramp	310	360	210
Bridge Bay Road northbound on-ramp	60	60	40
Bridge Bay Road southbound off-ramp	85	100	65
Bridge Bay Road southbound on-ramp	350	400	220

Source: Caltrans 2011

Key:
I-5 = Interstate 5

SR 299 is the major east-west route. This route traverses Trinity, Shasta, Lassen, and Modoc counties north of Shasta Dam. SR 44 is another major east-west route farther south that traverses Shasta County near the city of Redding. SR 36, which also runs generally east-west, intersects with SR 99 and I-5, and this route crosses the Sacramento River near the city of Red Bluff.

Between Shasta Dam and Keswick Dam, one vehicular bridge spans the Sacramento River. Between Keswick Dam and Red Bluff Pumping Plant along the Sacramento River, 3 pedestrian bridges, 1 railroad bridge, and 14 vehicular bridges (3 of which are for I-5) span the Sacramento River.

There are 317 bridges in Shasta County, 220 of which have bridge spans of 20 feet or more, making them eligible for Federal aid. Ninety-four bridges are beyond their design lives, functionally obsolete, or structurally deficient (Shasta County RTPA 2010).

Lower Sacramento River and Delta

SR 45 follows the Sacramento River north from SR 113 in Knights Landing, north of Sacramento. I-5 parallels SR 45 and the Sacramento River to the west. On the west side of the Sacramento Valley, SR 29 runs north-south through Napa and Lake counties. East-west highways include SR 20 in Lake County, SR 162 in Glenn County, and SR 36 in Tehama and Trinity counties. Major east-west routes on the east side of the Sacramento Valley include SRs 70, 49, and 88; U.S. Highway 50; and Interstate 80.

The Delta region is served by several major freeways. I-5 and SR 99 run north-south and Interstate 80 and U.S. Highway 50 run east-west through Sacramento. Other highways extend from the cities of Sacramento and Stockton to small cities and towns in the region. New roadways have facilitated growth and

urbanization along their corridors and within the upper watersheds of major inflowing rivers. Local roads in the Delta are often narrow and winding; during peak travel times, traffic in this area often includes slow, oversized farm equipment.

The 2 major north-south freeways in the San Joaquin River area are I-5 and SR 99, which pass through the San Joaquin Valley from Sacramento through Stockton and continue on to Bakersfield and its vicinity. SR 41 runs in a north-south direction south of Fresno. Several east-west routes traverse the San Joaquin River basin: SR 152 is an expressway that connects Los Banos and Chowchilla in Madera County, SR 180 terminates in Yosemite National Park, SR 168 is a primary east-west route in Fresno County, and SRs 190 and 198 are primary routes in Tulare County.

CVP/SWP Service Areas

Numerous freeways and expressways serve portions of the CVP and SWP service areas not discussed above. U.S. Highway 101 extends north and south near the coast from San Luis Obispo south to Los Angeles, and I-5 runs north-south through the Central Valley to Los Angeles and on to San Diego. An extensive, intricate freeway system serves the Los Angeles area. I-10 runs east from Los Angeles to Arizona, while I-8 runs east-west from San Diego to Arizona.

20.1.2 Public Transit

Public transit service in the primary study area is provided by the Redding Area Bus Authority (RABA), which provides fixed-route and demand-responsive (paratransit) service. RABA operates 12 fixed routes within the cities of Redding, Shasta Lake, and Anderson. Shasta County contracts with RABA for a rural commuter bus service. This commuter service offers express transportation into Redding from the outlying community of Burney. The RABA demand/response system provides complimentary transportation to disabled residents of the fixed-route service area. The service area is generally within 0.75 mile of the fixed routes, complying with the minimum mandates of the Federal Americans with Disabilities Act.

Most urban areas in the extended study area provide public transit. These transit systems generally provide both fixed-route and paratransit service. Transit services in the extended study area are not discussed further because they would not be affected by any of the alternatives.

20.1.3 Railroads

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

The UPRR and Western Pacific Railroad both have rail lines serving the vicinity of Shasta Lake and the upper Sacramento River area. The UPRR main line follows the I-5 alignment. Railroad bridges in the area include the Pit River

Bridge (which carries both the railroad and I-5), the Sacramento River Second Crossing Railroad Bridge, and the Doney Creek Railroad Bridge. All three railroad bridges were constructed by Reclamation during the original construction period of Shasta Dam. The Engineering Summary Appendix includes additional information on each of these railroad bridges.

The Pit River Bridge would require relocation or major modifications for Shasta Dam raises greater than about 18.5 feet. The Plan Formulation Appendix provides additional information on the limitations that the existing Pit River Bridge places on potential dam enlargements.

Lower Sacramento River and Delta

UPRR is the main rail line serving the Sacramento River region. The UPRR alignment approximates the alignment of I-5. The Western Pacific rail lines extend farther east through the cities of Marysville and Oroville.

Rail lines serving the Delta are the UPRR; the Western Pacific Railroad; and the Atchison, Topeka, and Santa Fe Railway.

The UPRR and Atchison, Topeka, and Santa Fe lines provide primary rail service connecting the Delta region to the San Joaquin River basin. The alignments of these rail lines generally follow the I-5 alignment through the San Joaquin Valley.

CVP/SWP Service Areas

The UPRR line runs north-south near the coast, from the San Francisco Bay Area through Los Angeles, then southeast toward the Arizona/Mexico border.

20.1.4 Water Navigation

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

The means of water travel and navigation in the primary study area consist of smaller watercraft such as kayaks and canoes, as well as motorboats for fishing, water-skiing, and boating. Shasta Lake is a popular destination for houseboats. A 65-foot-long catamaran provides ferry service to the Shasta Caverns on the east side of the McCloud Arm of Shasta Lake. Water flows and depths in this segment of the Sacramento River limit river navigation to smaller watercraft. Additional information on recreational boating in the primary study area, especially at Shasta Lake, is included in Chapter 18, “Recreation and Public Access.”

Lower Sacramento River and Delta

The Port of Sacramento is located in West Sacramento in the southeastern part of Yolo County. Ship access to the port is provided from San Francisco Bay up the Sacramento River and through the Sacramento Deep Water Ship Channel. San Francisco Bay is approximately 80 nautical miles southwest of the Port of

Sacramento. This route provides direct and unrestricted passage to the port (City of Sacramento 2005).

Two ports are located along the Sacramento River between Sacramento and Walnut Grove. Another commercial port is located on the Sacramento River at Isleton. A commercial port is located near Terminous and two ports are located adjacent to each other on Old and Middle rivers, northeast of Brentwood (CALFED 2000a). The Port of Stockton is on the San Joaquin River. A deep-water ship channel runs from Cache Slough in the Delta to West Sacramento, where the Port of Sacramento is located.

There are no commercial ports or shipping routes on the San Joaquin River upstream from the Port of Stockton.

CVP/SWP Service Areas

The Los Angeles–Long Beach installation on San Pedro Bay is one of the leading ports of California. The growth of Los Angeles led to the creation of its artificial harbors. Other harbors in this area serving commercial shipping are the San Luis Obispo, Santa Barbara, Carpinteria, Port Hueneme, El Segundo, Los Angeles, Long Beach, and San Diego harbors (CALFED 2000b).

20.1.5 Airports

There are four airports in the primary study area: Redding Municipal Airport, Benton Airpark, Shingletown Airport, and Fall River Mills Airport. Redding Municipal Airport, the closest airport to the project site, is located 20 miles southeast of Shasta Dam in Redding. Seaplanes are also permitted to land at Shasta Lake at the Bridge Bay Resort Seaplane Base. More than 120 other airports exist in the extended study area; these airports are not relevant to the environmental analysis and thus are not discussed further.

20.2 Regulatory Framework

20.2.1 Federal

Several statutes and regulations include provisions specific to the interstate system in California and transportation projects in general. Title 23 of the U.S. Code and the Code of Federal Regulations govern highways; the laws for transportation are included in U.S. Code Title 23 and Code of Federal Regulations Title 49.

The following Federal legislative statutes may also apply to surface transportation and transportation aspects of the project:

- Federal Clean Air Act
- Federal Transit Act

- Americans with Disabilities Act
- Civil Rights Act
- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

The Federal Highway Administration issues directives and policy memoranda in the form of technical advisories, orders, and notices for Federally funded roadway and transit projects in California.

20.2.2 State

Caltrans plans, designs, constructs, and maintains State-owned roadways. Caltrans's standard specifications (Caltrans 2006) establish uniform design and construction procedures for California highways and local roads. The highway design criteria and policies in the standard specifications ensure minimum design, contract, and construction standards for projects.

The primary study area is in Caltrans District 2, headquartered in Redding. Caltrans's Division of Transportation Planning, System Planning Branch, conducts long-range transportation plans in cooperation with local agencies to identify future highway improvements; the Division of Transportation Programming sets priorities for various Federal and State transportation funding programs.

20.2.3 Regional and Local

The circulation elements in the general plans of California cities and counties are concerned with the movement of people and goods. California Government Code Section 65302(b) requires that circulation elements address the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, and other local public utilities and facilities (Shasta County 2004).

Circulation elements establish goals and policies that pertain to transportation-related activities on city- or county-maintained roads. Most general plans contain circulation goals related to levels of service. "Level of service" describes the efficiency of road segments and intersections in terms of traffic delays. Level of service guidelines address long-term planning objectives rather than temporary conditions related to temporary, short-term traffic delays resulting from construction activities.

Counties in California classify county-maintained roads according to their intended function and linkage to land uses. Major roads are generally defined as primary carriers of intercity and intracounty travel. Collector roads are intended to provide subregional access and circulation by linking major roads with residential streets.

The Shasta County Regional Transportation Planning Agency is the congestion management agency in Shasta County. In 2010, the agency issued the *Regional Transportation Plan for Shasta County* in accordance with California Government Code Section 65080 et seq. and 23 U.S. Code 134–135 et seq. The plan discusses regional transportation issues, problems, and solutions and includes goals and objectives for each transportation mode and area of concern.

The Tehama County Transportation Commission is the regional transportation planning agency. It develops policies and allocates transportation funds in Tehama County. The commission published the 2006 *Tehama County Regional Transportation Plan* and is responsible for updating the plan.

Local agencies administer various transportation-related revenues that are sent directly to the agencies. The funds provide for the planning, design, operation, and maintenance of roadways and bridges. The Federal government provides matching funds under local assistance programs established under the Surface Transportation Improvement Program and Highway Bridge Rehabilitation and Replacement Program.

20.3 Environmental Consequences and Mitigation Measures

This section evaluates the environmental consequences of each project alternative related to traffic and transportation. The methods of evaluation are explained and the assumptions used to conduct the evaluation are listed below, and the criteria used to determine the significance of impacts are described. Mitigation measures are recommended to avoid or reduce any potentially significant impacts to less-than-significant levels.

20.3.1 Methods and Assumptions

Level of service standards are typically used to evaluate long-term (operational) traffic impacts resulting from residential, employment-generating, industrial, and institutional development projects. The SLWRI is not a land use development project. Long-term operation of the project alternatives would not generate additional residential, employment-related, industrial, or institutional vehicular trips (other than an increase in trips from additional recreation use); therefore, this analysis focuses on construction-related traffic effects. Level of service standards were not used in this analysis because such standards are typically used to evaluate long-term traffic congestion resulting from operations under a proposed action.

Figures 20-1a through 20-1g below show the locations of transportation facilities that would be relocated under the project alternatives. Table 20-2 lists the named roads and bridges that would require relocation and identifies the map figure that shows each facility. The facilities that would be relocated under each alternative are described with greater specificity in the associated impact evaluation that follows.

Table 20-2. Named Road and Bridge Facilities that Would Require Relocation Under the SLWRI

Roads and Bridges	Map Figure	CP1	CP2	CP3	CP4/CP4A	CP5
Lakeshore Drive	20-1f	X	X	X	X	X
Doney Creek Bridge	20-1f	X	X	X	X	X
Charlie Creek Bridge	20-1f	X	X	X	X	X
Lower Salt Creek Road	20-1f	X	X	X	X	X
Silverthorn Road	20-1c	X	X	X	X	X
Gillman Road	20-1g		X	X	X	X
McCloud River Bridge	20-1g		X	X	X	X
Salt Creek Road	20-1d		X	X	X	X
Didallas Creek Bridge	20-1d		X	X	X	X

Key:
CP = Comprehensive Plan
SLWRI = Shasta Lake Water Resources Investigation

The following project-related assumptions were used in the analysis of construction-related traffic that would result from needed roadway and bridge relocations and the dam raise:

- The estimated duration of proposed construction activities related to all major features would be 4.5 years for CP1 and 5 years for CP2–CP5. Construction activities would be phased, when feasible; however, some construction activities would occur concurrently.

- Import of fill and construction materials (aggregate, cobble, sand, and concrete) and export of construction waste related to construction of all major facilities would result in 95–177 truck trips per day for 4.5 to 5 years, with a maximum haul route distance of up to 20 miles. Export of vegetation cleared from the primary study area would result in 52–75 round trips per day, with a maximum haul route distance of up to 20 miles for up to 3.5 years.

- The estimated construction labor force for CP1–CP5 would be 300–360 workers per year, resulting in 300–360 daily round trips for 4.5 to 5 years.

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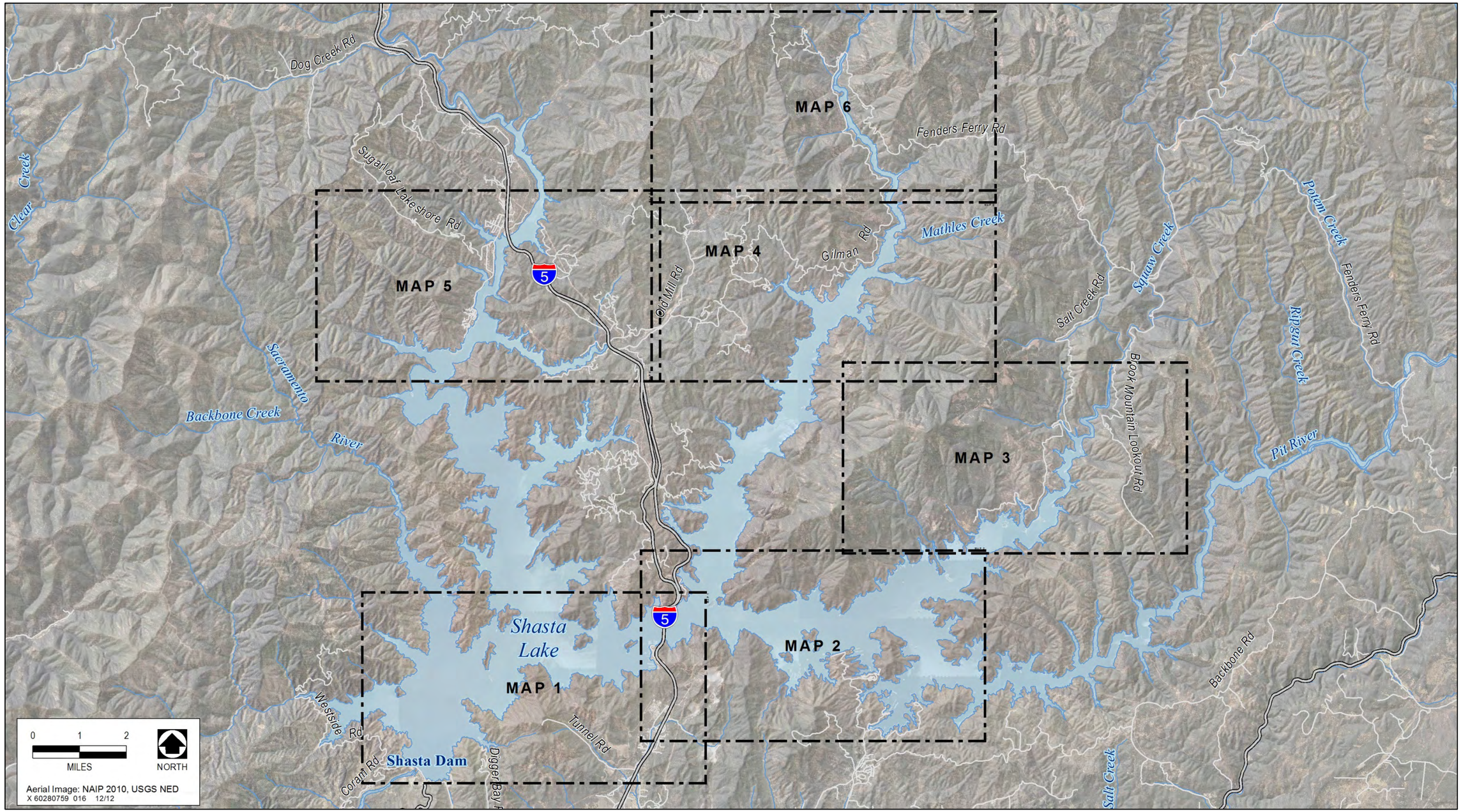

Figure 20-1a. Affected Transportation Facilities – Key to the Sheets

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Figure 20-1b. Affected Transportation Facilities – Map 1

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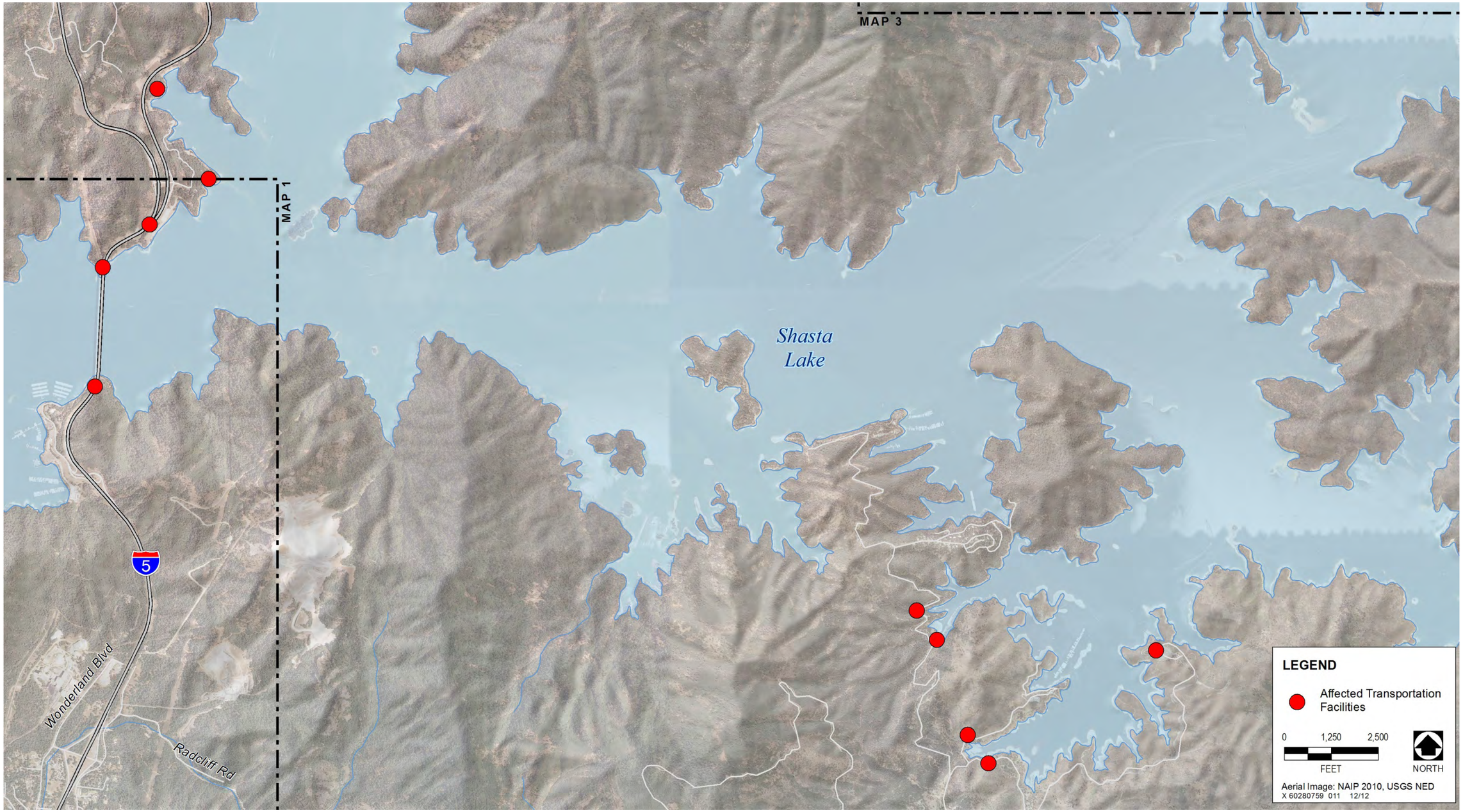

Figure 20-1c. Affected Transportation Facilities – Map 2

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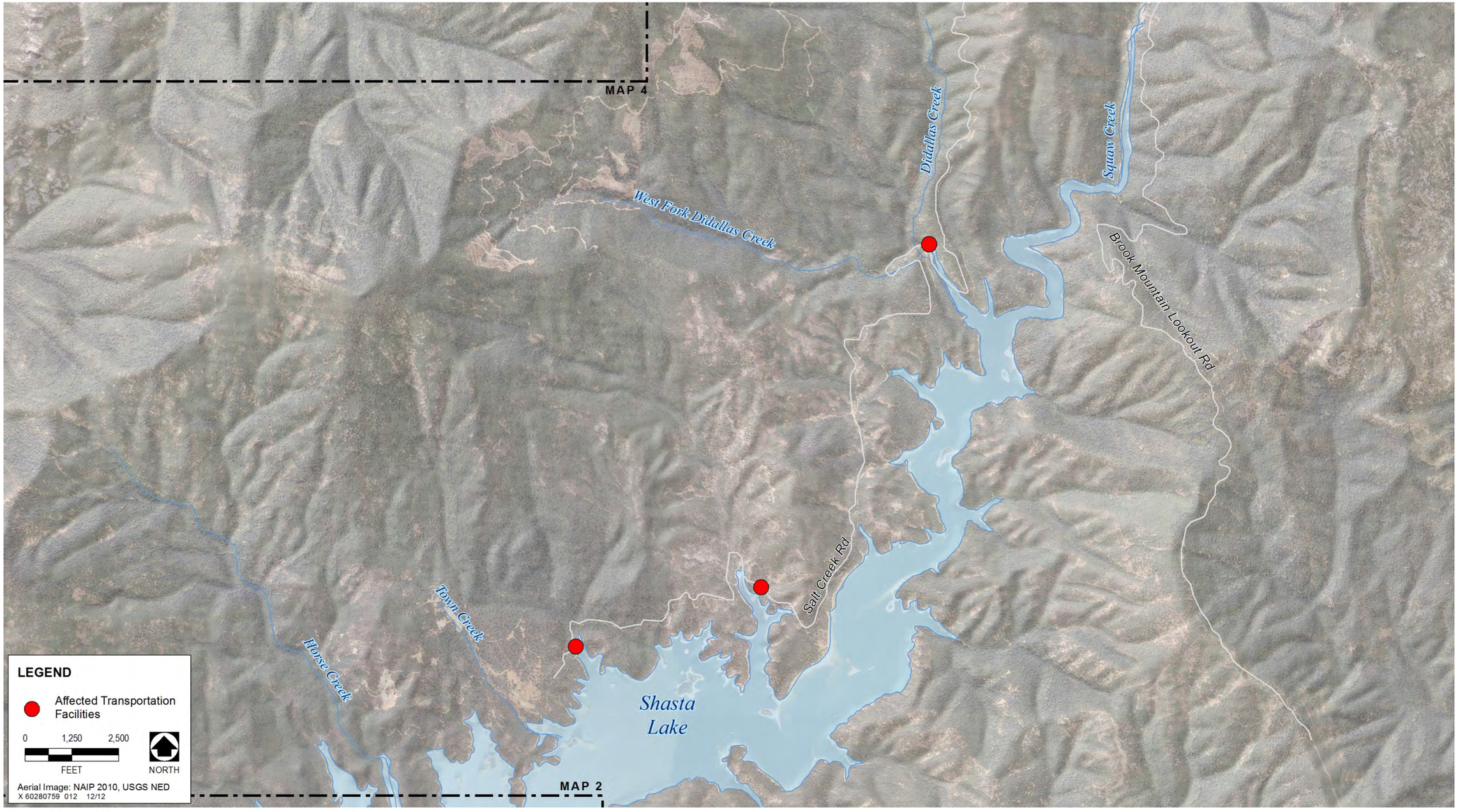

Figure 20-1d. Affected Transportation Facilities – Map 3

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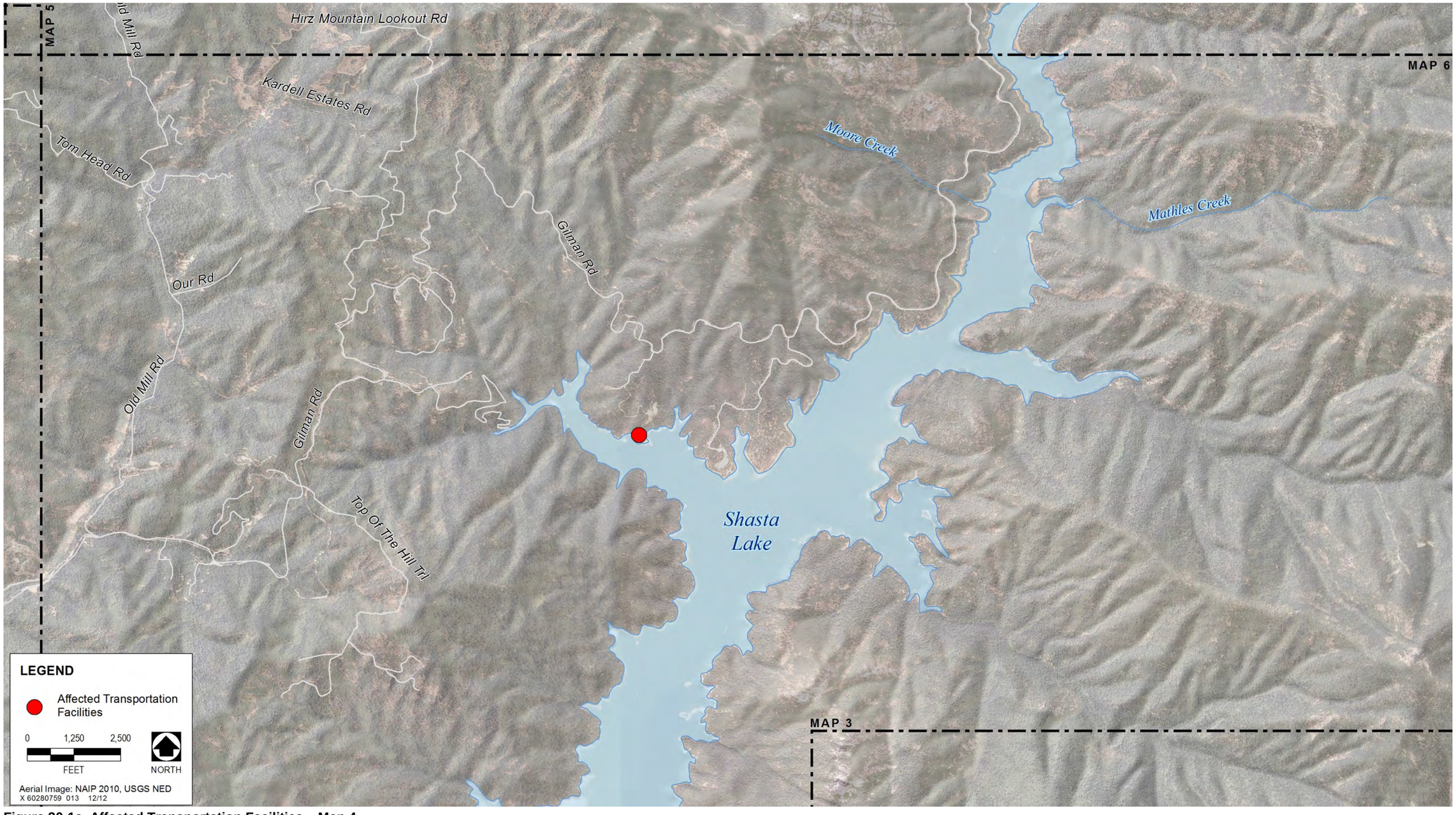

Figure 20-1e. Affected Transportation Facilities – Map 4

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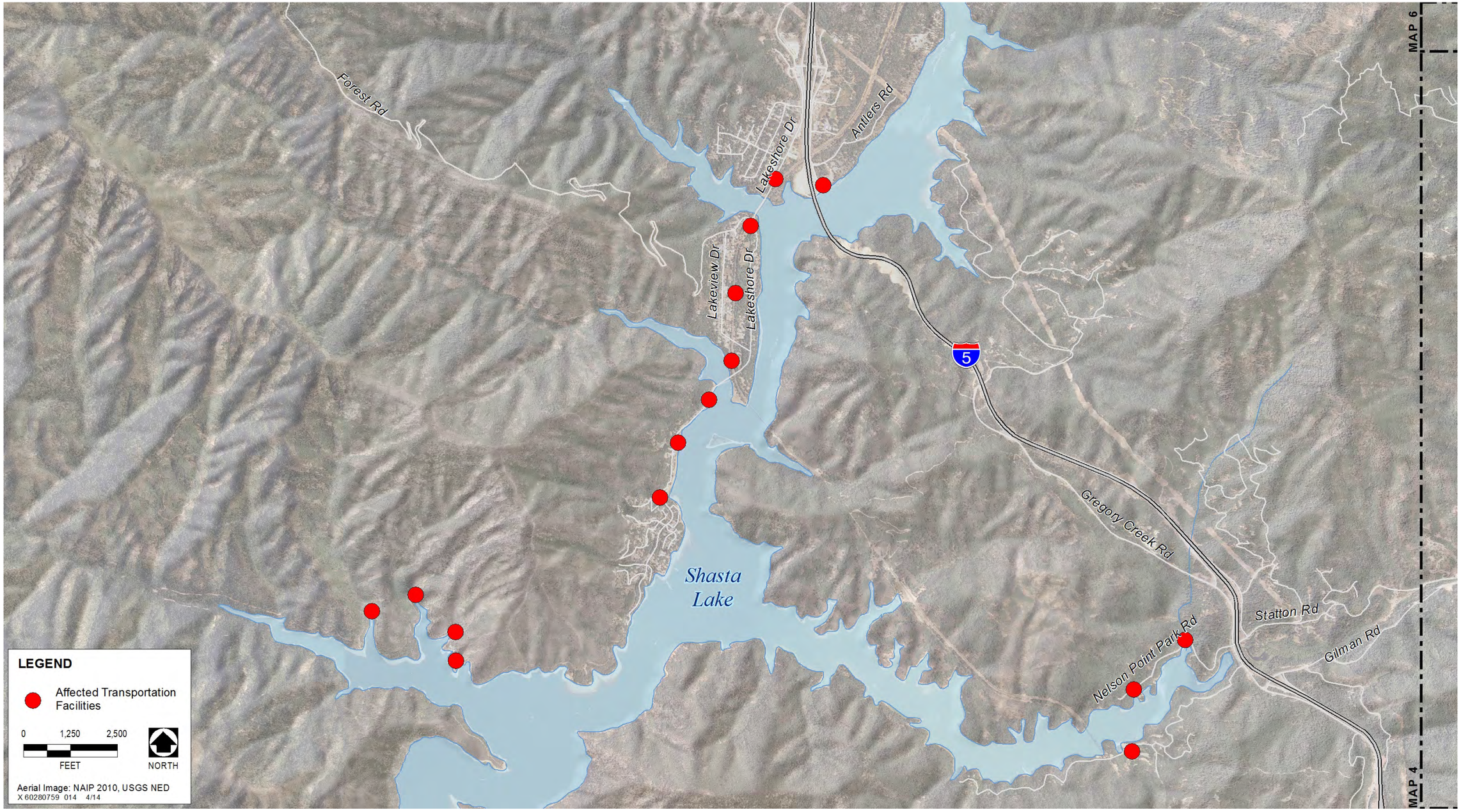

Figure 20-1f. Affected Transportation Facilities – Map 5

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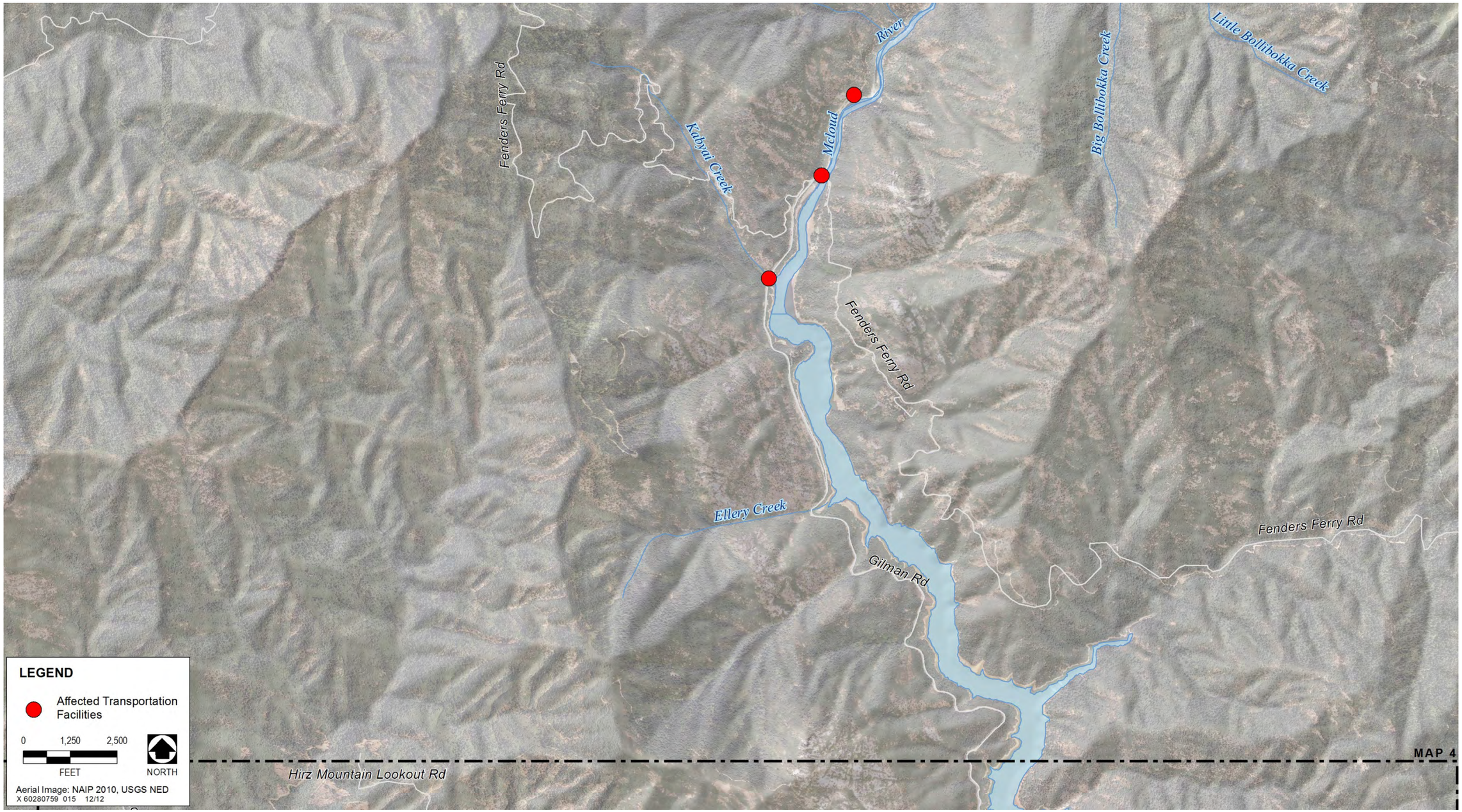

Figure 20-1g. Affected Transportation Facilities – Map 6

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- Existing access roads would be used to the extent feasible during construction. However, should temporary access roads need to be constructed, temporary fill for access would be completely removed after construction is completed.

- Construction would typically occur during daylight hours Monday through Friday, but the construction contractor may extend the hours and may schedule daytime construction work on weekend days with the approval of Reclamation. The average workday would be 8 hours.

- Under CP4, CP4A, and CP5, 5,000–10,000 tons of gravel on average would be installed per year at up to three sites per year. Gravel would be obtained from local commercial sources in Redding, and would result in up to 18 truck trips per day, with a maximum haul route distance of up to 40 miles. Under CP4, CP4A, and CP5, gravel augmentation would continue to occur annually for an additional 5 years, for a total construction period of 10 years.

- Under CP4, CP4A,and CP5, restoration at up to 6 restoration sites would result in up to 25 haul trips per day for approximately 1 month.

- The increase in long-term recreational opportunities and additional visitor days would generate an approximate average of 158 one-way trips per day to Shasta Lake and its tributaries under CP1, 238 one-way trips per day under CP2, 364 one-way trips per day under CP3, 658 one-way trips per day under CP4 or CP4A, and 311 one-way trips per day under CP5.

20.3.2 Criteria for Determining Significance of Effects

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by, or result from, the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. An environmental document prepared to comply with CEQA must identify the potentially significant environmental effects of a proposed project. A "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (State CEQA Guidelines Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental effects (State CEQA Guidelines Section 15126.4(a)) to less-than-significant levels.

Thresholds for determining the significance of transportation and traffic effects were based on the environmental checklist form in Appendix G of the State CEQA Guidelines and Federal, State, and local guidance. These thresholds consider the context and intensity of the environmental effects as required under NEPA.

Impacts of an alternative on transportation and traffic would be significant if project implementation would do any of the following:

- Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and nonmotorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit

- Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways

- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks

- Substantially increase hazards as a result of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)

- Result in inadequate emergency access

In accordance with NEPA, the methods for determining the significance of effects on traffic and transportation are based on the intensity of the effect within the context of the existing transportation facility.

The following screening criterion is recommended by the Institute of Transportation Engineers (ITE) (1989) for assessing the effects of construction projects that create temporary traffic increases. To account for the large percentage of heavy trucks associated with typical construction projects, ITE recommends a threshold level of 50 or more new peak-direction trips. Therefore, an alternative would cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system, and thus would result in a significant effect related to traffic and transportation, if it would result in 50 or more new truck trips during the a.m. peak hours or the p.m. peak hours. The a.m. peak hours are between 7 and 9 a.m. and the p.m. peak hours are between 4 and 6 p.m.

20.3.3 Topics Eliminated from Further Consideration

Several categories of effects would not result from the No-Action Alternative or any of the action alternatives. These categories are described below. An analysis of potential effects in applicable categories for the No-Action Alternative and action alternatives follows this discussion.

None of the airports (Redding Municipal, Benton Airpark, Shingletown, and Fall River Mills) in the primary study area are located near the project site; therefore, project construction and operation would not affect air traffic patterns. In addition, the project would not affect the ability of seaplanes to land at Bridge Bay Resort Seaplane Base. For these reasons, air traffic patterns are not discussed further in this analysis.

None of the alternatives would interfere with RABA services or affect transit service. Therefore, transit is not discussed further in this analysis.

None of the alternatives propose any facility that is in conflict with adopted policies, plans, or programs supporting alternative transportation. Therefore, this issue is not discussed further in this analysis.

The alternatives do not propose any changes in land use; however, under the action alternatives there could be minor changes in land uses throughout the study area because of increased water supply reliability. These indirect effects would be extremely minor and spread over a wide geographic area (i.e., throughout the CVP and SWP service areas). Therefore, none of the action alternatives would increase transportation hazards because of incompatible uses. This issue is not discussed further in this analysis.

20.3.4 Direct and Indirect Effects

No-Action Alternative

Under the No-Action Alternative, no improvements to Shasta Dam would be constructed and none of the associated road and bridge relocations would be needed. It is expected that over time, as population and traffic levels increase, roads and bridges would be maintained and improvements would be constructed throughout the study area when needed to ensure safety and meet current engineering-design requirements. Also, growth occurring under the No-Action Alternative would likely be consistent with city and county general plans, resulting in effects on California's transportation network. The effects on and impact conclusions for the primary study area and extended study area are essentially the same.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Trans-1 (No-Action): Short-Term and Long-Term Increases in Traffic in the Primary Study Area in Relation to the Existing Traffic Load and Capacity of the Street System Traffic levels would not increase above levels anticipated in local general plans and regional transportation plans. This impact would be less than significant.

Under the No-Action Alternative, traffic would be expected to increase compared to existing conditions. Traffic in the primary study area would increase by amounts anticipated in local general plans and regional

transportation plans, and no construction-related truck trips would occur. Planned growth under the No-Action Alternative, including development of residential and recreational uses, has the potential to result in temporary, short-term increases in construction traffic. It is reasonable to assume, however, that necessary improvements to roads, bridges, and other transportation facilities would be made in response to increased traffic levels associated with increased population growth over time. Therefore, this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Impact Trans-2 (No-Action): Adverse Effects on Access to Local Streets or Adjacent Uses in the Primary Study Area Access to local streets and adjacent uses would remain generally unchanged. This impact would be less than significant.

Access to local streets and adjacent uses in the primary study area would be maintained under the No-Action Alternative. No adverse construction-related effects on access would occur. Planned growth under the No-Action Alternative has the potential to impede access to local streets and adjacent uses. It is reasonable to assume, however, that road and bridge improvements needed to maintain access would be made in accordance with city and county regulations and policies. For this reason, this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Impact Trans-3 (No-Action): Hazards in the Primary Study Area Caused by a Design Feature No design hazards or incompatible uses would be introduced. This impact would be less than significant.

No design hazards or incompatible uses would be introduced in the primary study area under the No-Action Alternative. No construction-related effects would occur. Planned growth under the No-Action Alternative has the potential to introduce design hazards or incompatible uses. It is reasonable to assume, however, that necessary actions would be taken in accordance with city and county policies and design standards. Therefore, this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Impact Trans-4 (No-Action): Adverse Effects on Emergency Access in the Primary Study Area Emergency access would remain unchanged. This impact would be less than significant.

Emergency access in the primary study area would remain unchanged under the No-Action Alternative. No construction-related effects would occur. Planned residential and recreation growth under the No-Action Alternative has the potential to affect emergency access during construction of roadway improvements to accommodate that growth. It is reasonable to assume, however, that necessary actions would be taken in accordance with city and county standards. Therefore, this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Impact Trans-5 (No-Action): Accelerated Degradation of Surface Transportation Facilities in the Primary Study Area No increase in road degradation would occur because no trucks would transport materials to and from the project site. This impact would be less than significant.

Because construction would not occur under the No-Action Alternative, trucks would not be required to transport construction materials to and from the primary study area. Therefore, road degradation would not increase as a result of construction. Planned growth under the No-Action Alternative has the potential to result in increased truck trips, with the secondary effect of road degradation. It is reasonable to assume, however, that necessary actions would be taken to accommodate planned growth over time. Therefore, this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Trans-6 (No-Action): Temporary Increase in Traffic in the Extended Study Area in Relation to the Existing Traffic Load and Capacity of the Street System Traffic levels would not increase above levels anticipated in local general plans and regional transportation plans. This impact would be less than significant.

This impact is similar to Impact Trans-1 (No-Action) for the primary study area. For the same reasons as described under Impact Trans-1 (No-Action), this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Impact Trans-7 (No-Action): Adverse Effects on Access to Local Streets or Adjacent Uses in the Extended Study Area Access to local streets and adjacent uses would remain generally unchanged because no construction would occur. This impact would be less than significant.

This impact is similar to Impact Trans-2 (No-Action) for the primary study area. For the same reasons as described under Impact Trans-2 (No-Action), this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Impact Trans-8 (No-Action): Hazards in the Extended Study Area Caused by a Design Feature No design hazards or incompatible uses would be introduced. This impact would be less than significant.

This impact is similar to Impact Trans-3 (No-Action) for the primary study area. For the same reasons as described under Impact Trans-3 (No-Action), this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Impact Trans-9 (No-Action): Adverse Effects on Emergency Access in the Extended Study Area Emergency access would remain unchanged. This impact would be less than significant.

This impact is similar to Impact Trans-4 (No-Action) for the primary study area. For the same reasons as described under Impact Trans-4 (No-Action), this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Impact Trans-10 (No-Action): Accelerated Degradation of Surface Transportation Facilities in the Extended Study Area No increase in road degradation would occur because no trucks would transport materials to and from the project site. This impact would be less than significant.

This impact is similar to Impact Trans-5 (No-Action) for the primary study area. For the same reasons as described under Impact Trans-5 (No-Action), this impact would be less than significant. Mitigation is not required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

CP1 consists of raising Shasta Dam by 6.5 feet, which would increase the surface water elevation and acreage of the inundation area. Under CP1, transportation facilities in the proposed inundation area would be relocated to sites outside that area. Transportation facilities include road infrastructure and vehicular bridges. Construction would involve installing bank fortification to preserve road segments and dike/abutment protection for bridge structures that do not require relocation. The construction period would be approximately 4.5 years. As shown in Table 20-2 and Figures 20-1c and 20-1f, the following transportation facilities would need to be relocated to accommodate construction under CP1:

- Four segments of Lakeshore Drive beginning in the Lakeshore area west of I-5, extending south to the Sugarloaf Area and along the Sugarloaf Creek Inlet. Shasta County owns and maintains the first segment extending from the Lakeshore area to the Sugarloaf area, the most populated areas around the lake. The Doney Creek and Charlie Creek bridges in this segment would also require relocation. USFS owns and maintains the segments that extend from the Sugarloaf area along Sugarloaf Creek Inlet. A total of 8,100 feet of Lakeshore Drive would require relocation. No segment of Lakeshore Drive would need to be closed during construction.

- Three road segments in the Turntable Bay area, northeast of the north end of the Pit River Bridge. These road segments are owned and maintained by USFS. The segments provide access to the Shasta Yacht Club. A total of 6,200 feet of roadway would require relocation. Given

the terrain along these segments, these roadways would need to be closed during construction.

- Silverthorn Road and segments of USFS roads in the Jones Valley area, on the south side of the Pit Arm of Shasta Lake. Owned and maintained by Shasta County, Silverthorn Road provides access to a residential area composed of permanent and seasonally occupied dwelling units. A total of 2,000 feet of roadway would be relocated. These roadways would need to be closed during construction.

- Up to 1,260 feet of Lower Salt Creek Road. Owned and maintained by Shasta County, Lower Salt Creek Road provides access to several residences and recreation areas in the Lower Salt Creek Shoreline area. This roadway would need to be closed during construction.

- Additional road segments in the primary study area totaling 230 linear feet. None of these road segments would need to be closed during construction.

- Two railroad bridges with realignment of the railroad tracks between the bridges. Both of the bridges would require modification.

- Relocation of McCloud River Bridge and Didallas Creek Bridge. Modification of Pit River Bridge and Fenders Ferry Bridge.

Potential impacts on access roads to and internal loop roads at campsites and other recreation facilities are evaluated in Chapter 18, "Recreation and Public Access." Potential impacts from changes in Sacramento River flows due to water operations, that may affect transportation infrastructure (e.g., bridges), are described in Chapter 4, "Geology, Geomorphology, Minerals, and Soils" and Chapter 6, "Hydrology, Hydraulics, and Water Management."

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Trans-1 (CP1): Short-Term and Long-Term Increases in Traffic in the Primary Study Area in Relation to the Existing Traffic Load and Capacity of the Street System Construction activities would temporarily increase traffic. This short-term, temporary impact would be potentially significant. In the long term, increased recreational opportunities and visitor days would result in additional traffic on area roadways; however, the long-term impact would be less than significant.

Existing traffic in the primary study area is generated by residents living and working in the area, living in the area and working elsewhere, and living elsewhere and working in the area; and by tourists who come to visit the dam, picnic, hike, camp, fish, and go boating. Because Shasta Lake is a tourist

destination, traffic is seasonally heavier from the middle of spring to the middle of fall (Reclamation 2004).

Project construction activities would require numerous truck trips to move materials to and from the project site, as well as trips in personal vehicles by construction crew members commuting to and from the site. Traffic would temporarily increase on roadways in the primary study area including I-5, Shasta Dam Boulevard, Lake Boulevard, Lakeshore Drive, and other roads during the CP1 construction period. Commute trips by construction workers would add vehicles to the road system during the a.m. and p.m. peak periods. Haul truck trips would increase traffic on designated haul routes during peak and off-peak hours.

Approximately 95 round-trip haul trips per day are anticipated for trucking materials to the dam site over a 4.5-year construction period. Approximately 75 round trips per day are anticipated for trucking materials cleared from the land over the same period. The total number of truck trips, 170 round trips per day, would not exceed the ITE threshold of 50 new truck trips in the a.m. and p.m. peak hours (i.e., 7–9 a.m. and 4–6 p.m.) because the truck trips would be distributed over an 8-hour workday; approximately 21 truck trips would occur during the peak-hour period. This impact would be less than significant.

Up to 300 round trips per day by workers are anticipated. Because various construction activities would occur concurrently, these truck trips would be distributed to multiple locations within the primary study area. However, the total number of worker trips may temporarily exceed the existing traffic loads and capacities on the roads where substantial numbers of workers are located at any one time. This impact would be potentially significant.

Traffic slowdowns may also result from temporary obstruction of roadway access because of lane closures or heavy equipment entering and exiting the road. Most construction would be phased to maintain access to existing roadways and bridges while constructing the relocated roadways and bridges; however, some construction would require lane closures. There would also likely be temporary traffic controls for transport of large material loads to and from the demolition, modification, and relocation sites. Lane closures and traffic slowdowns could occur on a number of roadways and bridges, and circulation patterns would change if detours were to be required during replacement of transportation facilities. Detours may add traffic that could exceed the capacity of the facility being relocated. This impact would be potentially significant.

In the long term, increased recreational opportunities and visitors would increase traffic on area roads by an estimated average of 158 one-way trips per day. These additional trips would be distributed throughout the primary study area to numerous recreational facilities: 6 public boat ramps, 9 commercial marinas, 15 family campgrounds, and various other public and private facilities.

These recreational facilities are distributed around Shasta Lake and can be accessed via numerous roadways. Because these trips would be distributed over a large number of roadways throughout a large area, the additional trips are not expected to exceed the existing traffic loads and capacities of the street system. Growth in the primary study area that is generated through implementation of city and county general plans would increase traffic in the area. The regional transportation planning documents identify roadway projects needed to accommodate expected traffic increases. Therefore, the long-term impact of traffic increases on area roads would be less than significant.

In summary, in the short term, construction activities under CP1 are expected to result in a potentially significant impact on traffic; but in the long term, the impact of traffic increases resulting from expected growth and additional recreational opportunities would be less than significant. Mitigation for this short-term impact is proposed in Section 20.3.5, "Mitigation Measures."

Impact Trans-2 (CP1): Adverse Effects on Access to Local Streets and Adjacent Uses in the Primary Study Area Relocation of transportation facilities would require either road closures and detours or partial road closures, or a combination of both. This temporary direct impact would be potentially significant. Indirect impacts on air quality, noise, and recreation resulting from extended travel lengths, increased traffic near sensitive land uses, and limiting or restricting access to recreational facilities are evaluated in the corresponding chapters of this EIS.

CP1 would raise the elevation and increase the surface acreage of Shasta Lake. Several existing roads and bridges at the lake would require relocation to avoid potential inundation as the elevation of the lake's full pool increases.

It is anticipated that most of the new roadway alignments or bridges would be constructed and connected to existing road facilities before demolition of the existing facilities in the proposed inundation area. In some cases, work in the road relocation areas may require a road closure with detours, lane closures, or a combination of both. Road closures would temporarily impede access to local connector roads and recreational land uses, affecting residents, local recreational and nonrecreational businesses, and visitors to Shasta Lake. This impact would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

Detours and alternate routes resulting from road and bridge relocations could cause longer trip lengths and increase traffic in areas of sensitive land uses. The following potential indirect impacts are evaluated in the corresponding chapters of this EIS:

- Effects on air quality caused by extended trip lengths – Chapter 5, "Air Quality and Climate"

- Effects on sensitive receptors resulting from increased traffic on connector roads caused by detours – Chapter 8, "Noise and Vibration"

- Effects on recreation caused by restrictions to facility access – Chapter 18, "Recreation and Public Access"

Impact Trans-3 (CP1): Hazards in the Primary Study Area Caused by a Design Feature Relocated road segments and vehicular and railroad bridges would be designed to current engineering design standards. This impact would be beneficial.

Road segments, vehicular bridges, and railroad bridges must be designed to current engineering and seismic standards. Current engineering standards ensure that hazards are minimized to the extent practicable. Modernizing bridges to current design standards is a beneficial aspect of CP1. Because relocated road segments and vehicular bridges would be designed to current engineering design standards, design features would not increase hazards but would actually decrease the potential for hazards. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Trans-4 (CP1): Adverse Effects on Emergency Access in the Primary Study Area during Construction Road closures may result in increased response times for emergency vehicles. This direct impact would be potentially significant. Indirect impacts on air quality resulting from extended driving lengths, increased emergency vehicle response times, and potential noise impacts on sensitive receptors are discussed in the respective chapters of this EIS.

As discussed under Impact Trans-2 (CP1), temporary road closures and lane closures would be needed for construction of the relocated road alignments and bridges. Several schools are located near roadways that would be affected by construction, and it is expected that school bus routes could be affected by temporary road closures. Although no emergency response centers are in the immediate area affected by construction, road and lane closures may restrict emergency vehicle access. This impact would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

The following potential indirect impacts are evaluated in the corresponding chapters of this EIS:

- Effects on air quality caused by extended trip lengths – Chapter 5, "Air Quality and Climate"

- Effects on sensitive receptors – Chapter 8, "Noise and Vibration"

- Effects of increased emergency vehicle response times – Chapter 22, "Public Services"

Impact Trans-5 (CP1): Accelerated Degradation of Surface Transportation Facilities in the Primary Study Area during Construction Trucks used to import fill material and export construction waste would accelerate degradation of surface transportation facilities used as haul routes. This impact would be potentially significant.

As noted in the discussion of Impact Trans-1 (CP1), CP1 would generate approximately 170 round trips per day for the length of the 4.5-year construction period. Degradation of road surfaces would result in a significant impact if truck trips associated with the project would substantially shorten the life of the facility so that the owner of the right-of-way (ROW) would need to repair or rehabilitate the road surface before it is scheduled for repair. The significance determination is based on several factors, including the existing condition of road surfaces and the road's normal repair or rehabilitation schedule. Given the total number of anticipated trips and expected weight of the payloads, the impact of CP1 on existing road surfaces in relation to the anticipated utility of the road surfaces would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

Lower Sacramento River and Delta and CVP/SWP Service Areas No effects on traffic or transportation are expected to occur in the lower Sacramento River and Delta or in the CVP/SWP service areas; therefore, potential effects in those geographic regions are not discussed further in this EIS.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

CP2 consists of raising Shasta Dam by 12.5 feet, which would result in a greater increase in the surface water elevation and acreage of inundation area than under CP1. A larger number of transportation facilities would be relocated under CP2 than under CP1. CP2 would have a 5-year construction period, compared to 4.5 years under CP1. As shown in Table 20-2 and Figures 20-1c, 20-1d, 20-1f, and 20-1g, the following transportation facilities would need to be relocated to accommodate construction under CP2:

- Two segments of Lakeshore Drive in addition to the 4 road segments that would be relocated under CP1, for a total of 6 segment relocations along Lakeshore Drive totaling 13,100 feet. As under CP1, no segment of Lakeshore Drive would need to be completely closed during construction.

- The same 3 road segments in the Turntable Bay area (with a total roadway length of 6,200 feet) that would require relocation under CP1. As under CP1, these roadways would need to be closed during construction.

- Three segments of Gillman Road that run along the west side of the McCloud Arm of Shasta Lake, totaling 1,200 feet. Owned and maintained by Shasta County, the road is used primarily by logging trucks. Gillman Road would need to be closed during construction.

- The same segments of Lower Salt Creek Road. Owned and maintained by Shasta County, Lower Salt Creek Road provides access to several residences and recreation areas in the Lower Salt Creek Shoreline area. As under CP1, this roadway would need to be closed during construction.

- The same segments of Silverthorn Road and other USFS roads in the Jones Valley area that would require relocation under CP1 (with a total roadway length of 2,000 feet). As under CP1, these roadways would need to be closed during construction.

- Four segments of Salt Creek Road that run along the west side of the Squaw Creek Arm of Shasta Lake, totaling 4,300 feet. Salt Creek Road is a dirt and gravel road owned and maintained by USFS. Its primary use is for USFS access. Didallas Creek Bridge crosses one of the segments and would also require relocation under CP2. Salt Creek Road would need to be closed during construction.

- An additional two road segments besides the two other road segments that would be relocated under CP1. The total length of the 4 roadway segments that would be relocated under CP2 is 2,300 feet. As under CP1, none of these road segments would need to be closed during construction.

- Two railroad bridges with realignment of the railroad tracks between the bridges. Both of the bridges would require modification.

- Relocation of McCloud River Bridge and Didallas Creek Bridge. Modification of Pit River Bridge and Fenders Ferry Bridge.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Trans-1 (CP2): Short-Term and Long-Term Increases in Traffic in the Primary Study Area in Relation to the Existing Traffic Load and Capacity of the Street System Construction activities would temporarily increase traffic. This short-term, temporary impact would be potentially significant. In the long term, increased recreational opportunities and visitor days would result in additional traffic on area roadways; however, the long-term impact would be less than significant.

This impact is similar to Impact Trans-1 (CP1), but the impact would be greater than under CP1, as described below.

Approximately 118 round-trip haul trips per day are anticipated for trucking materials to the dam site over a 5-year construction period. Approximately 56 round trips per day are anticipated for trucking materials cleared from the land over the same period. The total number of truck trips, 174 round trips per day, would not exceed the ITE threshold of 50 new truck trips because the trips would be distributed over an 8-hour workday; approximately 21 truck trips would occur in the a.m. and p.m. peak hours (i.e., 7–9 a.m. and 4–6 p.m.). This is the same number of daily truck trips as under CP1, but these trips would be borne on the transportation network for a longer duration than under CP1; therefore, the impact would be greater than under CP1. Because the ITE threshold would not be exceeded, this impact would be less than significant.

Up to 300 round trips per day by workers are anticipated over a 5-year period under CP2. Because various construction activities would occur concurrently, these truck trips would be distributed to multiple locations within the primary study area. However, the worker trips would occur over a longer construction period than under CP1; therefore, the impact would be greater than under CP1. This impact would be potentially significant.

As under CP1, traffic slowdowns also may result from temporary obstruction of roadway access because of lane closures or heavy equipment entering and exiting the road. Interference would occur over a longer period than under CP1; therefore, the impact would be greater than under CP1. This impact would be potentially significant.

In the long term, under CP2, traffic on roads within the primary study area would increase by an estimated average of 238 one-way trips per day, more than under CP1; however, for the same reasons as described in CP1, this impact would be less than significant.

In summary, in the short term, construction activities under CP2 are expected to result in a potentially significant impact on traffic that would be greater than under CP1; but in the long term, the impact of traffic increases resulting from expected growth and additional recreational opportunities would be less than significant. Mitigation for this short-term impact is proposed in Section 20.3.5, “Mitigation Measures.”

Impact Trans-2 (CP2): Adverse Effects on Access to Local Streets and Adjacent Uses in the Primary Study Area Relocation of transportation facilities would require either road closures and detours or partial road closures, or a combination of both. This temporary direct impact would be potentially significant. Indirect impacts on air quality, noise, and recreation resulting from extended travel lengths, increased traffic near sensitive land uses, and limiting or restricting access to recreational facilities are evaluated in the corresponding chapters of this EIS.

This impact would be similar to Impact Trans-2 (CP1); however, because CP2 would require that more roads be closed for a longer duration than under CP1, the impact would be greater than under CP1. This impact would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures." Potential indirect effects are evaluated in Chapter 5, "Air Quality and Climate"; Chapter 8, "Noise and Vibration"; and Chapter 18, "Recreation and Public Access."

Impact Trans-3 (CP2): Hazards in the Primary Study Area Caused by a Design Feature Relocated road segments and vehicular and railroad bridges would be designed to current engineering design standards. This impact would be beneficial.

This impact would be similar to Impact Trans-3 (CP1); however, CP2 would result in a greater beneficial effect than CP1 because more bridges would be replaced and constructed using current design standards under CP2 than under CP1. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Trans-4 (CP2): Adverse Effects on Emergency Access in the Primary Study Area during Construction Road closures may result in increased response times for emergency vehicles. This direct impact would be potentially significant. Indirect impacts on air quality resulting from extended driving lengths, increased emergency vehicle response times, and potential noise impacts on sensitive receptors are discussed in the respective chapters of this EIS.

This impact would be similar to Impact Trans-4 (CP1). However, the construction period for CP2 would be 5 years, 6 months longer than the construction period for CP1. Because road closures under CP2 would occur for a longer period than under CP1, the impact would be greater under CP2 than under CP1. This impact would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures." Potential indirect effects are evaluated in Chapter 5, "Air Quality and Climate"; Chapter 8, "Noise and Vibration"; and Chapter 22, "Public Services."

Impact Trans-5 (CP2): Accelerated Degradation of Surface Transportation Facilities in the Primary Study Area Trucks used to import fill material and export construction waste would accelerate degradation of surface transportation facilities used as haul routes. This impact would be potentially significant.

This impact would be similar to Impact Trans-5 (CP1). As noted in the discussion of Impact Trans-1 (CP2), CP2 would generate approximately 174 round trips per day for the length of the 5-year construction period. This is similar to the number of round trips per day anticipated under CP1; however, because the construction period for CP2 would be longer than the construction

period for CP1, the impact on road surfaces would be greater under CP2 than under CP1. This impact would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

Lower Sacramento River and Delta and CVP/SWP Service Areas
No effects on traffic or transportation are expected to occur in the lower Sacramento River and Delta or in the CVP/SWP service areas; therefore, potential effects in those geographic regions are not discussed further in this EIS.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

CP3 consists of raising Shasta Dam by 18.5 feet, which would result in a greater increase in the surface water elevation and acreage of inundation area than would occur under CP1 or CP2. A larger number of transportation facilities would be relocated under CP3 than under CP1 and CP2. CP3 would have a 5-year construction period, compared to 4.5 years under CP1. As shown in Table 20-2 and Figures 20-1c, 20-1d, 20-1f, and 20-1g, the following transportation facilities would need to be relocated to accommodate construction under CP3:

- Two road segments of Lakeshore Drive in addition to the 6 road segments that would be relocated under CP2, for a total of 8 segment relocations along Lakeshore Drive totaling 13,700 feet. Doney Creek Bridge and Charlie Creek Bridge would be relocated. As under CP1 and CP2, no segment of Lakeshore Drive would need to be completely closed during construction.

- The same 3 segments in the Turntable Bay area (with a total roadway length of 6,200 feet) that would require relocation under CP1 and CP2. As under CP1 and CP2, these roadways would need to be closed during construction.

- The same three segments of Gillman Road that would require relocation under CP2. As under CP2, Gillman Road would need to be closed during construction.

- The same segments of Lower Salt Creek Road. Owned and maintained by Shasta County, Lower Salt Creek Road provides access to several residences and recreation areas in the Lower Salt Creek Shoreline area. As under CP1, this roadway would need to be closed during construction.

- An additional three road segments of Silverthorn Road and/or other USFS roads in the Jones Valley area besides the segments that would require relocation under CP1 and CP2. The total length of roadway that would be relocated under CP3 is 3,600 feet. As under CP1 and CP2, these roadways would need to be closed during construction.

- An additional road segment of Salt Creek Road that runs along the west side of the Squaw Creek Arm of Shasta Lake, besides the four roadway segments that would be relocated under CP2. The total length of roadways that would be relocated under CP3 is 5,100 feet. As under CP2, Salt Creek Road would need to be closed during construction.

- Three additional road segments besides the four other road segments that would be relocated under CP1 and CP2. The total length of the 7 roadway segments that would be relocated under CP3 is 3,900 feet. As under CP1 and CP2, none of these road segments would need to be closed during construction.

- Two railroad bridges with realignment of the railroad tracks between the bridges. Both of the bridges would require modification.

- Relocation of McCloud River Bridge and Didallas Creek Bridge. Modification of Pit River Bridge and Fenders Ferry Bridge.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Trans-1 (CP3): Short-Term and Long-Term Increases in Traffic in the Primary Study Area in Relation to the Existing Traffic Load and Capacity of the Street System Construction activities would temporarily increase traffic. This short-term, temporary impact would be potentially significant. In the long term, increased recreational opportunities and visitor days would result in additional traffic on area roadways; however, the long-term impact would be less than significant.

This impact would be similar to Impacts Trans-1 (CP1) and Trans-1 (CP2), but the impact would be greater than under CP1 or CP2, as described below.

Approximately 168 round-trip haul trips per day are anticipated for trucking materials to the dam site over a 5-year construction period. Approximately 52 round trips per day are anticipated for trucking materials cleared from the land over the same period. The total number of truck trips, 220 round trips per day, would not exceed the ITE threshold of 50 new truck trips because the trips would be distributed over an 8-hour workday; approximately 28 trips would occur during the a.m. and p.m. peak hours (i.e., 7–9 a.m. and 4–6 p.m.). This is a greater number of daily truck trips than under CP1 and CP2, and these daily truck trips would occur for a longer duration than under CP1; therefore, the impact would be greater under CP3 than under CP1 or CP2. Because the number of truck trips during the peak hours would not exceed the ITE threshold, this impact would be less than significant.

Up to 350 round trips per day by workers are anticipated over a 5-year period. Because various construction activities would occur concurrently, these truck trips would be distributed to multiple locations within the primary study area.

However, the total number of worker trips may temporarily exceed the existing traffic loads and capacities on the roads where substantial numbers of workers are located at any one time. The number of worker trips would be greater than under CP1 and CP2 and would occur over a longer construction period than under CP1; therefore, the impact would be greater than under CP1 or CP2. This impact would be potentially significant.

As under CP1 and CP2, traffic slowdowns may also result from temporary obstruction of roadway access because of lane closures or heavy equipment entering and exiting the road. Interference would occur over a longer period than under CP1 or CP2; therefore, the impact would be greater than under CP1 or CP2. This impact would be potentially significant.

In the long term, under CP3, traffic on roads within the primary study area would increase by an estimated average of 364 one-way trips per day, more than under either CP1 or CP2; however, for the same reasons as described in CP1, this impact would be less than significant.

In summary, in the short term, construction activities under CP3 are expected to result in a potentially significant direct impact on traffic that would be greater than under CP1 or CP2; however, the impact of traffic increases resulting from expected growth and additional recreational opportunities would be less than significant. Mitigation for this short-term impact is proposed in Section 20.3.5, "Mitigation Measures."

Impact Trans-2 (CP3): Adverse Effects on Access to Local Streets and Adjacent Uses in the Primary Study Area Relocation of transportation facilities would require either road closures and detours or partial road closures, or a combination of both. This temporary direct impact would be potentially significant. Indirect impacts on air quality, noise, and recreation resulting from extended travel lengths, increased traffic near sensitive land uses, and limiting or restricting access to recreational facilities are evaluated in the corresponding chapters of this EIS.

This impact would be similar to Impacts Trans-2 (CP1) and Trans-2 (CP2); however, because CP3 would require more roads to be closed for a longer duration than under CP1 and CP2, the impact would be greater than under CP1 or CP2. This impact would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures." Potential indirect effects are evaluated in Chapter 5, "Air Quality and Climate"; Chapter 8, "Noise and Vibration"; and Chapter 18, "Recreation and Public Access."

Impact Trans-3 (CP3): Hazards in the Primary Study Area Caused by a Design Feature Relocated road segments and vehicular and railroad bridges would be designed to current engineering design standards. This impact would be beneficial.

This impact would be similar to Impacts Trans-3 (CP1) and Trans-3 (CP2); however, CP3 would result in a greater beneficial effect than CP1 or CP2 because more bridges would be replaced and constructed using current design standards under CP3 than under CP1 or CP2. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Trans-4 (CP3): Adverse Effects on Emergency Access in the Primary Study Area during Construction Road closures may result in increased response times for emergency vehicles. This direct impact would be potentially significant. Indirect impacts on air quality resulting from extended driving lengths, increased emergency vehicle response times, and potential noise impacts on sensitive receptors are discussed in the respective chapters of this EIS.

This impact would be the same as Impact Trans-4 (CP2). This impact would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures." Potential indirect effects are evaluated in Chapter 5, "Air Quality and Climate;" Chapter 8, "Noise and Vibration;" and Chapter 22, "Public Services."

Impact Trans-5 (CP3): Accelerated Degradation of Surface Transportation Facilities in the Primary Study Area Trucks used to import fill material and export construction waste would accelerate degradation of surface transportation facilities used as haul routes. This impact would be potentially significant.

This impact would be similar to Impacts Trans-5 (CP1) and Trans-5 (CP2). As noted in the discussion of Impact Trans-1 (CP3), CP3 would generate approximately 220 round trips per day for the length of the 5-year construction period. This is greater than the number of round trips per day anticipated under CP1 and CP2. In addition, the construction period for CP3 would be longer than the construction period for CP1. Therefore, the impact on road surfaces would be greater under CP3 than under CP1 or CP2. This impact would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

Lower Sacramento River and Delta and CVP/SWP Service Areas No effects on traffic or transportation are expected to occur in the lower Sacramento and Delta area or in the CVP/SWP service areas; therefore, potential effects in those geographic regions are not discussed further in this EIS.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus

CP4 and CP4A consist of raising Shasta Dam by 18.5 feet. The same transportation facilities would be relocated under this alternative as under CP3. CP4 or CP4A would also have an approximately 5-year construction period like CP3, compared to 4.5 years under CP1.

In addition to constructing the dam raise and relocating transportation facilities described for CP3, CP4 and CP4A involve augmenting locations along the Sacramento River with gravel for spawning habitat. As noted previously, gravel augmentation would be conducted at up to 3 of the identified sites annually for a 10-year period, commencing with construction of CP4 or CP4A. The following analysis evaluates, as the maximum-intensity option, gravel augmentation at the three sites located the farthest from Redding where gravel is known to be available from commercial sources. All other combinations of gravel augmentation sites would have lesser impacts than the combination of sites evaluated herein.

In addition to the dam construction, relocation of transportation facilities, and gravel augmentation, CP4 and CP4A include the restoration of riparian, floodplain, and side channel habitat at up to six restoration sites on the upper Sacramento River. These proposed restoration sites are described in Chapter 2, "Alternatives." The sites under consideration for habitat restoration are shown in Figure 2-3.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Trans-1 (CP4 and CP4A): Short-Term and Long-Term Increases in Traffic in the Primary Study Area in Relation to the Existing Traffic Load and Capacity of the Street System Construction activities for CP4 or CP4A would temporarily increase traffic for CP4 or CP4A. This short-term, temporary impact would be potentially significant. In the long term, increased recreational opportunities and visitor days would result in additional traffic on area roadways; however, the long-term impact would be less than significant for CP4 or CP4A.

This impact for CP4 or CP4A would be similar to but greater than Impacts Trans-1 (CP1), Trans-1 (CP2), and Trans-1 (CP3) because additional haul trips would be required for construction, gravel augmentation, and habitat restoration. Approximately 175 round-trip haul trips per day are anticipated for trucking materials to the dam site over a 5-year construction period. Approximately 53 round trips per day are anticipated for trucking materials cleared from the land over the same period. The total number of truck trips, 228 round trips per day, would not exceed the ITE threshold of 50 new truck trips because the trips would be distributed over an 8-hour workday. Approximately 29 trips would occur during the a.m. and p.m. peak hours (i.e., 7–9 a.m. and 4–6 p.m.). This is a greater number of daily truck trips than under CP1, CP2, and CP3 and these daily truck trips would occur for a longer duration than under CP1; therefore, the impact would be greater than under CP1, CP2, and CP3 for CP4 or CP4A. Because the number of truck trips during the peak hours would not exceed the ITE threshold, this impact would be less than significant for CP4 or CP4A.

Using the Redding Riffle site as the maximum-intensity option in terms of haul truck trips affecting traffic for gravel augmentation, approximately 800 round trips would be made during the September and August construction term under CP4 or CP4A. This is based on placing 19,000 tons of gravel at the site and the capacity of the haul trucks being 25 tons per load. With a total of 44 8-hour workdays (2 months excluding weekends), the number of daily haul trips would be 18 haul trips per day. This would not exceed the ITE threshold of 50 new truck trips in the peak-hour period even if all of the truck trips occurred during the peak-hour period. Distributed over an 8-hour workday, two truck trips would occur during the a.m. peak-hour period and two truck trips would occur during the p.m. peak-hour period.

In addition to the haul trips for gravel augmentation, there would be haul trips for removing approximately 15,650 cubic yards of fill material from up to 6 restoration sites. Haul trucks can carry 14 cubic yards. Therefore, a total of approximately 1,118 haul trips would be required to remove the fill material. With a total of 44 8-hour workdays (2 months excluding weekends), the number of daily haul trips would be 25 haul trips per day. This would add approximately three truck trips in both the a.m. and p.m. peak-hour periods.

Combining the 3 truck trips during the peak-hour period resulting from removing the fill material from 1 or more of the restoration sites with gravel augmentation and the 18.5-foot Shasta Dam raise and related activities, approximately 37 peak-hour trips would occur. This is below the ITE threshold of 50 new truck trips during the a.m. and p.m. peak hours.

In the long term, under CP4 or CP4A, traffic on area roads would increase by an estimated average of 658 one-way trips per day. This is greater than under CP1, CP2, and CP3; however, for the same reasons as described in CP1, this impact would be less than significant for CP4 or CP4A.

In the short term, construction activities under CP4 or CP4A are expected to result in a potentially significant impact on traffic; but in the long term, for the same reasons as described in CP1, the impact of traffic increases resulting from expected growth and additional recreational opportunities would be less than significant.

Therefore, Impact Trans-1 would be less than significant for CP4. Mitigation for this short-term impact is proposed in Section 20.3.5, “Mitigation Measures.”

Therefore, Impact Trans-1 would be less than significant for CP4A. Mitigation for this short-term impact is proposed in Section 20.3.5, “Mitigation Measures.”

Impact Trans-2 (CP4 and CP4A): Adverse Effects on Access to Local Streets and Adjacent Uses in the Primary Study Area Relocation of transportation facilities for CP4 or CP4A would require either road closures and detours or partial road closures, or a combination of both. This temporary direct impact

would be potentially significant. Indirect impacts on air quality, noise, and recreation resulting from extended travel lengths, increased traffic near sensitive land uses, and limiting or restricting access to recreational facilities are evaluated in the corresponding chapters of this EIS.

The impact for CP4 or CP4A would be the same as Impacts Trans-2 (CP2) and Trans-2 (CP3) and similar to but greater than Impact Trans-2 (CP1) because the duration of project construction under CP4 or CP4A would be longer than under CP1. Potential indirect effects are evaluated in Chapter 5, "Air Quality and Climate"; Chapter 8, "Noise and Vibration"; and Chapter 18, "Recreation and Public Access."

This impact for CP4 would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

This impact for CP4A would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

Impact Trans-3 (CP4 and CP4A): Hazards in the Primary Study Area Caused by a Design Feature Relocated road segments and vehicular and railroad bridges would be designed to current engineering design standards for CP4 or CP4A. This impact would be beneficial for CP4 or CP4A.

The impact for CP4 or CP4A would be the same as Impact Trans-3 (CP3) and similar to Impacts Trans-3 (CP1) and Trans-3 (CP2); however, like CP3, CP4 or CP4A would result in a greater beneficial effect than CP1 and CP2 because more bridges would be replaced and constructed using current design standards under CP4 or CP4A than under CP1 or CP2.

This impact for CP4 would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

This impact for CP4A would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Trans-4 (CP4 or CP4A): Adverse Effects on Emergency Access in the Primary Study Area during Construction Road closures may result in increased response times for emergency vehicles. This direct impact would be potentially significant. Indirect impacts on air quality resulting from extended driving lengths, increased emergency vehicle response times, and potential noise impacts on sensitive receptors are discussed in the respective chapters of this EIS.

The impact for CP4 or CP4A would be the same as Impacts Trans-4 (CP2) and Trans-4 (CP3) and similar to Impact Trans-4 (CP1). For the same reasons as described under Impacts Trans-4 (CP2) and Trans-4 (CP3), the impact would be greater under CP4 or CP4A than under CP1. The potential indirect effects of

this impact are evaluated in Chapter 5, "Air Quality and Climate"; Chapter 8, "Noise and Vibration"; and Chapter 22, "Public Services."

This impact for CP4 would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

This impact for CP4A would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

Impact Trans-5 (CP4 and CP4A): Accelerated Degradation of Surface Transportation Facilities in the Primary Study Area Trucks used to import fill material and export construction waste would accelerate the degradation of surface transportation facilities used as haul routes. This impact would be potentially significant for CP4 or CP4A.

The impact for CP4 or CP4A would be similar to Impacts Trans-5 (CP1), Trans-5 (CP2), and Trans-5 (CP3), but would be greater because gravel augmentation would affect more roadways for a longer duration.

For the same reasons as described under Impact Trans-5 (CP3), the impact for CP4 would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

For the same reasons as described under Impact Trans-5 (CP3), the impact for CP4A would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

Lower Sacramento River and Delta and CVP/SWP Service Areas No effects on traffic or transportation are expected to occur in the lower Sacramento River and Delta or in the CVP/SWP service areas; therefore, potential effects in those geographic regions are not discussed further in this EIS.

CP5 – 18.5-Foot Dam Raise, Combination Plan

CP5 consists of raising Shasta Dam by 18.5 feet. The same transportation facilities would be relocated under this alternative as under CP3, CP4, CP4A, and CP5 would have an approximately 5-year construction period like CP2, CP3, CP4 and CP4A, compared to 4.5 years under CP1.

Like CP4 or CP4A, CP5 involves augmenting locations along the Sacramento River with gravel. The assumptions stated for CP4 and CP4A, gravel augmentation are the same for CP5.

Also like CP4 and CP4A, CP5 would include the restoration of riparian, floodplain, and side channel habitat at up to six restoration sites on the upper Sacramento River These proposed restoration sites are described in Chapter 2, "Alternatives." The sites under consideration for habitat restoration are shown in Figure 2-3.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact Trans-1 (CP5): Short-Term and Long-Term Increases in Traffic in the Primary Study Area in Relation to the Existing Traffic Load and Capacity of the Street System Construction activities would temporarily increase traffic. This short-term, temporary impact would be potentially significant. In the long term, increased recreational opportunities and visitor days would result in an additional 311 one-way trips on area roadways, similar to CP3; however, for the same reasons as described in CP1, the long-term impact would be less than significant.

This impact would be similar to but greater than Impacts Trans-1 (CP1), Trans-1 (CP2), Trans-1 (CP3), and Trans-1 (CP4 and CP4A) because very limited additional construction-related trips associated with enhancements to shoreline and tributary aquatic habitat and recreational trails would be needed and 10 more workers per year than under CP4 or CP4A. For the same reasons as described under Impact Trans-1 (CP3) and Trans-1 (CP4 and CP4A), the impact would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

Impact Trans-2 (CP5): Adverse Effects on Access to Local Streets and Adjacent Uses in the Primary Study Area Relocation of transportation facilities would require either road closures and detours or partial road closures, or a combination of both. This temporary direct impact would be potentially significant. Indirect impacts on air quality, noise, and recreation resulting from extended travel lengths, increased traffic near sensitive land uses, and limiting or restricting access to recreational facilities are evaluated in the corresponding chapters of this EIS.

This impact would be the same as Impacts Trans-2 (CP2), Trans-2 (CP3), and Trans-2 (CP4 and CP4A), but greater than Impact Trans-2 (CP1) because the duration of project construction would be longer. This impact would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures." Potential indirect effects are evaluated in Chapter 5, "Air Quality and Climate"; Chapter 8, "Noise and Vibration"; and Chapter 18, "Recreation and Public Access."

Impact Trans-3 (CP5): Hazards in the Primary Study Area Caused by a Design Feature Relocated road segments and vehicular and railroad bridges would be designed to current engineering design standards. This impact would be beneficial.

This impact would be the same as Impacts Trans-3 (CP3) and Trans-3 (CP4 and CP4A) and similar to Impacts Trans-3 (CP1) and Trans-3 (CP2); however, like CP3 and CP4, CP5 would result in a greater beneficial effect than CP1 and CP2 because more bridges would be replaced and constructed using current design

standards under CP5 than under CP1 or CP2. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Trans-4 (CP5): Adverse Effects on Emergency Access in the Primary Study Area during Construction Road closures may result in increased response times for emergency vehicles. This direct impact would be potentially significant. Indirect impacts on air quality resulting from extended driving lengths, increased emergency vehicle response times, and potential noise impacts on sensitive receptors are discussed in the respective chapters of this EIS.

This impact would be the same as Impacts Trans-4 (CP2), Trans-4 (CP3), and Trans-4 (CP4 and CP4A) and similar to Impact Trans-4 (CP1). For the same reasons as described under Impact Trans-4 (CP2), the impact would be greater under CP5 than under CP1 and would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

Impact Trans-5 (CP5): Accelerated Degradation of Surface Transportation Facilities in the Primary Study Area Trucks used to import fill material and export construction waste would accelerate degradation of surface transportation facilities used as haul routes. This impact would be potentially significant.

This impact would be similar to Impact Trans-5 (CP4 and CP4A) and greater than Impacts Trans-5 (CP1), Trans-5 (CP2), and Trans-5 (CP3) because gravel augmentation would affect more roadways for a longer duration. For the same reasons as described under Impact Trans-5 (CP4 and CP4A), this impact would be potentially significant. Mitigation for this impact is proposed in Section 20.3.5, "Mitigation Measures."

Lower Sacramento River and Delta and CVP/SWP Service Areas No effects on traffic or transportation are expected to occur in the lower Sacramento River and Delta or the CVP/SWP service areas; therefore, potential effects in those geographic regions are not discussed further in this EIS.

20.3.5 Mitigation Measures

Table 20-3 presents a summary of mitigation measures for potentially significant and significant effects on transportation and traffic.

No-Action Alternative

No mitigation measures are required for this alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impact Trans-3 (CP1). Mitigation is provided below for Impact Trans-1 (CP1), Impact Trans-2 (CP1), Impact Trans-4 (CP1), and Impact Trans-5 (CP1) on traffic and transportation. Impacts Trans-6 through Trans-10 are not applicable to CP1.

Table 20-3. Summary of Mitigation Measures for Transportation and Traffic

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/CP4A	CP5
Impact Trans-1: Short-Term and Long-Term Increases in Traffic in the Primary Study Area in Relation to the Existing Traffic Load and Capacity of the Street System	LOS before Mitigation	LTS	PS (short term), LTS (long term)	PS (short term), LTS (long term)	PS (short term), LTS (long term)	PS (short term), LTS (long term)	PS (short term), LTS (long term)
	Mitigation Measure	None required.	Mitigation Measure Trans-1: Prepare and Implement a Traffic Control and Safety Assurance Plan				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Trans-2: Adverse Effects on Access to Local Streets or Adjacent Uses in the Primary Study Area	LOS before Mitigation	LTS	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Trans-2: To Reduce Effects on Local Access, Implement Mitigation Measure Trans-1: Prepare and Implement a Traffic Control and Safety Assurance Plan				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Trans-3: Hazards in the Primary Study Area Caused by a Design Feature	LOS before Mitigation	LTS	B	B	B	B	B
	Mitigation Measure	None required.	None needed; thus, none proposed				
	LOS after Mitigation	LTS	B	B	B	B	B
Impact Trans-4: Adverse Effects on Emergency Access in the Primary Study Area	LOS before Mitigation	LTS	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Trans-4: To Reduce Effects on Emergency Access, Implement Mitigation Measure Trans-1: Prepare and Implement a Traffic Control and Safety Assurance Plan				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS

Table 20-3. Summary of Mitigation Measures for Transportation and Traffic (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/CP4A	CP5
Impact Trans-5: Accelerated Degradation of Surface Transportation Facilities in the Primary Study Area	LOS before Mitigation	LTS	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Trans-5: Identify and Repair Roadway Segments Damaged by the Project.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Trans-6 (No-Action only): Temporary Increase in Traffic in the Extended Study Area in Relation to the Existing Traffic Load and Capacity of the Street System	LOS before Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
Impact Trans-7 (No-Action only): Adverse Effects on Access to Local Streets or Adjacent Uses in the Extended Study Area	LOS before Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
Impact Trans-8 (No-Action only): Hazards in the Extended Study Area Caused by a Design Feature	LOS before Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
Impact Trans-9 (No-Action only): Adverse Effects on Emergency Access in the Extended Study Area	LOS before Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	N/A	N/A	N/A	N/A	N/A

Table 20-3. Summary of Mitigation Measures for Transportation and Traffic (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/CP4A	CP5
Impact Trans-10 (No-Action only): Accelerated Degradation of Surface Transportation Facilities in the Extended Study Area	LOS before Mitigation	LTS	N/A	N/A	N/A	N/A	N/A
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	N/A	N/A	N/A	N/A	N/A

Key:
B = beneficial
CP = Comprehensive Plan
LOS = level of significance
LTS = less than significant
N/A = not applicable
PS = potentially significant

Mitigation Measure Trans-1 (CP1): Prepare and Implement a Traffic Control and Safety Assurance Plan Before construction starts, Reclamation and its primary contractors for engineering and construction will develop a coordinated construction traffic control plan to minimize the simultaneous use of roadways by different construction contractors for worker commute trips, material hauling, and equipment delivery to the extent feasible. The plan will outline phasing of activities and the use of multiple routes to and from off-site locations to minimize the daily amount of traffic on individual roadways. Reclamation will require that the construction contractors implement and enforce the plans throughout the construction periods. In addition, the plan will include the following elements:

- To the extent feasible, require construction contractors to limit truck trips to less than 50 trips per hour on any affected roadway during the morning and afternoon or evening peak-hour periods.

- To the extent feasible, limit the construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone.

- Provide flagger control at construction zones to manage traffic control and flows as necessary.

- Install temporary steel-plate trench crossings, as needed, to maintain reasonable traffic, bicycle, and pedestrian access to homes, businesses, and streets.

- Maintain access for emergency vehicles at all times. Provide advance notification to local law enforcement, fire, and emergency service providers of the timing, location, and duration of construction activities that could affect the movement of emergency vehicles on local roadways.

- Post advance warning of construction activities (for any affected roadways that would be closed or major roadways where lane closures would occur) in the local newspaper(s) and/or coordinate with the local jurisdictions to post such warnings in highly visible locations near the affected roadways.

- Post advance warnings about the potential presence of slow-moving vehicles in construction zones, where needed to reduce potential traffic hazards.

- Place and maintain barriers and install traffic control devices necessary for safety, as specified in Caltrans's *Manual of Traffic Controls for Construction and Maintenance Work Zones* and in accordance with the guidance provided by the affected local jurisdictions.

- Limit the accumulation of project-generated mud or dirt on roadways adjacent to construction areas. The construction contractor will sweep the affected paved roadways (water sweeper with reclaimed water recommended) at the end of each day if substantial volumes of soil material have been carried onto adjacent paved, public roads from construction sites.

- Train construction personnel in appropriate safety measures as described in the plan.

Reclamation will also inform the community at a public hearing about the potential traffic delays and the preparation of the traffic control plan.

Implementation of this mitigation measure would reduce Impact Trans-1 (CP1) to a less-than-significant level.

Mitigation Measure Trans-2 (CP1): To Reduce Effects on Local Access, Implement Mitigation Measure Trans-1 (CP1) Reclamation will implement Mitigation Measure Trans-1 (CP1) as described above to reduce adverse effects of road closures and detours or partial road closures on access to local streets and adjacent uses.

Implementation of this mitigation measure would reduce Impact Trans-2 (CP1) to a less-than-significant level.

Mitigation Measure Trans-4 (CP1): To Reduce Effects on Emergency Access, Implement Mitigation Measure Trans-1 (CP1) Reclamation will implement Mitigation Measure Trans-1 (CP1) as described above to reduce adverse effects of road closures on access by emergency vehicles.

Implementation of this mitigation measure would reduce Impact Trans-4 (CP1) to a less-than-significant level.

Mitigation Measure Trans-5 (CP1): Identify and Repair Roadway Segments Damaged by the Project The performance standard is to return roadway segments damaged by the project to pre-project conditions. The following measures will be implemented to require that Reclamation provide for the repair of roadways that are degraded as a result of hauling:

- The contractor(s) responsible to Reclamation for delivery of borrow material shall identify all proposed haul routes on a map. The map will identify the owner of the ROWs that are proposed for use as haul routes. The contractor(s) will also prepare a pre-project condition report of the roadway segments to document the roadway conditions before construction.

- The contractor(s) shall notify the owner of the ROW in writing and request conditional approval to use the ROW as a haul route. The

contractor(s) shall submit a copy of the written request to Reclamation for Reclamation's file.

- The contractor(s) shall implement the conditions of approval for use of the haul route ROW. Conditions may include constructing repairs to damaged lengths of roadway. Before commencement of hauling activities, the contractor(s) shall submit a copy of the ROW owner's conditional approval to Reclamation for Reclamation's file.

- Within 90 days after hauling activities are completed (that is the haul route is no longer in use for the project term), the contractor(s) shall submit a project close-out report to Reclamation to document compliance with the conditions of approval. Reclamation will keep the project close-out report on file.

Implementation of this mitigation measure would reduce Impact Trans-5 (CP1) to a less-than-significant level.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impact Trans-3 (CP2). Mitigation is provided below for Impact Trans-1 (CP2), Impact Trans-2 (CP2), Impact Trans-4 (CP2), and Impact Trans-5 (CP2) on traffic and transportation. Impacts Trans-6 through Trans-10 are not applicable to CP2.

Mitigation Measure Trans-1 (CP2): Prepare and Implement a Traffic Control and Safety Assurance Plan This mitigation measure is identical to Mitigation Measure Trans-1 (CP1). Implementation of this mitigation measure would reduce Impact Trans-1 (CP2) to a less-than-significant level.

Mitigation Measure Trans-2 (CP2): To Reduce Effects on Local Access, Implement Mitigation Measure Trans-1 (CP1) This mitigation measure is identical to Mitigation Measure Trans-2 (CP1). Implementation of this mitigation measure would reduce Impact Trans-2 (CP2) to a less-than-significant level.

Mitigation Measure Trans-4 (CP2): To Reduce Effects on Emergency Access, Implement Mitigation Measure Trans-1 (CP1) This mitigation measure is identical to Mitigation Measure Trans-4 (CP1). Implementation of this mitigation measure would reduce Impact Trans-4 (CP2) to a less-than-significant level.

Mitigation Measure Trans-5 (CP2): Identify and Repair Roadway Segments Damaged by the Project This mitigation measure is identical to Mitigation Measure Trans-5 (CP1). Implementation of this mitigation measure would reduce Impact Trans-5 (CP2) to a less-than-significant level.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

No mitigation is required for Impact Trans-3 (CP3). Mitigation is provided below for Impact Trans-1 (CP3), Impact Trans-2 (CP3), Impact Trans-4 (CP3), and Impact Trans-5 (CP3) on traffic and transportation. Impacts Trans-6 through Trans-10 are not applicable to CP3.

Mitigation Measure Trans-1 (CP3): Prepare and Implement a Traffic Control and Safety Assurance Plan This mitigation measure is identical to Mitigation Measure Trans-1 (CP1). Implementation of this mitigation measure would reduce Impact Trans-1 (CP3) to a less-than-significant level.

Mitigation Measure Trans-2 (CP3): To Reduce Effects on Local Access, Implement Mitigation Measure Trans-1 (CP1) This mitigation measure is identical to Mitigation Measure Trans-2 (CP1). Implementation of this mitigation measure would reduce Impact Trans-2 (CP3) to a less-than-significant level.

Mitigation Measure Trans-4 (CP3): To Reduce Effects on Emergency Access, Implement Mitigation Measure Trans-1 (CP1) This mitigation measure is identical to Mitigation Measure Trans-4 (CP1). Implementation of this mitigation measure would reduce Impact Trans-4 (CP3) to a less-than-significant level.

Mitigation Measure Trans-5 (CP3): Identify and Repair Roadway Segments Damaged by the Project This mitigation measure is identical to Mitigation Measure Trans-5 (CP1). Implementation of this mitigation measure would reduce Impact Trans-5 (CP3) to a less-than-significant level.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus

No mitigation is required for Impact Trans-3 (CP4 and CP4A). Mitigation is provided below for Impact Trans-1 (CP4 and CP4A), Impact Trans-2 (CP4 and CP4A), Impact Trans-4 (CP4 and CP4A), and Impact Trans-5 (CP4 and CP4A) on traffic and transportation. Impacts Trans-6 through Trans-10 are not applicable to CP4 or CP4A.

Mitigation Measure Trans-1 (CP4 and CP4A): Prepare and Implement a Traffic Control and Safety Assurance Plan This mitigation measure is identical to Mitigation Measure Trans-1 (CP1). Implementation of this mitigation measure would reduce Impact Trans-1 (CP4 and CP4A) to a less-than-significant level.

Mitigation Measure Trans-2 (CP4 and CP4A): To Reduce Effects on Local Access, Implement Mitigation Measure Trans-1 (CP1) This mitigation measure is identical to Mitigation Measure Trans-2 (CP1). Implementation of this mitigation measure would reduce Impact Trans-2 (CP4 and CP4A) to a less-than-significant level.

Mitigation Measure Trans-4 (CP4 and CP4A): To Reduce Effects on Emergency Access, Implement Mitigation Measure Trans-1 (CP1) This mitigation measure is identical to Mitigation Measure Trans-4 (CP1). Implementation of this mitigation measure would reduce Impact Trans-4 (CP4 and CP4A) to a less-than-significant level.

Mitigation Measure Trans-5 (CP4 and CP4A): Identify and Repair Roadway Segments Damaged by the Project This mitigation measure is identical to Mitigation Measure Trans-5 (CP1). Implementation of this mitigation measure would reduce Impact Trans-5 (CP4 and CP4A) to a less-than-significant level.

CP5 – 18.5-Foot Dam Raise, Combination Plan

No mitigation is required for Impact Trans-3 (CP5). Mitigation is provided below for Impact Trans-1 (CP5), Impact Trans-2 (CP5), Impact Trans-4 (CP5), and Impact Trans-5 (CP5) on traffic and transportation. Impacts Trans-6 through Trans-10 are not applicable to CP5.

Mitigation Measure Trans-1 (CP5): Prepare and Implement a Traffic Control and Safety Assurance Plan This mitigation measure is identical to Mitigation Measure Trans-1 (CP1). Implementation of this mitigation measure would reduce Impact Trans-1 (CP5) to a less-than-significant level.

Mitigation Measure Trans-2 (CP5): To Reduce Effects on Local Access, Implement Mitigation Measure Trans-1 (CP1) This mitigation measure is identical to Mitigation Measure Trans-2 (CP1). Implementation of this mitigation measure would reduce Impact Trans-2 (CP5) to a less-than-significant level.

Mitigation Measure Trans-4 (CP5): To Reduce Effects on Emergency Access, Implement Mitigation Measure Trans-1 (CP1) This mitigation measure is identical to Mitigation Measure Trans-4 (CP1). Implementation of this mitigation measure would reduce Impact Trans-4 (CP5) to a less-than-significant level.

Mitigation Measure Trans-5 (CP5): Identify and Repair Roadway Segments Damaged by the Project This mitigation measure is identical to Mitigation Measure Trans-5 (CP1). Implementation of this mitigation measure would reduce Impact Trans-5 (CP5) to a less-than-significant level.

20.3.6 Cumulative Effects

Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," discusses overall cumulative impacts methodology related to the action alternatives, including the relationship to the CALFED Bay-Delta Program Programmatic EIS/EIR cumulative impacts analysis, qualitative and quantitative assessment, past and future actions in the study area, and significance criteria. Table 3-1, "Present and Reasonably

Foreseeable Future Actions Included in the Analysis of Cumulative Impacts, by Resource Area," in Chapter 3, lists the present and reasonably foreseeable future projects considered quantitatively and qualitatively within the cumulative impacts analysis. This cumulative impacts analysis accounts for potential project impacts combined with the impacts of existing facilities, conditions, land uses, and reasonably foreseeable actions expected to occur in the study area on a qualitative and quantitative level. None of the projects listed in Table 3-1 under Quantitative Analysis would have effects on transportation in the primary study area or have effects in extended study area that contribute to cumulative impacts of the action alternatives since no impacts have been identified in the extended study area. This analysis is based on the projects listed in Table 3-1 under Qualitative Analysis.

The majority of the past, present, and reasonably foreseeable projects are related to the SLWRI through operations of Shasta Dam. The projects in the extended study area are not evaluated further because construction of the SLWRI would not affect transportation facilities in the extended study area. Projects that could influence the local transportation network affected by the SLWRI include implementation of the *Shasta-Trinity National Forest Land and Resource Management Plan, Iron Mountain Mine Restoration Plan, and Mendocino National Forest Land and Resource Management Plan*; and construction of the Antlers Bridge Replacement. The geographic scope of the management plans is vast while the geographic scope of the Antlers Bridge Replacement is relatively limited. Individually and combined, none of these projects would result in significant haul trips that would occur during the peak-hour period. The ITE threshold of 50 trips during the peak-hour period on any particular route is not expected because the actions would be distributed throughout a substantially large study area compared to the area affected by the SLWRI. Another reason that the ITE threshold would not be exceeded is that the forest and mine management and restoration actions would take place over a long period and the Antlers Bridge Replacement would be completed in 2014. Consequently, no significant cumulative adverse effect on transportation or traffic presently exists or would exist under the No-Action Alternative in the primary study area.

Potential impacts of the project alternatives (CP1–CP5) are related to construction activities and increased vehicle trips resulting from increased recreational opportunities at Shasta Lake and its tributaries. Construction impacts would be temporary and short term, and recreational vehicle trips would be permanent and long term.

For the following reasons, implementation of any of the project alternatives (CP1–CP5), when combined with construction traffic for present and reasonably foreseeable actions, would not result in a cumulatively considerable incremental contribution to a significant cumulative adverse effect on localized traffic and circulation. Under CP5, the maximum-intensity alternative, approximately 12 truck trips would be added to the a.m. and p.m. peak hours. These truck trips would not occur simultaneously on the haul routes. They would be distributed

throughout the shoreline region of the lake, gravel augmentation sites (the sites that would change annually), and up to six restoration sites on the Sacramento River. The truck trips for the gravel augmentation and restoration activities would occur during a 2-month period, while the eight peak-hour trips upstream from Shasta Dam would occur over a much longer portion of the construction year. To result in a significant cumulative adverse effect on traffic and circulation, the present reasonably foreseeable future projects would need to generate 38 trips during the a.m. or p.m. peak hour. Because of the large geographic scope and length of time for implementing the present and reasonably foreseeable future projects, it is reasonable that they would not generate peak-hour truck trips that would be 68 percent more than the peak-hour truck trips that would be generated by CP5. Furthermore, the cumulative peak-hour truck trips would not be concentrated at any one road segment or intersection.

For the reasons set forth for adverse effects of construction traffic on localized traffic and circulation problems, construction traffic under any of the project alternatives (CP1–CP5) would not result in a cumulatively considerable incremental contribution to a significant cumulative adverse effect on emergency access.

For potential accelerated degradation of roadways from construction traffic, none of the construction alternatives (CP1–CP5) would result in cumulatively adverse effects. The reason is that the mitigation measure for these alternatives requires physical repair of damaged roadways to pre-project conditions, thereby eliminating the adverse effects of the alternatives. Implementation of Mitigation Measure Trans-5 (CP1) would ensure that the roadways would be equal to or in better condition than under preproject conditions. In addition, roads and bridges that would be relocated under any of the project alternatives would be modernized using current design standards and would likely be replaced before they were scheduled for replacement by the local transportation agencies.

In conclusion, with implementation of any of the project alternatives (CP1–CP5), no significant cumulative adverse effects would occur on traffic and circulation, emergency access, or transportation facilities.

Chapter 21
Utilities and Service Systems

21.1 Affected Environment

This chapter describes the affected environment related to utilities and service systems for the dam and reservoir modifications proposed under SLWRI action alternatives.

Because of the potential influence of the proposed modification of Shasta Dam, and subsequent water deliveries over a large geographic area, the SLWRI includes both a primary and an extended study area. The primary area has been further divided into Shasta Lake and vicinity and upper Sacramento River (Shasta Dam to Red Bluff). The extended study area has been further divided into the lower Sacramento River and Delta and the CVP/SWP service areas.

The utilities and service systems addressed are water supply in the Shasta Lake and vicinity portion of the primary study area, wastewater infrastructure, stormwater drainage and infrastructure, solid waste management, electrical service and infrastructure, natural gas service and infrastructure, and telecommunications infrastructure. Hydropower generation, public services (e.g., fire protection law enforcement, emergency services), roadways and bridges, and recreation are addressed in separate chapters.

The utilities and service systems setting for the Shasta Lake and vicinity portion of the primary study area consists of the portion of Shasta County above Shasta Dam and includes the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA). Utilities and service systems are influenced by rugged, mountainous terrain; lakeside communities; and Shasta Lake. The utilities and service systems setting for the upper Sacramento River portion of the primary study area consists of Shasta County below Shasta Dam and Tehama County. Two incorporated cities, Redding and Red Bluff, necessitate urban utilities and service systems needs in the otherwise rural upper Sacramento Valley, which is characterized by rolling hills with mountains to the north, east, and west.

The utilities and service systems setting for the extended study area consists of 21 counties downstream from the Red Bluff Pumping Plant and encompasses all areas served by the CVP and the SWP. A discussion of project impacts on CVP/SWP water supply and overall CVP and SWP management and operations is provided in the EIS, Chapter 6, “Hydrology, Hydraulics, and Water Management,” and in the *Hydrology, Hydraulics, and Water Management Technical Report*.

21.1.1 Water Supply

Shasta Lake and Vicinity

Water supplies for the Shasta Lake and vicinity portion of the primary study area are provided in one of three ways: by a community service area (CSA) run by Shasta County, by a mutual water company, or by an individual or group well. CSA #2 provides water for the Sugarloaf community, and CSA #6 provides water for the Silverthorn community. Fifteen mutual water companies serve the Shasta Lake and vicinity portion of the primary study area. Mutual water companies are cooperative or mutual associations that furnish water to resorts and other developments (Reclamation 2007) (Figure 21-1).

Upper Sacramento River (Shasta Dam to Red Bluff)

Provided below are descriptions of each entity in Shasta County that currently relies on Reclamation to provide a portion of its water supply and the associated Shasta and Trinity River diversions and facilities. This information was taken from the *Final Environmental Assessment for the Long-Term Contract Renewal Shasta and Trinity River Divisions* (Reclamation 2005).

City of Redding (Sacramento River, Spring Creek, Toyon) Before 1941, water service for the City of Redding was provided by the California Water Service Company, which had water rights to the Sacramento River dating from 1886. The City of Redding acquired the local facilities and water rights of the company in 1941 and filed for an additional appropriative water right of 5 cubic feet per second in 1944. Subsequent annexations to the City of Redding's service area consist of the Buckeye County Water District, the Cascade Community Services District, and the Enterprise Public Utility District in 1967, 1976, and 1977, respectively.

The Buckeye zone service area includes two City of Redding pressure zones: Buckeye and Summit City. Approximately half of the Buckeye zone is located within the Redding city limits, and the other half is in an unincorporated area of Shasta County. Approximately one-quarter of the Summit City zone is in an unincorporated area of Shasta County, and three-quarters is in the City of Shasta Lake. The City of Redding currently receives water to its Buckeye zone under a long-term CVP contract with Reclamation (the water comes from Whiskeytown Lake via the Spring Creek tunnel). There are no known groundwater resources within the Buckeye zone service area. During peak-demand periods, supplemental water is pumped from the Sacramento River, then treated and delivered into the Buckeye zone service area. The municipal and industrial (M&I) connections in the Summit City zone are supplied exclusively by water diverted from Shasta Lake via the Toyon pipeline. The water is treated by the City of Shasta Lake and delivered to the Summit City zone.

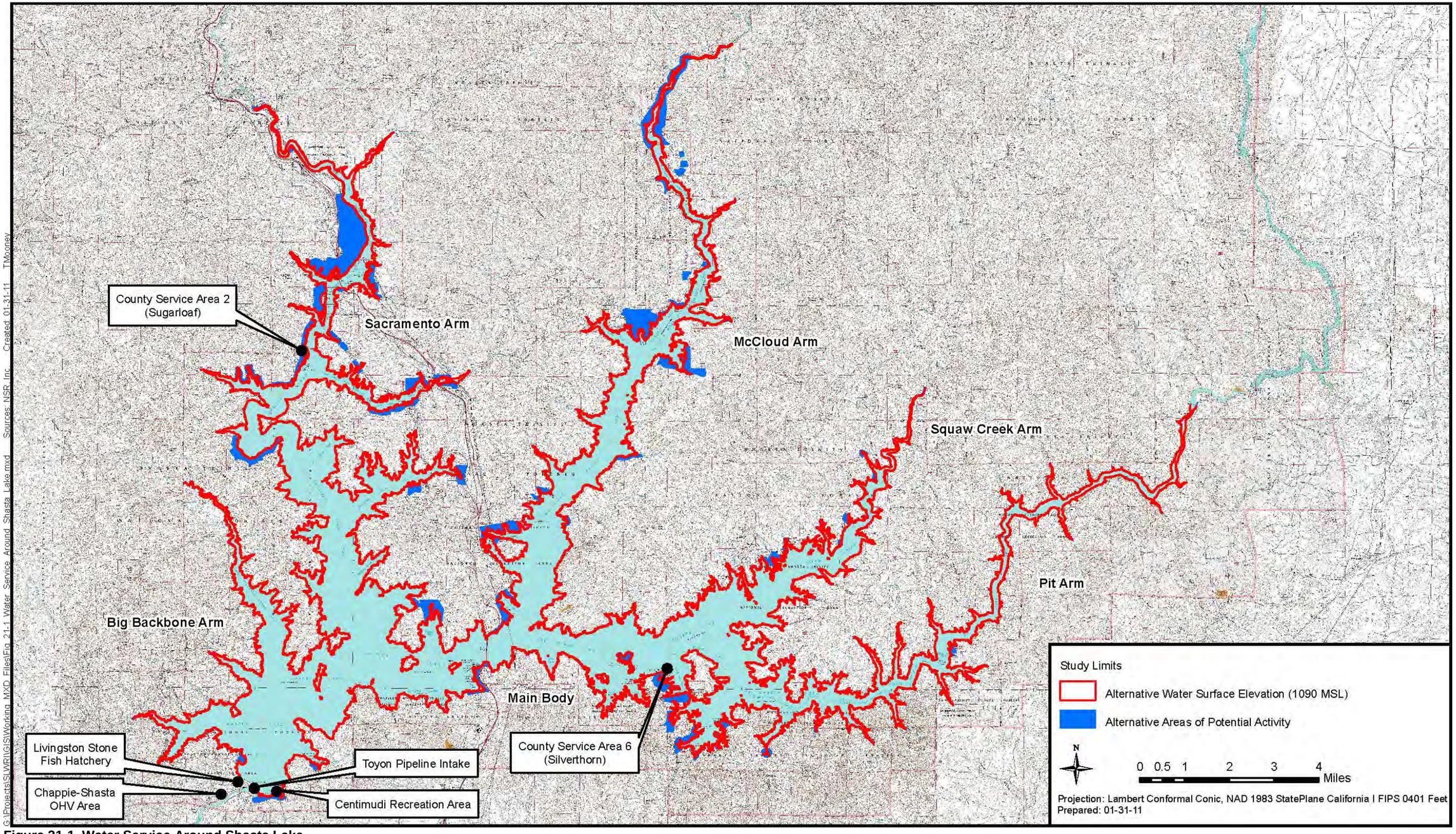

Figure 21-1. Water Service Around Shasta Lake

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The City of Redding has one additional water contract with Reclamation. Redding's 1966 Settlement Contract with Reclamation specifies a base supply and a project water supply. In 2003, the maximum base supply was set at 17,850 acre-feet per year, and the project water supply was set at 3,150 acre-feet per year; since 1995, project water supply entitlements have been increased by 45 acre-feet annually.

Redding's surface-water supply comes from the Sacramento River and Whiskeytown Lake. Sacramento River water is treated at the Foothill Water Treatment Plant (24 million gallons per day (mgd)), and Whiskeytown Lake water is treated at the 7-mgd Buckeye Water Treatment Plant. Redding supplements its surface-water supply with well production capacity from the Redding groundwater basin primarily during peak-demand periods. Currently, 14 wells are operational, providing a total capacity of up to 12 mgd.

Redding provides CVP and non-CVP water service to about 24,709 connections. Connections provide water primarily for M&I uses and a small number of agricultural uses. The city administers 4,179 connections in the Buckeye zone and 58 M&I connections in the Summit City zone.

City of Shasta Lake Water for the City of Shasta Lake comes from Shasta Lake via a pump station at Shasta Dam that has a maximum diversion of 9.3 mgd. Water is pumped from an intake in the face of Shasta Dam through the Toyon pipeline to a storage/treatment facility immediately east of the Shasta Dam compound. From there it is delivered to the City of Shasta Lake (Figure 21-1). An interim contract with Reclamation (Contract No. 4-7-20-W1134-IR10) provides an allocation of 4,400 acre-feet per year from this source. Reclaimed water is also available for industrial and landscaping use. Groundwater use is limited because of low aquifer yields.

Before incorporation, the community water supply and utility services were provided by the Shasta Dam Area Public Utilities District (PUD), which was formed in 1945 to provide a reliable water supply for an area of 3.5 square miles. Originally, the PUD service area was a residential area established to house workers who were constructing Shasta Dam. Reclamation constructed the Toyon pipeline to transport water from Shasta Lake to the PUD in 1948, and the PUD concurrently constructed water storage and distribution systems. The Summit City PUD was annexed in 1978. Before annexation, water was supplied by a series of wells with low and unreliable yields.

The City of Shasta Lake provides water service to 3,800 connections for primarily urban and residential uses, although industrial use has increased over the past decade. The City of Shasta Lake also provides water service to Reclamation's Northern California Area Office.

Bella Vista Water District The Bella Vista Water District (BVWD) is a publicly owned water agency formed in 1957 to serve agricultural irrigation

demands (California Water Code Division 13, Sections 34000–38501). The BVWD service area is located generally east of Redding and south of Shasta Lake. The service area includes the rural communities of Bella Vista and Palo Cedro.

BVWD's primary water source is the Sacramento River. The BVWD supply system consists of the Wintu Pump Station on the Sacramento River and five wells. Water pumped from the river is treated at the district's treatment plant, which provides inline filtration. Distribution facilities include a network of transmission and distribution pipelines, three storage tanks, nine booster pump stations, and pressure-reducing facilities. The major distribution piping was initially constructed by Reclamation but has been expanded over time. The main supply system is still Federally owned, but it was constructed solely for use by BVWD. Both domestic and agricultural users are served through the same distribution system, so all water is treated to meet the higher water quality standards for domestic use. The CVP water that BVWD purchases from the Shasta County Water Agency (SCWA) is described below.

BVWD's original contract allows for up to 24,000 acre-feet per year, which is supplemented with 578 acre-feet per year of CVP water purchased through SCWA. Both of these allotments are subject to reduction during dry years. In the severe drought years of 1991 and 1992, water supplies for M&I were reduced by 25 percent and water for agricultural uses was reduced by 75 percent. Available surface water was supplemented with groundwater from wells located near the southern boundary of the district. These reductions in supply caused severe drought restrictions to be imposed, which have had a continuing impact on district water sales. The supplementary water provided by the wells constitutes about 10 percent of the supply normally available from the Sacramento River and about 15–20 percent of the reduced supply during a severe drought year. The aquifers in the district have limited yield, so it is not practical to greatly increase the production of wells in the district.

Agricultural and irrigation still represent 70–80 percent of the district's water demand. However, most of the service connections are now either domestic or rural residential. BVWD currently has 4,538 residential connections and 615 agricultural connections. Urban uses predominate in the southeast portion of the district where sewage disposal facilities are available. Residential uses, with lot sizes between 1 and 5 acres, are dispersed across the rest of the district. Agricultural uses are almost exclusively confined to the fertile soil along Stillwater Creek and Cow Creek. Pasture represents the bulk of agricultural use, although there is a broad range of other crops.

Centerville Community Services District The Centerville Community Services District (CCSD) was originally formed in September 1959 to supply water for domestic use, irrigation, sanitation, industrial use, fire protection, and recreation (California Government Code, Division 3, Community Services Districts, Section 61000 et seq.). The CCSD service boundary encompasses

11,278 acres in the unincorporated area of Shasta County immediately west of Redding.

The source of the district's water supply is Whiskeytown Lake, a key feature of the Trinity River Division of the CVP. This reservoir covers about 3,250 acres at maximum capacity and provides water storage of about 241 thousand acre-feet. The reservoir regulates the flows of the Clear Creek watershed and the imported flows from the Trinity River, which discharge through the Carr Powerhouse into the reservoir.

Designed and constructed by Reclamation, the district's water system dates back to 1967. Water is diverted to the district through 2 intakes in Whiskeytown Dam, 1 at an elevation of 1,110 feet and the other at an elevation of 965 feet. The ability to select the depth of the diverted water gives CCSD the capacity to draw less turbid water. The water is treated at a 30-mgd-capacity plant located at the base of Whiskeytown Dam. CCSD shares the inline treatment facility with the Clear Creek Community Services District (CCCSD).

Treated water is distributed to the district through an aqueduct that begins at Whiskeytown Dam and terminates at a 250,000-gallon control tank about 8.5 miles south of the dam. This aqueduct, commonly called the Muletown Aqueduct (also Muletown Conduit), consists of about 27,500 feet of 45-inch pipe and 17,400 feet of 42-inch pipe buried along Muletown Road, paralleling Clear Creek. The steel pipe, lined and coated in coal tar, was installed in 1965.

CCSD has a contract with CCCSD that allocates CCSD a 25 percent share of the capacity. CCSD holds 2 contracts with Reclamation for a total allocation of 3,800 acre-feet per year. The first contract, entered into on April 11, 2001, is an assignment contract. This contract permanently assigned 2,900 acre-feet per year of CVP water from SCWA's 5,000 acre-feet per year contract with Reclamation. This contract carries with it those terms and conditions defined in SCWA's contract, which also includes a binding agreement for early renewal. The second contract, entered into on August 11, 2000, is an exchange contract. This contract with Reclamation for 900 acre-feet per year was intended to provide CCSD with substitute project water for its pre-1914 water rights on Clear Creek. The district does not have access to a groundwater supply source.

CCSD currently provides M&I water to 1,125 metered connections that serve a population of approximately 2,850.

Clear Creek Community Services District CCCSD was formed in 1961 and encompasses about 14,314 acres. The facilities were designed and constructed by Reclamation, and CCCSD began operating in 1967. CCCSD is located approximately 10 miles southwest of Redding and 6 miles west of Anderson in southern Shasta County. The district's service area includes the rural areas known as Olinda and Cloverdale. The general area served by the district is commonly known as Happy Valley.

The source and treatment of CCCSD water is the same as those of CCSD water; water from Whiskeytown Lake is treated and diverted to service connections via the Muletown Aqueduct. The distribution system within the district's boundaries consists of approximately 75 miles of pipe ranging in size from 2 inches to 45 inches. Title to the distribution line system was transferred to CCCSD on May 29, 2001.

CCCSD has 1 storage tank along the aqueduct with a capacity of 1 million gallons. A control tank with a 250,000-gallon capacity regulates pressure at the upper elevation of the district. A 32,000-gallon storage tank is located outside of the district boundary at the booster station facility.

The district has developed the first of 3 planned wells, and it has installed 13,800 feet of 18-inch pipeline to connect a groundwater supply to the distribution system. The first well attached to the distribution system (Well #1) became operational in October 1992. Well #1 and the two proposed wells are intended for use only when surface supplies are inadequate to meet emergency demands.

CCCSD currently provides service for approximately 5,817 acres of irrigated agricultural land and approximately 4,000 acres of rural residences receiving M&I water. Approximately 4,497 acres in the district are undeveloped. The majority of the developed agricultural property in the district is ditch or flood irrigated. The balance of irrigation is done by overhead and drip systems.

Shasta Community Services District The Shasta Community Services District (SCSD), located west of Redding, was formed in 1959 to supply water for domestic use and fire protection for the area generally referred to as Old Shasta (Community Services District Laws: California Government Code, Sections 61000–61934). Congress authorized a water system for the area as part of the Trinity River Division of the CVP. Bonds that were issued by SCSD to finance construction of the transmission and distribution systems have been repaid.

A long-term CVP water service contract provides up to 1,000 acre-feet annually. Water is supplied by gravity from Whiskeytown Lake via a turnout on the Spring Creek conduit. The Spring Creek conduit is the only source of supply, and there are only 0.30 million gallons of storage located near the source. Downstream from the turnout, a single transmission main serves as the backbone of the distribution system and most mains are not looped. Historically, SCSD has been vulnerable to disruptions in supply from its Reclamation contract. During the 1991 drought, Reclamation reduced SCSD's allotment by 25 percent to 750 acre-feet per year.

The district currently serves 630 connections. Virtually all of the active land use is residential or municipal, consisting primarily of ranchettes. Wells are not feasible because the district does not lie over an aquifer.

Shasta County Water Agency SCWA was formed in 1957 to develop water resources for Shasta County (Shasta County Water Agency Act (Legislative Act 7580)). SCWA evolved from the Shasta County Department of Water Resources, which organized Shasta County efforts in conjunction with the Trinity River Division of the CVP.

SCWA has assisted with the creation of BVWD, CCSD, CCCSD, and SCSD and helped create CSAs for water and sewer services in Shasta County. The agency also acts as staff to the Redding Area Water Council, a group that works to preserve the quality and quantity of water in the Redding groundwater basin. Funding for SCWA comes from Shasta County property taxes.

Other Shasta and Trinity River Divisions CVP Contractors Three smaller water districts (see below) are served by either the Shasta or Trinity River division of the CVP. The three districts constitute about 1 percent of the CVP long-term contract water supply to the divisions.

Keswick County Service Area The Keswick County Service Area (KCSA), located west of Redding, was formed in 1990 (California Government Code, Sections 25210.1–25250). Previously, KCSA operated as the Keswick Community Services District, which was formed in the early 1960s to supply water for domestic use and fire protection for the town of Keswick and adjacent developed areas (California Government Code Section 61000 et seq.). The district boundary encompasses Keswick Dam and the Spring Creek Diversion Dam; however, these facilities are not served by the district.

Congress authorized a water system for the Keswick area as part of the Trinity Project Act (69 Stat. 719), and the facilities were constructed in 1965. A repayment schedule was established whereby the Federal government would be reimbursed by KCSA for delivery system construction costs. On completion of repayment, ownership of all project facilities was to remain with the Federal government.

The water source for KCSA is Whiskeytown Lake. Water is transported by gravity flow to a turnout on the Spring Creek conduit that is located upstream from the Spring Creek powerhouse. Two storage tanks provide 0.2 million gallons of storage.

A CVP water service contract provides for up to 500 acre-feet annually. KCSA serves about 195 connections, which are concentrated in the town of Keswick. Land served by KCSA is exclusively rural residential properties.

Mountain Gate Community Services District The Mountain Gate Community Services District (MGCSD) was initially formed in 1956 to provide water service for a 2-square-mile area north of the City of Shasta Lake (California Government Code, Section 61000 et seq.). The water source for MGCSD is Shasta Lake. The distribution system consists of 29 miles of pipelines that serve

3,750 acres in MGCSD and Bridge Bay Resort (located between the Sacramento and McCloud arms of Shasta Lake on USFS land).

A CVP water service contract provides 350 acre-feet annually. District water supplies are supplemented by a contract with SCWA that provides 1,000 acre-feet annually. MGCSD also operates three wells that take water from a local aquifer. The wells supply nearly half of MGCSD's total needs. There is no water storage in the district.

MGCSD provides water service to 593 connections and fire protection services for its service area. Although MGCSD primarily provides water for residential uses, it also serves M&I customers.

U.S. Forest Service A memorandum of agreement between USFS and Reclamation provides USFS with up to 10 acre-feet of municipal, industrial, and domestic water diverted from the City of Shasta Lake's water main to supply the Centimudi Recreation Area (Figure 21-1). The Centimudi facilities continue to receive water under this memorandum of agreement.

Livingston Stone National Fish Hatchery The Livingston Stone National Fish Hatchery is located near the foot of Shasta Dam and is managed by USFWS. The hatchery receives its water from the penstocks of Shasta Dam. Water flows through pipes fitted with pressure-reducing valves that pierce manhole covers near the bases of the penstocks. Then the water is routed via a buried pipeline to the hatchery, where it passes through a degassing device, flows through the hatchery, and then returns to the Sacramento River.

Other Users of Lake Water Some of the recreation residences at Campbell Creek and Didallis draw water from the lake for domestic uses. Also, some marinas draw raw water from the lake for washing out boats. Return water drains back into the lake.

Shasta County Water supplies in Shasta County are provided by the CVP, surface water diversions, and groundwater wells. The City of Redding uses groundwater wells for 40 percent of its water supply to supplement the CVP water sources described in the preceding section. Maximum available groundwater production is approximately 19,000 acre-feet per year. Most city groundwater comes from 10 wells located near Redding Municipal Airport, within the Redding groundwater basin. These wells supply a maximum of 16.5 mgd. Four additional wells in the county supply a maximum of 0.7 mgd.

Tehama County Water supplies in Tehama County are provided by CVP, local surface water diversions, and groundwater wells. The recent trend in the county is a shift from reliance on CVP water supplies to groundwater supplies. There are more than 10,000 wells designated for domestic, irrigation, municipal, monitoring, and other uses in the county. CVP deliveries provide 21,300 acre-feet per year; local stream diversions provide 106,300 acre-feet in a normal

water year; and groundwater provides approximately 382,000 acre-feet per year, which represents two-thirds of the county's irrigated water supply.

Red Bluff The City of Red Bluff obtains all of its water from 14 wells. It maintains a 3-million-gallon storage tank used for equalizing storage, fire flow, and emergency storage. The City of Red Bluff is in the process of seeking funding for an additional storage tank similar to the first. The wells produce between 500 and 2,500 gallons per minute, with the majority producing between 800 and 1,000 gallons per minute. Well depths range from 150 to 250 feet.

Other Nearby Uses The Chappie-Shasta Off-Highway Vehicle Area and residential and commercial uses in the community of Coram draw water from local groundwater wells.

Lower Sacramento River and Delta and CVP/SWP Service Areas The overall CVP/SWP water supply discussion describes the environmental setting for water supply for the extended study area. Other water supplies come from local surface water diversions and wells, which serve domestic, irrigation, municipal, and commercial uses. A detailed discussion of the overall CVP and SWP management and operations is provided in EIS Chapter 6, "Hydrology, Hydraulics, and Water Management," and in the *Hydrology, Hydraulics, and Water Management Technical Report*.

21.1.2 Wastewater Infrastructure

Shasta Lake and Vicinity

Wastewater is treated and returned to the natural environment using one of several technical methods with either community or individual on-site disposal systems. Most residential, commercial, and recreational developments located in the Shasta Lake and vicinity portion of the primary study area use on-site septic tank/leachfield systems for wastewater treatment. Typically, individual homes, cabins, or businesses are routed to individual septic systems. Large resorts route septic from several buildings to a single tank/leachfield system. Campgrounds and public restrooms use either septic tank/leachfield systems or vault/pit toilets (Reclamation 2007). Marinas also use booster pumps to lift gray water to upslope leachfield areas. No large wastewater collection or treatment systems are located near Shasta Lake.

The highest concentrations of wastewater facilities near Shasta Lake are located in the Lakeshore and Sugarloaf areas, with a substantial number of facilities in the Bridge Bay, Holiday Harbor, Salt Creek, Campbell Creek, Silverthorn, Jones Valley, Tsasdi Resort, and Digger Bay Marina areas (Figure 21-2). The Utilities and Miscellaneous Minor Infrastructure Technical Memorandum shows detailed maps of the wastewater facilities in the ancillary areas near Shasta Lake (Reclamation 2007).

Upper Sacramento River (Shasta Dam to Red Bluff)

Many areas scattered throughout Shasta and Tehama counties are serviced by individual septic systems. The remaining wastewater treatment systems are a form of community collection, treatment, and disposal. The most common form of community system is the treatment plant, which discharges treated effluent to a storage and irrigation system (land disposal) or, diluted, to a surface watercourse.

Below Shasta Dam, a number of community wastewater systems are operated by the cities of Anderson, Redding, Red Bluff, and Shasta Lake. Several unincorporated communities have community wastewater systems that are operated by CSAs.

Redding operates both the Clear Creek Wastewater Treatment Plant (WWTP) and Stillwater WWTP, both of which discharge treated effluent year round to the Sacramento River. The Clear Creek WWTP is currently permitted by the Central Valley Regional Water Quality Control Board to discharge up to 8.8 mgd of average dry-weather flow into the Sacramento River. The wastewater receives advanced secondary treatment. The Stillwater WWTP receives an average of 2.0 mgd of wastewater, approximately one-third of its design capacity of 6 mgd for average dry-weather flow. The Anderson WWTP discharges year round into the Sacramento River at a location approximately 0.25 mile from the Stillwater WWTP.

The City of Shasta Lake operates a large community wastewater system that is permitted to seasonally discharge treated effluent to surface water, namely Churn Creek; a major goal of the city's capital improvement plan has been to significantly reduce these discharges. Churn Creek eventually discharges to the Sacramento River about 0.5 mile upstream from the Stillwater WWTP.

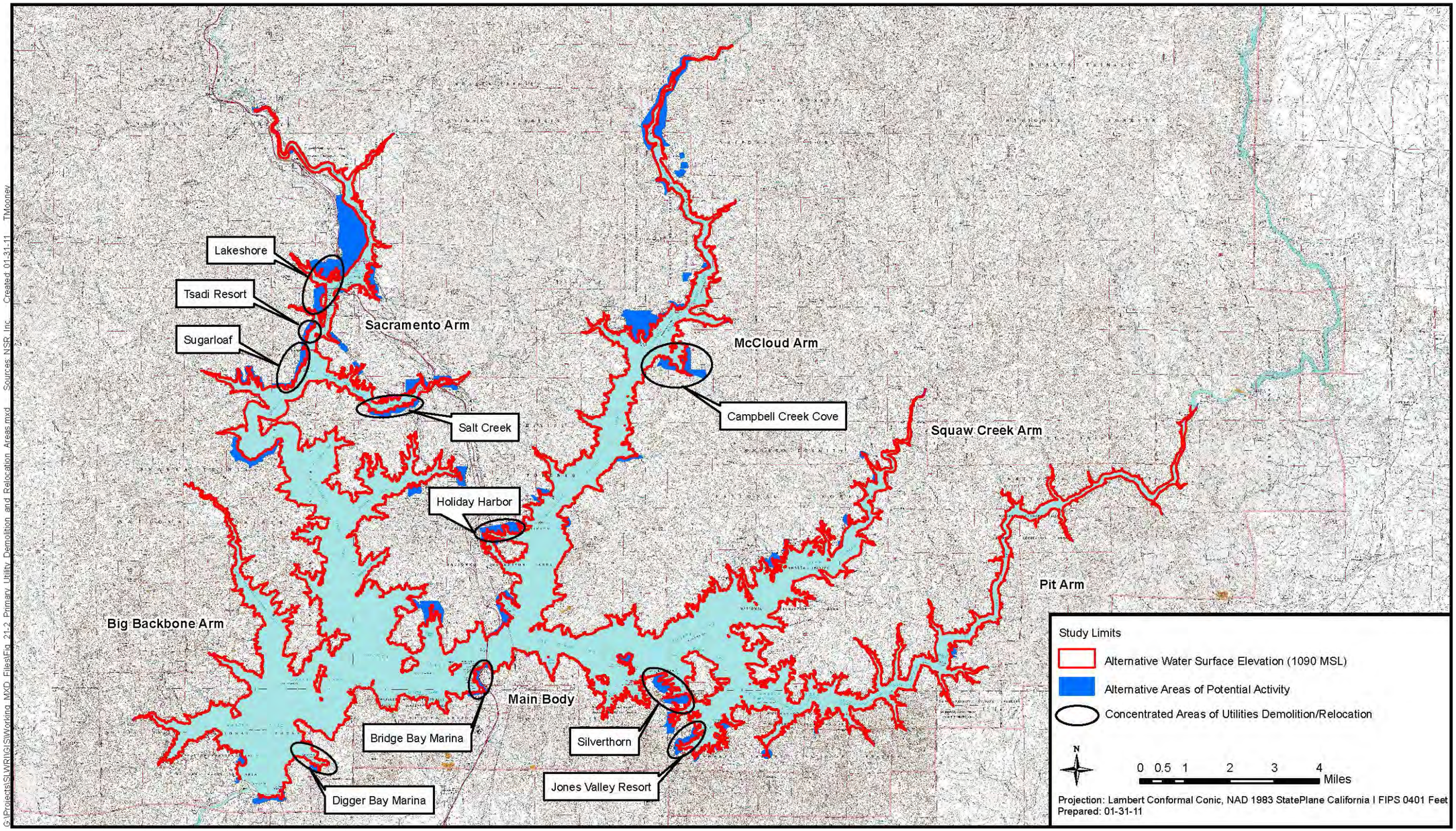

Figure 21-2. Primary Utility Demolition and Relocation Areas

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The Red Bluff WWTP has a treatment capacity of 4.8 mgd and discharges tertiary-treated wastewater by gravity into the Sacramento River at approximately 1.4 mgd. The City of Red Bluff operates a wastewater treatment system at the south end of the city. The Rio Alto Water District provides wastewater treatment services for some portions of the community of Cottonwood. Septic/leachfield systems or seepage pits are used in areas not served by these systems.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Wastewater systems in the extended study area are similar to those discussed for the primary study area. Community wastewater service systems are provided through a collection network of gravity and force main sewer lines operated primarily by local utility agencies. Pump stations and lift stations augment sewer line networks. These conveyance systems terminate at WWTPs that discharge treated effluent to storage and irrigation systems (land disposal) or to surface watercourses where the treated effluent is diluted. Individual on-site wastewater treatment methods are also used where the land is able to accommodate a leachfield/septic tank system.

21.1.3 Stormwater Drainage and Infrastructure

Shasta Lake and Vicinity

Stormwater drainage is primarily a function of the precipitation and runoff characteristics of a watershed. About 6.5 percent (5.8 million acre-feet) of all surface runoff in the state of California originates in Shasta County, representing a substantial portion of the total surface runoff in the Sacramento River system. Runoff in the Shasta Lake and vicinity portion of the primary study area is discharged to the McCloud River, the Sacramento River, and the Pit River, which drain into Shasta Lake. Numerous creeks and small local tributaries also drain into Shasta Lake.

The California Department of Transportation maintains a stormwater drainage system along the Interstate 5 (I-5) corridor. Drainage facilities in developed communities include gutters, swales, ditches, culverts, storm drain inlets, catch basins, storm drainage pipes, and detention basins. Roads also channel stormwater drainage from residences, commercial, and industrial land uses to adjacent lands and stormwater drains.

Upper Sacramento River (Shasta Dam to Red Bluff)

Runoff in the upper Sacramento River portion of the primary study area is discharged to the Sacramento River directly and indirectly via numerous major creeks and small local tributaries in rural and urban areas. Stormwater drainage in undeveloped portions of Shasta and Tehama counties generally consists of natural swales and topographic features.

Stormwater collection systems are present in urban areas and developed communities. Drainage facilities in urban areas include gutters, swales, ditches,

culverts, storm drain inlets, catch basins, storm drainage pipes, canals, detention basins, and pump stations. Roads also channel stormwater drainage from residences and commercial and industrial land uses to adjacent lands and stormwater drains. The Cities of Redding, Anderson, and Red Bluff and the City of Shasta Lake each operate municipal storm drainage systems in the city limits. The California Department of Transportation's I-5 stormwater drainage system continues along I-5 in the upper Sacramento River area.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Stormwater systems in the extended study area are similar to those discussed for the primary study area. Various storm drainage facilities and collection/conveyance systems are located throughout the extended study area. Stormwater facilities and infrastructure are operated primarily by local districts and road departments, and include gutters, swales, ditches, culverts, storm drain inlets, catch basins, storm drainage pipes, canals, detention basins, and pump stations. Treated stormwater is often discharged to rivers, tributaries, and major creeks throughout the extended study area.

21.1.4 Solid Waste Management

Shasta Lake and Vicinity

Contractors, under the auspices of Shasta County, provide solid waste disposal services for the private sector. The Shasta-Trinity National Forest (STNF), Reclamation, and California Department of Transportation use contractors to provide disposal services for facilities on public lands. A number of sites are used to collect solid waste and recyclables, which are later transferred to landfills or recycling centers in the extended study area, primarily in Shasta County.

Upper Sacramento River (Shasta Dam to Red Bluff)

The Shasta County Department of Public Works is responsible for providing solid waste management in unincorporated areas of the county. Three landfills (West Central Landfill, Anderson Landfill, and Twin Bridges Landfill) and 11 collection/transfer stations are currently operating in Shasta County. Shasta County generated 187,909 tons of solid waste in 2006; however, 307,568 tons of solid waste were disposed of in the county during the same period (CIWMB 2008).

In 2006, the 1,200-acre West Central Landfill received approximately 417 tons per day (CIWMB 2008) of nonhazardous waste from residential, commercial, industrial, and agricultural sources. This Class III landfill has a permitted capacity of 7,078,000 cubic yards and a storage area of 107 acres. In 2001, the State of California estimated that the landfill had a remaining capacity of 6,606,000 cubic yards (CalRecycle 2010). Under existing State permits, the landfill has sufficient capacity to accommodate the disposal of solid waste at least until the year 2019. In 2006, the 246-acre Anderson Landfill, a Class III landfill and asbestos-containing waste disposal site, received approximately 426

tons of solid waste per day (CIWMB 2008). This landfill has a permitted capacity of 16,840,000 cubic yards, and in 2008 the State of California estimated that the landfill had a remaining capacity of 11,914,000 cubic yards (CalRecycle 2010). The estimated year of closure is 2055. The Twin Bridges Landfill is a Class II landfill that has ceased accepting solid waste and is undergoing closure (CIWMB 2008).

Tehama County operates the 102-acre Tehama County/Red Bluff Sanitary Landfill, located approximately 2.5 miles northwest of Red Bluff. This landfill, a Class III facility, has a maximum permitted daily capacity of 400 tons (CIWMB 2008). This landfill has a permitted capacity of 5,097,000 cubic yards, and in 2008 the State of California estimated that the landfill had a remaining capacity of 2,149,000 cubic yards (CalRecycle 2010). The estimated year of closure is 2040. The landfill is owned by the Tehama County Sanitary Landfill Association, a joint-powers authority composed of Tehama County and the cities of Red Bluff, Corning, and Tehama. The Tehama County/Red Bluff Landfill Management Agency oversees daily landfill operations at the Tehama County/Red Bluff Landfill and at the Material Recovery Facility. Tehama County/Red Bluff Landfill Management Agency is another joint-powers authority and is composed of Tehama County and the City of Red Bluff. This agency is also responsible for maintaining permits and monitoring environmental compliance at the landfill.

In addition to the landfill and material recovery facilities, Tehama County operates two household hazardous waste facilities, in Corning and Red Bluff, and four transfer stations in the outlying rural areas of Manton, Payne's Creek, Mineral, and Rancho Tehama. There are no facilities authorized to accept commercial hazardous waste within the primary study area.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Solid waste services and infrastructure in the extended study area are similar to those discussed for the primary service area. Urban centers in the extended study area may generate more solid waste than the population centers in the primary study area; however, the mechanisms used for transfer and disposal of the waste are similar. Solid waste facilities, including landfills and transfer stations, provide pickup and disposal services. There are three commercial hazardous waste disposal facilities authorized to accept various types of commercial hazardous waste in the extended study area. These facilities are located in Kings, Kern, and Imperial counties. Only the facility in Kings County is certified to accept materials that contain polychlorinated biphenyls.

21.1.5 Electrical Service and Infrastructure

Shasta Lake and Vicinity

Pacific Gas and Electric Company (PG&E), the City of Redding, and the City of Shasta Lake provide electrical service to Shasta Lake and vicinity. The PG&E service area is part of a larger PG&E territory, which encompasses

70,000 square miles in northern and central California, from Eureka in the north to Bakersfield in the south. Power transmission facilities serving the Shasta Lake and vicinity portion of the primary study area have developed mostly parallel to I-5 and adjacent to developed communities.

Currently, PG&E is capable of providing three-phase power parallel to the I-5 corridor, north to Bridge Bay and south from Lakehead to Turntable Bay. Power lines around Shasta Lake are typically routed overhead on utility poles or towers, although a portion of the lines serving individual businesses, homes, and cabins are routed underground. Power lines serving the Shasta Lake and vicinity portion of the primary study area are frequently attached to bridges when routed over rivers and lake inlets. The voltage of local distribution lines is typically 12 kilovolts (kV), whereas the voltage of high-voltage power transmission lines is typically 60–230 kV. Service to individual homes and businesses is typically 120–480 volts.

The highest concentrations of electrical service facilities near Shasta Lake are in the Lakeshore and Sugarloaf areas, with a substantial number of facilities in the Bridge Bay, Holiday Harbor, Salt Creek, Campbell Creek, Silverthorn, Jones Valley, Tsasdi Resort, and Digger Bay Marina areas (Figure 21-2). The Utilities and Miscellaneous Minor Infrastructure Technical Memorandum shows detailed maps of the electrical service facilities in the ancillary areas near Shasta Lake (Reclamation 2007).

The City of Shasta Lake is located at the heart of the Shasta Division of the CVP. The City of Shasta Lake is the successor utility to the former Shasta Dam Area PUD and serves customer both upstream and downstream from Shasta Dam. The PUD contracted with Reclamation for power in January 1947 to serve electrical energy to residents and businesses. The PUD received 13.8kV service from the Shasta Dam switchyard on a leased-line arrangement. Today, the City of Shasta Lake is a load serving entity and retail distribution provider of electrical energy to more than 4,500 homes and businesses including Digger Bay Marina, the Centimudi Boat Ramp, and the Fisherman’s Point Picnic Area facilities.

Upper Sacramento River (Shasta Dam to Red Bluff)

Electrical service and related infrastructure in the upper Sacramento River portion of the primary study area are similar to those discussed for the Shasta Lake and vicinity portion. The City of Anderson, outlying rural areas of Shasta County, and Tehama County (Red Bluff and Corning) receive electrical service from PG&E.

The City of Shasta Lake owns and operates a looped 115kV system, which delivers energy to two 115/12kV distribution substations that step the voltage down to 12kV for delivery to the end users. The system is managed by the City of Shasta Lake and is assisted by the City of Redding Electric Utility for ancillary services. In total, the City of Shasta Lake’s distribution system has 15

miles of 115kV transmission lines and approximately 67 miles of overhead and underground 12kV distribution lines. The City of Shasta Lake has two points of delivery: one from the Flanagan 230/115kV transmission substation and the other at Keswick Dam switchyard. The City of Shasta Lake has a base resource allocation from the Western Area Power Administration (Western), which delivers energy to the City of Shasta Lake from Shasta and Keswick Dams. The City of Shasta Lake also has a supplemental energy agreement with the City of Redding.

The City of Redding's electric system is managed by the Redding Electric Utility. It receives nearly eight percent of the hydroelectric output from the CVP, which amounts to approximately 30 percent of Redding's annual power supply. Federal hydropower from the CVP is the most cost-effective, renewable, and carbon-free resource currently in Redding's power supply portfolio. The City of Redding owns and operates a looped 115kV system, which delivers energy to eleven 115/12kV distribution substations that step the voltage down to 12 kV for delivery to the city's customers. . In total, Redding's distribution system has 67.3 miles of 115kV local transmission lines and approximately 610 miles of overhead and underground 12kV distribution lines. Delivery of all power from outside the city is made to the Redding Municipal Airport 230/115kV transmission substation and to the Keswick Dam switchyard. Redding jointly owns the airport substation with Western. Western owns and operates the Keswick switching substation and an electrical transmission line that runs north and south along the western side of Redding and the City of Shasta Lake.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Electrical services and infrastructure in the extended study area are similar to those discussed for the primary study area. Power generation and transmission facilities have developed parallel to population centers, power, natural gas, nuclear, oil, hydroelectric, wind, solar, and other technologies used for power production.

Infrastructure in the Sacramento River basin downstream from the Red Bluff Pumping Plant, the American River basin, and the San Joaquin River basin consists primarily of natural gas–fired and hydroelectric generating facilities, transmission lines, substations, and distribution lines. In the Delta, PG&E and Western have developed power transmission lines across Delta islands and waterways. Many of the corridors are within the periphery of the Delta upland areas, including several natural gas–fired plants. There are no power-generating facilities in the central Delta. In other portions of the CVP and SWP service areas, a complex system of electrical generating facilities, substations, and transmission infrastructure exists.

21.1.6 Natural Gas Service and Infrastructure

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

PG&E is responsible for providing natural gas service to the primary study area. Gas is delivered to customers below Shasta Dam, including residents of the cities of Redding, Anderson, and Red Bluff and the city of Shasta Lake. Although the study area is bisected by a large PG&E natural gas pipeline, service varies based on PG&E's distribution system. No natural gas facilities are present in the Shasta Lake and vicinity portion of the primary study area.

The USFS facility at Turntable Bay, the USFS Lakeshore Guard Station, and a number of rural residences and businesses in the primary study area rely on propane for various purposes. Propane is supplied by various local providers to individual on-site tanks. Propane tanks for homes and businesses are portable and are typically leased (Reclamation 2007).

Lower Sacramento River and Delta and CVP/SWP Service Areas

Natural gas services and infrastructure are located throughout the extended study area and are supplied by various energy providers. Pipelines, storage areas, and compressor stations are located in the Sacramento River and San Joaquin River valleys and in the CVP/SWP service areas. Natural gas discovered in the Delta region has been developed into a significant supply source and depot for underground storage. Gas fields, pipelines, and related infrastructure have been developed throughout the CVP/SWP service areas. Natural gas infrastructure is owned by oil and gas companies, public utilities, and various independent leaseholders.

21.1.7 Telecommunications

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Landline telephone service in the primary study area is provided by various commercial communications companies. The majority of the landline facilities are located in county- or city-owned rights-of-way and on private easements. Telecommunications lines are either copper wire or fiber optic cable and are routed overhead on utility poles and underground. Telephone lines are frequently attached to bridges when routed over rivers and lake inlets. There are no transcontinental fiber optic lines in the Shasta Lake and vicinity portion of the primary study area.

In addition to landline service, a large number of communications towers have been constructed throughout the primary study area for cellular phone service. Cellular towers have been erected along major travel corridors to meet emergency service objectives. Cellular service is available, to varying degrees, throughout the service area.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Telecommunications systems in the extended study area are similar to those discussed for the primary study area and are supplied by various providers. Associated infrastructure is located throughout the extended study area and consists of underground fiber optic cable, telephone transmission lines (overhead and underground), and cellular towers owned or leased by telecommunications service providers.

21.2 Regulatory Framework

21.2.1 Federal

Reclamation Act

The 1902 Reclamation Act authorized the Federal government to finance and build water supply projects. The act set up the Reclamation Fund to finance single-purpose irrigation projects in the western United States. Since that time, water supply projects and the financing needed to construct and maintain infrastructure have grown substantially. The act has been amended several times, most recently in 1982 with the passage of the Reclamation Reform Act.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was passed to protect public health by regulating the nation's drinking water supply. The law requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and groundwater wells. Originally, the SDWA focused on water treatment as the primary means to provide safe drinking water at the tap. In 1996, amendments to the SDWA expanded the act to include source water protections.

The U.S. Environmental Protection Agency (EPA) is responsible for administering the act. EPA establishes National Primary Drinking Water Regulations for contaminants that may cause adverse public health effects. These regulations set maximum contaminant levels and nonenforceable health goals (called Maximum Contaminant Level Goals) for recognized contaminants.

The SDWA does not regulate private wells that serve fewer than 25 people. However, the act does apply to all public water systems. A public water system is a system that provides water for public consumption that regularly serves at least 25 people or has at least 15 service connections. This includes facilities such as resorts and marinas.

Clean Water Act

The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the

integrity of wetlands. The act regulates discharges of pollutants into the waters of the United States. EPA is responsible for administering waste discharge permits under the National Pollutant Discharge Elimination System. M&I wastewater facilities that discharge effluent into surface waters are required to obtain National Pollutant Discharge Elimination System permits. Large and medium storm sewer systems also require a National Pollutant Discharge Elimination System permit. The stormwater permits often require implementation of a pollution prevention plan to prevent contaminants from reaching surface waters.

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) is designed to provide "cradle to grave" control of hazardous waste by imposing management requirements on generators and transporters of hazardous wastes and on owners and operators of treatment, storage, and disposal facilities. The RCRA also applies to the management of nonhazardous solid waste through the municipal solid waste landfill. EPA is responsible for administering the RCRA.

Shasta-Trinity National Forest Land and Resource Management Plan

The STNF Land and Resource Management Plan (LRMP) identifies goals, standards, and guidelines related to utilities and service systems in the STNF. The following public services goals, standards, and guidelines related to the project area were excerpted from the LRMP (USFS 1995).

Facilities Goals

- Provide and maintain those administrative facilities that effectively and safely serve the public and USFS workforce.

Facilities Standards and Guidelines

- Manage, construct, and maintain buildings and administrative sites to meet applicable codes and to provide the necessary facilities to support resource management.

Lands Goals

- Provide for continued use and new development of hydroelectric facilities.

Lands, Special Uses Standards and Guidelines

- Do not approve special use applications if such use can reasonably be accommodated on private land.

- Bury new telephone lines and new or reconstructed power distribution lines less than 35 kV, unless:

  – Visual quality objectives (VQO) can be met without burying,

  – Geologic conditions make burying infeasible, and

  - Burying will produce greater long-term site disturbance.

Whiskeytown-Shasta-Trinity National Recreation Area Management Plan

- Road construction will be restricted to that which is compatible with the purpose of the NRA and to provide essential private land access.
- Road closures will be implemented as opportunities arise to decrease road density and associated wildlife disturbance.
- No additional roads will be constructed for timber harvest.
- Any timber harvest must be consistent with NRA goals and objectives.
- All developments and long-term activities in the NRA will be designed with the intent of meeting VQOs. Those objectives include areas designated as retention, partial retention, and modification.
- Management activities that can be seen from within developed recreation sites will meet a VQO of retention in the foreground and partial retention in the middle ground.
- Best management practices and soil quality standards apply to all management activities.
- Riparian reserve standards and guidelines apply to all management activities within riparian reserves.

U.S. Bureau of Land Management Resource Management Plans

The U.S. Department of the Interior, Bureau of Land Management (BLM) manages a number of public lands adjacent to the Sacramento River corridor downstream from Shasta Dam. The study area falls under two BLM districts (Northern California and Central California) and the resource management plans (RMP) of three BLM field offices: Redding, Ukiah, and Mother Lode (BLM 2006). The purpose of BLM's RMPs is to provide overall direction for managing and allocating public resources in each planning area. The RMP for the Redding field office designates utility corridors as all existing or occupied corridors delineated in BLM's Western Regional Corridor Study of 1986, with the exception of several avoidance areas that include portions of the Sacramento River Management Area. The RMP also states that no additional utility corridors will be permitted in the Sacramento River Management Area, except for a 2-acre aerial communications site on Inks Ridge (BLM 1993).

21.2.2 State

California Water Plan

The California Water Plan provides a framework for water supply planning for the state. It identifies and evaluates existing and proposed statewide demand,

water supply programs, and projects to address the state's water supply needs. DWR is responsible for the preparation of the California Water Plan and the management of the state's surface water and groundwater resources (DWR 2009). DWR also oversees California's SWP and the regulation and protection of dams, assists local agencies in preparing urban water management plans, and reviews the plans to ensure compliance with the Urban Water Management Act.

The State Water Resources Control Board (State Water Board) has broad authority over water rights and regulations for the state. The State Water Board and its nine regional water quality control boards administer water rights and enforce pollution control standards throughout the state. The State Water Board is responsible for granting water rights through an appropriation process following public hearings and requisite environmental review by applicants and responsible agencies. In granting water rights permits, the State Water Board must consider all beneficial uses, including water for downstream human and environmental needs.

Water suppliers must obtain a permit from the California Department of Public Health, Office of Drinking Water, for a community water system, defined as a "public water system that serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents of the area served by the system" (42 Code of Federal Regulations Section 300f).

Water Quality Control Plan for the Sacramento and San Joaquin River Basins

The *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (Basin Plan) provides guidance for wastewater and stormwater facilities and development that could affect water quality in the basins. Basin Plan objectives are incorporated into county and city general plans, zoning ordinances, building codes, and subdivision ordinances. The Central Valley Regional Water Quality Control Board is responsible for issuing and enforcing waste discharge requirements, including discharge prohibitions and user reuse requirements for wastewater reclamation projects.

Nonhazardous Solid Waste Disposal Standards

Title 14, Chapter 3, of the California Code of Regulations provides minimum standards for solid waste handling and disposal in California and pertains to nonhazardous solid waste management. The California Department of Resources Recycling and Recovery is a new department in the California Natural Resources Agency that administers the programs formerly managed by the California Integrated Waste Management Board, including the regulation of nonhazardous solid waste facilities in the state.

Hazardous Waste Control Act

The California Hazardous Waste Control Act governs hazardous waste management and cleanup in California (Health and Safety Code, Chapters 6.5–6.98). The act mirrors the RCRA and imposes a "cradle to grave" regulatory

system for handling hazardous waste in a manner that protects human health and the environment. County Environmental Health Departments and California Environmental Protection Agency Certified Unified Program Agencies assume responsibility for enforcing local hazardous waste reporting requirements. Sites that store, handle, or transport specified quantities of hazardous materials are inspected annually. The California Department of Toxic Substances Control, part of the California Environmental Protection Agency, regulates the generation, transportation, treatment, storage, and disposal of hazardous waste under the RCRA and the California Hazardous Waste Control Act.

California Public Utilities Code

The California Public Utilities Code has broad regulatory authority over public utilities in California, which include electrical utilities, mutual water companies, private energy producers, telephone corporations, and railroad corporations. The California Public Utilities Commission is the government body that administers the California Public Utilities Code. The California Public Utilities Commission issued General Order 95 to provide safety standards for construction of power transmission facilities. Furthermore, the California Public Utilities Commission issued General Order 131-D to provide rules related to the planning and construction of electrical generation and transmission/power/distribution line facilities.

21.2.3 Regional and Local

City and County General Plans

The general plans for the counties and cities in the primary and extended study areas contain policies regarding utilities and services systems. Water supply, wastewater treatment, solid waste disposal, and utilities are subjects covered in the general plans and are considered essential public services required by all types and densities of development.

21.3 Environmental Consequences and Mitigation Measures

21.3.1 Methods and Assumptions

Evaluation of potential utility and services system impacts was based on a review of planning documents pertaining to the primary and extended study areas, including the STNF LRMP, California Department of Toxic Substances Control databases, and the general plans for the Cities of Redding and Red Bluff, the City of Shasta Lake, and Shasta and Tehama counties. The analysis also uses an inventory of utilities and service system infrastructure in the primary study area as it relates to the SLWRI.

Effects on water supply in the Shasta Lake and vicinity portion of the primary study area were evaluated based on construction and operational activities that would result from project implementation. It was generally assumed that construction activities associated with modifying Shasta Dam could result in

short-term effects on the delivery of local water supplies if the surface elevation of the reservoir were lowered to accommodate construction. A long-term effect would result if project operation would create a substantial disruption or reduction in the distribution or quantity of water supply.

Impacts on utilities and service systems were evaluated based on the duration and extent to which such services would be affected, as well as the ability of the service provider to continue to provide a level of service that could meet the needs of the public. The evaluation compares the duration of the effect with the service provided, taking into account the ability of the provider to maintain necessary services through alternative means.

Due to the higher cost and increased environmental impacts associated with relocating the utility lines to new rights-of-way, it is assumed that the transmission lines will generally remain along their current alignments. The installation of temporary lines would be required for some facility relocations to maintain operation of the lines during construction.

21.3.2 Criteria for Determining Significance of Effects

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by, or result from, the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. An environmental document prepared to comply with CEQA must identify the potentially significant environmental effects of a proposed project. A "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project (State CEQA Guidelines, Section 15382). CEQA also requires that the environmental document propose feasible measures to avoid or substantially reduce significant environmental effects (State CEQA Guidelines, Section 15126.4(a)).

The following significance criteria were developed based on guidance provided by State CEQA Guidelines and consider the context and intensity of the environmental effects as required under NEPA. Impacts of an alternative related to utilities and service systems would be significant if project implementation would do any of the following:

- Not comply with published local, State, or Federal statutes, regulations, or standards relating to solid waste
- Exceed permitted landfill capacity with waste generated by the project
- Degrade the level of service of a public utility or services system
- Require relocating utility infrastructure

- Exceed wastewater treatment requirements of the applicable regional water quality control board

- Exceed water supplies available to service the project from existing entitlements and resources, such that new or expanded entitlements would be needed

- Disrupt utilities service to create a public health hazard or extended service disruption

- Require substantial improvements to the infrastructure or level of staffing of a utility or services system to maintain its existing level of service

- Require or result in the construction of new water treatment, wastewater treatment, or stormwater drainage facilities, or the expansion of such existing facilities, the construction of which could cause significant environmental effects

21.3.3 Topics Eliminated from Further Consideration

The action alternatives would increase availability of water supply for water users on the Sacramento River and Delta. Increased water supplies might increase demand for new or expanded WWTPs that discharge to the Sacramento River or Delta. The State Water Board has review, approval, and permitting authority over operation of new or expanded WWTPs, and the environmental effects of approving WWTPs must be evaluated under CEQA. If approved, WWTPs must operate within the limits established in the waste discharge requirements issued by the State Water Board. Although increased water supplies might increase demand for new or expanded WWTPs that discharge to the Sacramento River or Delta, it is speculative to assume that the State Water Board would approve new or expanded WWTPs. Therefore, increased discharge of treated wastewater into the Sacramento River or Delta that is not currently authorized as a result of this project (and that has not already been evaluated under CEQA) is not reasonably foreseeable and is eliminated from further consideration.

21.3.4 Direct and Indirect Effects

Utilities and service system impacts in the primary study area – Shasta Lake and vicinity and upper Sacramento River (Shasta Dam to Red Bluff) – caused by project construction and operation are described below. Only minimal, if any, project-related impacts on utilities and service systems are expected to occur downstream from the Red Bluff Pumping Plant or in the remainder of the extended study area.

No-Action Alternative

Shasta Lake and Vicinity, Upper Sacramento River (Shasta Dam to Red Bluff), Lower Sacramento and Delta, and CVP/SWP Service Areas The

impact discussion for the No-Action Alternative addresses all of both the primary and extended study areas together, because this alternative would not affect utilities in either the primary or extended study area.

Impact Util-1 (No-Action): Damage to or Disruption of Public Utility and Service Systems Infrastructure Under the No-Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, no damage to public utilities infrastructure or temporary disruption of services in the vicinity of Shasta Lake would occur from implementing the No-Action Alternative. No impact would occur. Mitigation is not required for the No-Action Alternative.

Impact Util-2 (No-Action): Utility Infrastructure Relocation or Modification Under the No-Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, relocation or modification of existing utilities infrastructure in the vicinity of Shasta Lake would not occur from implementing the No-Action Alternative. No impact would occur. Mitigation is not required for the No-Action Alternative.

Impact Util-3 (No-Action): Short-Term Increase in Solid Waste Generation Under the No-Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, no solid waste would be generated as a result of implementing the No-Action Alternative. No impact would occur. Mitigation is not required for the No-Action Alternative.

Impact Util-4 (No-Action): Increases in Solid Waste Generation from Increased Recreational Opportunities Under the No-Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, no solid waste associated with increased recreational opportunities would be generated as a result of implementing the No-Action Alternative. No impact would occur. Mitigation is not required for the No-Action Alternative.

Impact Util-5 (No-Action): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Under the No-Action Alternative, no new facilities would be constructed and no existing facilities would be altered, expanded, or demolished. Therefore, increased demand for water treatment and distribution facilities related to increases in water supply would not occur from implementing the No-Action Alternative. No impact would occur. Mitigation is not required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Utilities and service systems impacts would occur primarily in the Shasta Lake and vicinity portion of the primary study area. The majority of impacts

identified would be short-term impacts resulting from the abandonment and relocation of utilities and service systems. Individual utilities or service systems are discussed where project detail is available. However, stormwater, wastewater, solid waste management, and water supply systems are also referred to as service systems when a general reference to all of the systems would be appropriate; and electrical service and infrastructure, natural gas service and infrastructure, and telecommunications service and infrastructure are referred to as utilities when a general reference to all of the utilities would be appropriate.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP1 addresses the Shasta Lake and vicinity and upper Sacramento River portions of the primary study area together, because impacts from construction activities would affect both areas.

Impact Util-1 (CP1): Damage to or Disruption of Public Utility and Service Systems Infrastructure Project construction activities could damage public utility and service systems infrastructure, which could result in short-term disruptions of service. Construction activities would occur in areas proposed for utilities or service systems abandonment and relocation. Project implementation could require disruption of public utilities or service systems to accommodate construction activity. This impact would be potentially significant.

The quantity of utility and service systems infrastructure relocation varies for the developed areas in the general vicinity of Shasta Lake. The bulk of the work would be done along the shores of the Sacramento Arm, the most developed portion of Shasta Lake. Utility abandonment and relocation would take approximately 4.5 years. Some service systems construction would occur in the upper Sacramento River portion of the primary study area, primarily at the Shasta Dam compound. Disruptions of utilities service in the upper Sacramento River area could result from project implementation and are discussed below.

Project construction activities associated with abandonment and relocation of utilities and service systems infrastructure could damage existing public utility lines. Excavation activities, vegetation clearing, and heavy equipment operations could accidentally damage utility lines or service system pipes/ditches, which could result in a disruption of public utilities or service systems.

Reclamation inventoried utilities and service systems on lands surrounding Shasta Lake that could be inundated by an increased reservoir elevation. Based on Reclamation's inventory, a 6.5-foot raise in the level of Shasta Lake would require abandonment and relocation of approximately 31,000 feet (5.8 miles) of power lines and 33,000 feet (6.2 miles) of telecommunications lines. Power and telecommunications facilities that could be inundated and that would require relocation include transmission towers, power poles, underground power and telecommunications lines, above-ground power and telecommunications lines,

and cable lines. Approximately 20 percent of the power transmission facilities that could be inundated would consist of high-voltage power lines; the remaining 80 percent would consist of low-voltage power lines. Numerous individual on-site wastewater systems and stormwater systems (primarily adjacent to roads) would be relocated to areas that would not be affected under CP1 (Figure 21-2). The Utilities and Miscellaneous Minor Infrastructure Technical Memorandum shows detailed maps of the utilities in the ancillary areas that would need to be demolished or relocated (Reclamation 2007).

Disruptions in services resulting from damage to utility lines would likely be localized because the majority of power and telecommunication lines that would require relocation serve the local population around Shasta Lake. Reclamation or project contractors would likely repair potential infrastructure damage immediately after discovery of the damage. Therefore, disruptions of public utilities in the Shasta Lake and vicinity portion of the primary study area would not continue for extended periods of time. However, periodic service disruptions could occur throughout the 4.5-year construction period for CP1, which could inconvenience the local population.

Project construction activities associated with raising Shasta Dam could damage existing public utilities infrastructure and result in disruptions of public utilities service in the primary study area. Activities that could damage public utilities at the dam and result in disruptions of service include drilling activities, heavy equipment operations, and other worksite accidents. As explained above, infrastructure damage would be repaired immediately. If hydropower generation is interrupted at Shasta Dam, repair time could be extended and there would be prolonged impacts on the upper Sacramento River portion of the primary study area.

Public utilities or service systems could be disrupted during construction activities that require a temporary shut-off for safety or mechanical purposes. This effect would be most likely to occur in the Shasta Lake and vicinity portion of the primary study area because of the amount of project construction in that area relating to local utilities and service systems relocation activities. Public utilities and service systems would be relocated such that they would be functional by project completion. Occasional disruptions of public utilities could also occur in the upper Sacramento River area because of construction activities at Shasta Dam that require temporary power outages. Construction activities in the immediate vicinity of the Shasta Dam compound could occasionally affect the treatment and delivery of water to the City of Shasta Lake. This impact would be short term and would continue intermittently until project construction activities were completed. Construction would take approximately 4.5 years.

To minimize potential disruption of service and damage to the utilities and service systems infrastructure, project contractors would follow local, State, and Federal regulations pertaining to utilities and service systems location and

construction. However, the magnitude of the project and number of utilities and service systems requiring relocation make it likely that utilities or service systems could be damaged or services disrupted. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-2 (CP1): Utility Infrastructure Relocation or Modification Project implementation would require relocation or modification of utilities infrastructure, which could result in localized impacts on vegetation, land use, transportation, wildlife, noise, air quality, water quality, and utilities service. This impact would be potentially significant.

In general, short-term impacts that could result from relocation of utilities infrastructure would be localized (Shasta Lake and vicinity) and could include disruptions caused by noise, traffic, and dust associated with construction activities. Relocation of utilities infrastructure could result in localized long-term impacts related to visual quality, land use, vegetation, transportation, water quality, air quality, noise, and wildlife in the Shasta Lake and vicinity portion of the primary study area; these impacts are discussed in separate EIS chapters. Some utilities infrastructure would also be modified in the upper Sacramento River portion of the primary study area, particularly in the general vicinity of the Shasta Dam compound.

As discussed in Impact Util-1 (CP1), project construction and operation would result in relocation and/or modification of utilities infrastructure at Shasta Dam and in communities in the Shasta Lake and vicinity portion of the primary study area (Figures 21-1 and 21-2). The infrastructure components include water and wastewater service and electrical infrastructure, telephone lines, and cable lines. Proposed infrastructure relocation was based on (1) whether utilities components would be inundated by an increased lake elevation and (2) whether the inundation would warrant relocation or permanent abandonment.

The largest potentially affected residential developments near Shasta Lake are in the Lakeshore and Sugarloaf areas. Recreational facilities (e.g., campgrounds and marinas) would also change substantially. The quantity of services and utilities infrastructure reconstruction would vary around Shasta Lake with an emphasis on the Sacramento, McCloud, and Pit arms as well as the Main Body. Abandonment and relocation of utilities infrastructure would take 4.5 years. The Utilities and Miscellaneous Minor Infrastructure Technical Memorandum shows detailed maps of the utilities in the ancillary areas that would need to be demolished or relocated (Reclamation 2007).

Consistent with Shasta County Development Standards, septic systems within 200 feet of the new full pool waterline or 100 feet downslope of the new full pool waterline would be demolished. Wastewater pipes, septic tanks, vaults/pits, and leachfields would be abandoned in place, and restroom buildings and contents would be removed and taken to an approved landfill. Relocation of

septic systems in the project area would be done in one of two ways: (1) construct new septic systems on the property of the affected home or facility, where feasible; or (2) define a possible localized WWTP alternative for homes that do not meet Shasta County requirements for septic system separation from the lake. The general WWTP would include a pressurized sewer collection system to transport wastewater flows to several centralized package WWTPs. Localized WWTPs would likely be constructed to serve the areas of Salt Creek, Sugarloaf/Tsasdi Resort, Lakeshore (possibly several plants), Antlers Campground, Campbell Creek Cove, Bridge Bay Marina, Silverthorn Resort, and Jones Valley.

WWTP operation can result in undesirable environmental effects. For example, discharge of treated wastewater could affect the water quality of Shasta Lake, pump stations could generate unwanted noise, and the treatment process could generate undesirable odors. The environmental impacts of constructing and operating wastewater treatment facilities are evaluated in the pertinent technical chapters of the EIS.

Power lines and telecommunications lines usually follow parallel alignment and typically use the same power pole. Some of the utility lines serving individual houses, businesses, government facilities, and cabins are routed underground. All transmission towers, power poles, underground power lines, and telecommunications lines that would be inundated under CP1 would need to be removed and relocated.

Low-voltage power lines, telecommunications lines, or power poles located within 50 feet of the CP1 maximum lake elevation would be considered threatened by inundation, and high-voltage power lines and towers located within 100 feet would be considered inundated. Relocation of utilities infrastructure would be consistent with applicable local, State, and Federal requirements.

CP1 would inundate 31,000 feet (approximately 5.8 miles) of power lines and 33,000 feet (about 6.2 miles) of telecommunications lines near Shasta Lake. All associated transmission towers, power poles, underground power lines, telecommunications lines, and cable lines that would be inundated under CP1 would need to be removed and relocated.

Relocation of infrastructure would include vegetation removal, which would result in project impacts. Clearing of vegetation would be required to provide space for utilities structures and to create a safety buffer. Reclamation would clear the appropriate space for utilities infrastructure as provided by local, State, and Federal regulations. Additional space could be cleared to provide the highest level of safety for project operation and maintenance. In addition, Reclamation would apply the National Electric Safety Code, a voluntary safety code followed by the utilities industry, to ensure that relocated infrastructure would operate as safely or safer than existing utilities. Widths of vegetation

clearance would range from 40 to 75 feet. Cleared areas could be wider, depending on site-specific conditions, such as on steep slopes or when tall trees are nearby.

Impacts resulting from vegetation clearing associated with relocation of utilities infrastructure would be minimized where possible. When possible, Reclamation would locate utility corridors in sites that are not heavily forested to minimize vegetation clearing. Where heavily forested areas cannot be avoided for relocation of utilities infrastructure, Reclamation would coordinate vegetation removal with USFS and other landowners/managers to minimize impacts. Reclamation will consider co-locating and undergrounding relocated utility lines to the extent practicable.

Relocation of utilities infrastructure would require additional roads for construction and maintenance of the new facilities. Roads would be constructed in the rights-of-way of the cleared utility lines and would be constructed according to the appropriate jurisdiction's standards (i.e., USFS or Shasta County). New roads serving relocated utilities infrastructure would be located and designed to prevent erosion and avoid geologic hazards.

As discussed in Chapter 20, "Transportation and Traffic," some work in the road relocation areas could require a road closure with detours, lane closures, or a combination of both. Road closures would temporarily impede access to local connector roads and recreational land uses, affecting residents, local recreational and nonrecreational businesses, and visitors to Shasta Lake.

To minimize potential impacts resulting from relocation of utilities infrastructure, Reclamation and project contractors would follow local, State, and Federal regulations pertaining to installation of utilities infrastructure, the STNF LRMP standards and guidelines, and the *Shasta County General Plan* and zoning guidance. Before vacating a street or public service easement, the Shasta County Board of Supervisors must consider applicable consistency with the general plan. Shasta County Streets and Highways Code Section 8313 and California Public Utilities Code Section 12808.5 require cities and counties approving electrical transmission and distribution lines of municipal utilities districts to make a finding concerning the consistency of the lines with the general plan.

Reclamation is committed to funding the demolition and relocation of existing infrastructure and construction of replacement infrastructure, including localized WWTPs that might replace some individual septic systems. Reclamation is also committed to facilitating establishment of community services districts and transferring plant ownership to the districts, which would be responsible for long-term operation and management.

Project implementation would result in relocation or modification of utilities infrastructure. The extent of relocation of utilities infrastructure and/or

modification that would be necessary could result in short-term impacts on noise, traffic, and utilities services; and project implementation could result in long-term impacts on land use, wildlife, water quality, and soils. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-3 (CP1): Short-Term Increase in Solid Waste Generation Project implementation would result in a short-term increase of solid waste generation during construction activities. The project would not generate construction waste materials that would exceed the capacity of local landfills. This impact would be less than significant.

Demolition and construction activities would generate waste materials, including concrete, metal, and other materials from the dam renovation; structural metal, concrete, and wood from demolished bridges and buildings; concrete and asphalt from relocated boat launch facilities; unusable recreation equipment from relocated campgrounds and picnic areas; cables, pumps, wiring, and power towers from utility relocations; and scrap material generated as a byproduct of construction. Demolition and construction waste for CP1 would total about 176,627 cubic yards. Reclamation's contractors would take measures to recycle or reuse demolished materials, such as steel or copper wire, where practical. Therefore, some of the demolition and construction waste would be brought to nearby recycling facilities. Hazardous materials (e.g., asbestos, if found) would be brought to an approved hazardous waste landfill for disposal. Much of the underground utilities and service systems proposed for abandonment would be abandoned in place and would not be removed to a landfill or recycling facility.

Table 21-1 provides a summary of project-generated solid waste for the action alternatives.

Table 21-1. Waste Generated by Project Construction

Feature	Estimated Volume (cubic yards)		
	CP1	CP2	CP3, CP4, CP4A, CP5
Vehicle bridge replacements	10,700	10,700	10,700
Doney Creek UPRR bridge replacement	4,718	4,718	4,847
Sacramento River UPRR second crossing	15,558	15,558	15,558
Pit River Bridge piers 3 and 4 protection	0	0	0
Railroad realignment	2,420	2,420	2,420
Major road relocations	10,980	20,659	23,516
Reservoir area utilities (removals/relocations)	1,364	3,251	4,847
Reservoir area recreation (removals/relocations)	99,240	102,076	132,624
Main dam	2,263	1,553	1,553
Outlet works	388	388	388
Spillway	18,305	16,590	12,765
Temperature control device modification	20	20	20
Powerplant and penstocks	0	0	0
Right wing dam	531	511	511
Left wing dam	8,630	8,630	8,630
Visitor Center replacement	1,510	1,510	1,510
Reservoir area dikes	0	0	0
Pit 7 modifications	0	0	0
Total	176,627	188,584	219,889

Key:
CP = Comprehensive Plan
UPRR = Union Pacific Railroad

Two landfills are currently operational in Shasta County: the West Central Landfill and the Anderson Landfill. The West Central Landfill, in the city of Redding, is the closest facility to Shasta Dam and would likely receive the majority of solid waste generated during construction. This landfill has sufficient permitted capacity to accommodate solid waste disposal needs during construction of the project. CP1 would generate roughly 176,627 cubic yards of solid waste; the West Central Landfill has a remaining capacity of approximately 5 million cubic yards, and the Anderson Landfill has a remaining capacity of approximately 11 million cubic yards. Recycling of demolition and construction waste materials would further reduce the volume of waste disposed at landfills.

Three commercial hazardous waste landfills operate in Southern California. Utilities poles, materials containing asbestos or lead-based paints, and transformers containing polychlorinated biphenyls would be sent to one of these landfills or to another EPA-permitted hazardous waste facility.

Solid waste generation by the project would be a short-term impact. Furthermore, accepting the project waste would not impair solid waste facilities that would serve the project. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-4 (CP1): Increases in Solid Waste Generation from Increased Recreational Opportunities Project implementation could result in more recreationists in and around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River, which could cause incremental increases in the amount of solid waste generated. However, multiple landfills are located throughout the region with adequate capacity for disposal of solid waste generated from implementation of the project. Therefore, this impact would be less than significant.

Implementation of the project could increase and enhance recreational opportunities in and around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River. Additional recreationists could incrementally increase the amount of solid waste generated. Multiple landfills, including the West Central Landfill, the Anderson Landfill, and the Tehama County/Red Bluff Landfill, are located in the project region and have a substantial amount of available capacity. Private transfer stations are located throughout the region as well. These multiple facilities have adequate capacity for disposal of solid waste generated by implementation of the project (CIWMB 2008). Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-5 (CP1): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply It is reasonable to assume that the increased water supply expected under this alternative would increase demand for construction and operation of water treatment and distribution facilities within the CVP service area. No information is currently available about future water facilities that might be built in response to the expected increase in water supply. Therefore, it is not possible to evaluate the environmental effects of building and operating such facilities. Such an evaluation would be too speculative for meaningful consideration and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Util-6 (CP1): Damage to or Disruption of Public Utility and Service Systems Infrastructure Construction would not occur outside of the primary study area; therefore, there would be no temporary disruption of utilities during construction in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-7 (CP1): Utility Infrastructure Relocation or Modification Construction would not occur outside of the primary study area; therefore, there

would be no relocation or modification of utilities infrastructure in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-8 (CP1): Short-Term Increase in Solid Waste Generation Construction would not occur outside of the primary study area; therefore, there would be no increases in solid waste generation from construction activities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-9 (CP1): Increases in Solid Waste Generation from Increased Recreational Opportunities Increased recreational opportunities resulting from project implementation would not occur outside of the primary study area; therefore, there would be no increases in solid waste generation from increased recreational opportunities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-10 (CP1): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply It is reasonable to assume that the increased water supply expected under this alternative would increase demand for construction and operation of water treatment and distribution facilities within the extended study area. No information is currently available about future water facilities that might be built in response to the expected increase in water supply. Therefore, it is not possible to evaluate the environmental effects of building and operating such facilities. Such an evaluation would be too speculative for meaningful consideration and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP2 addresses the Shasta Lake and vicinity and upper Sacramento River portions of the primary study area together, because impacts from construction activities would affect both areas.

Impact Util-1 (CP2): Damage to or Disruption of Public Utility and Service Systems Infrastructure Project implementation could damage public utilities and service systems infrastructure, which could result in short-term disruptions of service. The potential exists for construction activities to damage or interfere with utilities and service systems infrastructure, and thus service, during construction operations. Construction activities would occur in areas proposed for abandonment of utilities or service systems, and implementation of relocation projects could require disruption of public utilities or services to accommodate construction activity. This impact would be potentially significant.

This impact would be similar to Impact Util-1 (CP1). An increase in the height of the dam could result in a larger area of inundation and additional infrastructure and service systems construction activities. Construction activities for CP2 would take longer than for CP1 and would extend the duration of impacts resulting from CP2. CP2 would require the relocation of approximately 5,000 more feet of power lines and about 3,000 more feet of telecommunications lines, and would take approximately 6 more months than CP1. Additional service systems would need to be demolished and/or relocated for CP2.

Project implementation could damage public utilities and service systems infrastructure, or result in short-term disruption of utilities and service systems service. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-2 (CP2): Utility Infrastructure Relocation or Modification Project implementation would require relocation or modification of utilities infrastructure, which could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. This impact would be potentially significant.

This impact would be similar to Impact Util-2 (CP1). An increase in the height of the dam could result in a larger area of inundation, which would result in additional relocation or modification of utilities infrastructure compared to Impact Util-1 (CP1). Construction activities for CP2 would take longer than for CP1 and would extend the duration of impacts resulting from CP2. CP2 would require the relocation of approximately 5,000 more feet of power lines and associated transmission facilities and relocation of about 3,000 more feet of telecommunications lines and associated facilities, and would take approximately 6 more months than CP1. Additional vegetation clearing would also be required to accommodate relocation of infrastructure.

Project implementation could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utilities service. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-3 (CP2): Short-Term Increase in Solid Waste Generation Project implementation would result in a short-term increase of solid waste generation during construction activities. The project would not generate construction waste materials that would exceed the capacity of local landfills. This impact would be less than significant.

This impact would be similar to Impact Util-3 (CP1). An increase in the height of the dam would result in a larger area of inundation, which could result in a greater potential for generation of construction waste materials compared to Impact Util-1 (CP1). CP2 would generate roughly 188,584 cubic yards of solid

waste (see Table 21-1). Similar to CP1, the anticipated increase in the amount of solid waste generated during construction of this alternative would still be sufficiently handled by the three local landfills and permitted hazardous waste landfills. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-4 (CP2): Increases in Solid Waste Generation from Increased Recreational Opportunities Project implementation could result in more recreationists around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River, which could cause incremental increases in the amount of solid waste generated. However, multiple landfills are located throughout the region with adequate capacity for disposal of solid waste generated from implementation of the project. Therefore, this impact would be less than significant.

This impact would be similar to Impact Util-4 (CP1). An increase in the height of the dam could result in a larger area of inundation, which could result in more recreationists and greater potential for generation of solid waste materials than with Impact Util-1 (CP1). The anticipated increase in the amount of construction waste generated during long-term operation of this alternative is expected to be sufficiently handled by the three local landfills, which have a substantial amount of available capacity. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-5 (CP2): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP2 would increase demand for construction and operation of water treatment and distribution facilities. However, evaluation of the environmental effects of building and operating such facilities would be too speculative for meaningful consideration and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Util-6 (CP2): Damage to or Disruption of Public Utility and Service Systems Infrastructure Construction would not occur outside of the primary study area; therefore, there would be no temporary disruption of utilities service during construction in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-7 (CP2): Utility Infrastructure Relocation or Modification
Construction would not occur outside of the primary study area; therefore, there would be no relocation or modification of utilities infrastructure in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-8 (CP2): Short-Term Increase in Solid Waste Generation Construction would not occur outside of the primary study area; therefore, there would be no increases in solid waste generation from construction activities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-9 (CP2): Increases in Solid Waste Generation from Increased Recreational Opportunities Increased recreational opportunities resulting from project implementation would occur only in the primary study area; therefore, there would be no increases in solid waste generation from increased recreational opportunities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-10 (CP2): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP2 would increase demand for construction and operation of water treatment and distribution facilities within the extended study area. However, evaluation of the environmental effects of building and operating such facilities would be too speculative for meaningful consideration and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply and Anadromous Fish Survival

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP3 addresses the Shasta Lake and vicinity and upper Sacramento River portions of the primary study area together, because impacts from construction activities would affect both areas.

Impact Util-1 (CP3): Damage to or Disruption of Public Utility and Service Systems Infrastructure Project implementation could damage public utilities and service systems infrastructure, which could result in short-term disruptions of service. The potential exists for construction activities to damage or interfere with utilities and service systems infrastructure, and thus service, during construction operations. Construction activities would occur in areas proposed for abandonment and relocation of utilities or service systems. Project implementation could require disruption of public utilities or services to accommodate construction activity. This impact would be potentially significant.

This impact would be similar to Impact Util-1 (CP1). An increase in the height of the dam could result in a larger area of inundation and additional infrastructure and service systems construction activities. Construction activities for CP3 would take longer than for CP1 and would extend the duration of impacts resulting from CP3. CP3 would require the relocation of approximately 8,000 more feet of power lines and about 6,000 more feet of telecommunications lines and would take approximately 6 more months than

CP1. Additional service systems would need to be demolished and/or relocated for CP3 to prevent inundation.

Project implementation could damage public utility and service systems infrastructure, or result in short-term disruption of utility and service systems service. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-2 (CP3): Utility Infrastructure Relocation or Modification Project implementation would require relocation or modification of utility infrastructure, which could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. This impact would be potentially significant.

This impact would be similar to Impact Util-2 (CP1). An increase in the height of the dam could result in a larger area of inundation, which would result in additional relocation or modification of utility infrastructure compared to Impact Util-1 (CP1). Construction activities for CP3 would take longer than for CP1 and would extend the duration of impacts resulting from CP3. CP3 would require the relocation of approximately 8,000 more feet of power lines and associated transmission facilities and about 6,000 more feet of telecommunications lines and associated facilities; CP3 would take approximately 6 more months than CP1 to implement. Additional vegetation clearing would also be required to accommodate infrastructure relocation.

Project implementation could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-3 (CP3): Short-Term Increase in Solid Waste Generation Project implementation would result in a short-term increase of solid waste generation during construction activities. The project would not generate construction waste materials that would exceed the capacity of local landfills. This impact would be less than significant.

This impact would be similar to Impact Util-3 (CP1). An increase in the height of the dam would result in a larger area of inundation, which could result in a greater potential for generation of construction waste materials compared to Impact Util-1 (CP1). CP3 would generate roughly 219,889 cubic yards of solid waste (see Table 21-1). Similar to CP1, the anticipated increase in the amount of solid waste generated during construction of this alternative would still be sufficiently handled by the three local landfills and permitted hazardous waste landfills. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-4 (CP3): Increases in Solid Waste Generation from Increased Recreational Opportunities Project implementation could result in more recreationists in and around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River, creating incremental increases in the amount of solid waste generated. However, multiple landfills are located throughout the region with adequate capacity for disposal of solid waste generated from implementation of the project. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

This impact would be similar to Impact Util-4 (CP1). An increase in the height of the dam could result in a larger area of inundation, which could result in more recreationists and greater potential for generation of solid waste materials compared to Impact Util-1 (CP1). The anticipated increase in the amount of solid waste generated during long-term operation of this alternative would be handled by the three local landfills and permitted hazardous waste landfills. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-5 (CP3): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP3 would increase demand for construction and operation of water treatment and distribution facilities. However, evaluation of the environmental effects of building and operating such facilities would be too speculative for meaningful consideration and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta/CVP/SWP Service Areas

Impact Util-6 (CP3): Damage to or Disruption of Public Utility and Service Systems Infrastructure Construction would not occur outside of the primary study area; therefore, there would be no temporary disruption of utilities service during construction in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-7 (CP3): Utility Infrastructure Relocation or Modification
Construction would not occur outside of the primary study area; therefore, there would be no relocation or modification of utilities infrastructure in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-8 (CP3): Short-Term Increase in Solid Waste Generation
Construction would not occur outside of the primary study area; therefore, there would be no increases in solid waste generation from construction activities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-9 (CP3): Increases in Solid Waste Generation from Increased Recreational Opportunities Increased recreational opportunities resulting from project implementation would occur only in the primary study area; therefore, there would be no increases in solid waste generation from increased recreational opportunities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-10 (CP3): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP3 would increase demand for construction and operation of water treatment and distribution facilities within the extended study area. However, evaluation of the environmental effects of building and operating such facilities would be too speculative for meaningful consideration and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP4 and CP4A addresses the Shasta Lake and vicinity and upper Sacramento River portions of the primary study area together, because impacts from construction activities would affect both areas.

Impact Util-1 (CP4 and CP4A): Damage to or Disruption of Public Utility and Service Systems Infrastructure Project implementation, including gravel augmentation and habitat restoration activities along the upper Sacramento River, could damage public utilities and service systems infrastructure, which could result in short-term disruptions of service. The potential exists for construction activities to damage or interfere with utilities and service systems infrastructure, and thus service, during construction operations. Construction activities would occur in areas proposed for utilities or service systems abandonment and relocation. Project implementation could require disruption of public utilities or services to accommodate construction activity. This impact would be potentially significant for CP4 and CP4A.

This impact would be similar to Impact Util-1 (CP1). The greater increase in the height of the dam for CP4 or CP4A would result in a larger area of inundation and additional infrastructure and service systems construction activities. Construction activities for CP4 or CP4A would take longer than for CP1 and would extend the duration of impacts resulting from CP4 or CP4A. CP4 or CP4A would require the relocation of approximately 8,000 more feet of power lines and about 6,000 more feet of telecommunications lines and would take approximately 6 more months than CP1. Additional service systems would need to be demolished and/or relocated for CP4 or CP4A to prevent inundation.

Project implementation could damage public utility and service systems infrastructure, or result in short-term disruption of utility and service systems service. Therefore, this impact would be potentially significant for CP4. Mitigation for this impact is proposed in Section 21.3.5.

Project implementation could damage public utility and service systems infrastructure, or result in short-term disruption of utility and service systems service. Therefore, this impact would be potentially significant for CP4A. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-2 (CP4 and CP4A): Utility Infrastructure Relocation or Modification Project implementation would require relocation or modification of utilities infrastructure, which could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. Gravel augmentation and habitat restoration activities along the upper Sacramento River might also require relocation or modification of utilities infrastructure. This impact would be potentially significant for CP4 or CP4A.

This impact would be similar to Impact Util-2 (CP1). The greater increase in the height of the dam for CP4 or CP4A would result in a larger area of inundation, which would result in additional relocation or modification of utility infrastructure compared to Impact Util-1 (CP1). Construction activities for CP4 or CP4A would take longer than for CP1 and would extend the duration of impacts resulting from CP4 or CP4A. This would require the relocation of approximately 8,000 more feet of power lines and associated transmission facilities and about 6,000 more feet of telecommunications lines and associated facilities; CP4 or CP4A would take approximately 6 more months than CP1 to implement. Additional vegetation clearing would also be required to accommodate infrastructure relocation.

Project implementation could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. Therefore, this impact would be potentially significant for CP4. Mitigation for this impact is proposed in Section 21.3.5.

Project implementation could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. Therefore, this impact would be potentially significant for CP4A. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-3 (CP4 and CP4A): Short-Term Increase in Solid Waste Generation Project implementation, including gravel augmentation and habitat restoration activities along the upper Sacramento River, would result in a short-term increase of solid waste generation during construction activities. The project would not generate construction waste materials that would exceed the capacity of local landfills. This impact would be less than significant for CP4 or CP4A.

This impact would be similar to Impact Util-3 (CP3), with a very slight increase in solid waste generation related to downstream restoration construction activities.

Therefore, this impact would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

Therefore, this impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-4 (CP4 and CP4A): Increases in Solid Waste Generation from Increased Recreational Opportunities Project implementation could result in more recreationists in and around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River, which could cause incremental increases in the amount of solid waste generated. However, multiple landfills are located throughout the region with adequate capacity for disposal of solid waste generated from project implementation. Therefore, this impact would be less than significant for CP4 or CP4A.

This impact would be similar to Impact Util-4 (CP1). The greater increase in the height of the dam would result in a larger area of inundation, which could result in more recreationists and greater potential for generation of solid waste materials compared to Impact Util-1 (CP1). The anticipated increase in the amount of solid waste generated during long-term operation of this alternative would be handled by the three local landfills and permitted hazardous waste landfills.

This impact would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-5 (CP4 and CP4A): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP4 or CP4A would increase demand for construction and operation of water treatment and distribution facilities. However, evaluation of the environmental effects of building and operating such facilities would be too speculative for meaningful consideration for CP4 or CP4A and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Util-6 (CP4 and CP4A): Damage to or Disruption of Public Utility and Service Systems Infrastructure Construction would not occur outside of the primary study area; therefore, there would be no temporary disruption of utilities service in the extended study area.

No impact would occur for CP4. Mitigation for this impact is not needed, and thus not proposed.

No impact would occur for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-7 (CP4 and CP4A): Utility Infrastructure Relocation or Modification No utility infrastructure relocation or modification would occur outside of the primary study area; therefore, there would be no relocation or modification of utilities infrastructure in the extended study area.

No impact would occur for CP4. Mitigation for this impact is not needed, and thus not proposed.

No impact would occur for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-8 (CP4 and CP4A): Short-Term Increase in Solid Waste Generation Construction would not occur outside of the primary study area; therefore, there would be no increases in solid waste generation in the extended study area.

No impact would occur for CP4. Mitigation for this impact is not needed, and thus not proposed.

No impact would occur for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-9 (CP4 and CP4A): Increases in Solid Waste Generation from Increased Recreational Opportunities Increased recreational opportunities resulting from project implementation would occur only in the primary study area; therefore, there would be no increases in solid waste generation from increased recreational opportunities in the extended study area.

No impact would occur for CP4. Mitigation for this impact is not needed, and thus not proposed.

No impact would occur for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-10 (CP4 and CP4A): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP4 or CP4A would increase demand for construction and operation of water treatment and distribution facilities within the extended study area. However, evaluation of the environmental effects of building and operating such facilities would be too speculative for meaningful consideration for CP4 or CP4A and is, therefore, not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

CP5 – 18.5-Foot Dam Raise, Combination Plan

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff) The impact discussion for CP5 addresses the Shasta Lake and vicinity and upper Sacramento River portions of the primary study area together, because impacts from construction activities would affect both areas.

Impact Util-1 (CP5): Damage to or Disruption of Public Utility and Service Systems Infrastructure Project implementation, including gravel augmentation and the habitat restoration activities along the upper Sacramento River, could damage public utilities and service systems infrastructure, which could result in short-term disruptions of service. The potential exists for construction activities to damage or interfere with utilities and service systems infrastructure, and thus service, during construction operations. Construction activities would occur in areas proposed for abandonment and relocation of utilities or service systems. Project implementation could require disruption of public utilities or services to accommodate construction activity. This impact would be potentially significant.

This impact would be similar to Impact Util-1 (CP1) and identical to Impact Util-1 (CP4 and CP4A). Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-2 (CP5): Utility Infrastructure Relocation or Modification Project implementation would require relocation or modification of utilities infrastructure, which could result in localized impacts on vegetation, land use, transportation, wildlife, noise, water quality, and utility service. Gravel augmentation and the habitat restoration activities along the upper Sacramento River might also require relocation or modification of utilities infrastructure. This impact would be potentially significant.

This impact would be similar to Impact Util-2 (CP1) and identical to Impact Util-2 (CP4 and CP4A). Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 21.3.5.

Impact Util-3 (CP5): Short-Term Increase in Solid Waste Generation Project implementation, including gravel augmentation and habitat restoration activities along the upper Sacramento River, would result in a short-term increase of solid waste generation during construction activities. The project would not generate construction waste materials that would exceed the capacity of local landfills. This impact would be less than significant.

This impact would be similar to Impact Util-3 (CP4 and CP4A), with a very slight increase in solid waste generation related to enhancement of tributary and warm-water habitat and recreational trails. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-4 (CP5): Increases in Solid Waste Generation from Increased Recreational Opportunities Project implementation could result in more recreationists in and around Shasta Lake, on streams near Shasta Lake, and along the upper Sacramento River, which could cause incremental increases in the amount of solid waste generated. However, multiple landfills are located throughout the region with adequate capacity for disposal of solid waste generated from implementation of the project. Therefore, this impact would be less than significant.

This impact would be similar to Impact Util-4 (CP1) and identical to Impact Util-4 (CP4 and CP4A). Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-5 (CP5): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP5 would increase demand for construction and operation of water treatment and distribution facilities. However, evaluation of the environmental effects of building and operating such facilities would be too speculative for meaningful consideration and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact Util-6 (CP5): Damage to or Disruption of Public Utility and Service Systems Infrastructure Construction would not occur outside of the primary study area; therefore, there would be no temporary disruption of utilities service in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-7 (CP5): Utility Infrastructure Relocation or Modification No utility infrastructure relocation or modification would occur outside of the primary study area; therefore, there would be no relocation or modification of utilities infrastructure in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-8 (CP5): Short-Term Increase in Solid Waste Generation Construction would not occur outside of the primary study area; therefore, there would be no increases in solid waste generation in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-9 (CP5): Increases in Solid Waste Generation from Increased Recreational Opportunities Increased recreational opportunities caused by project implementation would occur only in the primary study area; therefore, there would be no increases in solid waste generation from increased recreational opportunities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact Util-10 (CP5): Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply Similar to CP1, it is reasonable to assume that the increased water supply expected under CP5 would increase demand for construction and operation of water treatment and distribution facilities within the extended study area. However, evaluation of the environmental effects of building and operating such facilities would be too speculative for meaningful consideration and, therefore, is not provided in this document. Mitigation for this impact is not needed, and thus not proposed.

21.3.5 Mitigation Measures

Table 21-2 presents a summary of mitigation measures for utilities and service systems.

Table 21-2. Summary of Mitigation Measures for Utilities and Service Systems

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/CP4A	CP5
Impact Util-1: Damage to or Disruption of Public Utility and Service Systems Infrastructure (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Util-1: Implement Procedures to Avoid Damage to or Temporary Disruption of Service.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Util-2: Utility Infrastructure Relocation or Modification (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Util-2: Adopt Measures to Minimize Infrastructure Relocation Impacts.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Util-3: Short-Term Increase in Solid Waste Generation (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Util-4: Increases in Solid Waste Generation from Increased Recreational Opportunities (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS

Table 21-2. Summary of Mitigation Measures for Utilities and Service Systems (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/CP4A	CP5
Impact Util-5: Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	TS	TS	TS	TS	TS
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	NI	TS	TS	TS	TS	TS
Impact Util-6: Damage to or Disruption of Public Utility and Service Systems Infrastructure (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	N/A	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	N/A	NI	NI	NI	NI	NI
Impact Util-7: Utility Infrastructure Relocation or Modification (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	N/A	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	N/A	NI	NI	NI	NI	NI
Impact Util-8: Short-Term Increase in Solid Waste Generation (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	N/A	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	N/A	NI	NI	NI	NI	NI
Impact Util-9: Increases in Solid Waste Generation from) Increased Recreational Opportunities (Lower Sacramento River, Delta, CVP/SWP Service Areas	LOS before Mitigation	N/A	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	N/A	NI	NI	NI	NI	NI
Impact Util-10: Increased Demand for Water Treatment and Distribution Facilities Resulting from Increases in Water Supply (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	N/A	TS	TS	TS	TS	TS
	Mitigation Measure	None required.	None needed; thus none proposed.				
	LOS after Mitigation	N/A	TS	TS	TS	TS	TS

Key:
B = beneficial
LOS = level of significance
LTS = less than significant
N/A = not applicable
NI = no impact
PS = potentially significant
S = significant

No-Action Alternative

No mitigation is required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impacts Util-3 (CP1) through Util-10 (CP1). Mitigation is provided below for other impacts of CP1 on utilities and service systems.

Mitigation Measure Util-1 (CP1): Implement Procedures to Avoid Damage to or Temporary Disruption of Service To avoid temporary disruption of service, the following measures will be implemented during project construction to ensure that existing utilities infrastructure is not damaged:

- **Permits** – Reclamation will obtain utilities excavation or encroachment permits as necessary before initiating any work with potential to affect utility lines and will include all necessary permit terms in construction contract specifications.

- **Locating Line** – Utility locations will be identified through field surveys and the use of the Underground Service Alert services. Any buried utility lines will be clearly marked before initiation of any ground-disturbing construction activity.

- **Clearing Right-of-Way and Road Access** – If necessary, infrastructure will be removed or reinforced in coordination with all potential service providers known to have, or potentially having, utilities infrastructure in the project area.

- **Response Plan** – The construction contractor will prepare a response plan to address potential accidental damage to utility lines before the start of construction. The plan will identify chain of command rules for notification of authorities and affected businesses and will identify appropriate actions and responsibilities to ensure the safety of the public and workers. The response plan will be circulated to the potentially affected service system providers for review and approval before the start of construction activities. Worker education training in response to such situations will be conducted by the contractor.

Implementation of this mitigation measure would reduce Impact Util-1 (CP1) to a less-than-significant level.

Mitigation Measure Util-2 (CP1): Adopt Measures to Minimize Infrastructure Relocation Impacts For each segment of a utility line that would need to be relocated or modified as a result of project construction and operations, the following measures will be implemented:

- **Permits** – Reclamation will obtain utilities excavation or encroachment permits as necessary before initiating any work associated with modification or relocation of an existing utility line and will include all necessary permit terms in construction contract specifications.

- **Locating and Staking Line** – Locations for relocated utility lines will be identified in coordination with affected service providers. Reclamation will consider co-locating and undergrounding relocated utility lines to the extent practicable. As part of this effort, field surveys will be conducted and the Underground Service Alert services will be used to ensure that there are no conflicts with other existing utility lines. After the alignment of the line has been finalized, a survey will be made to map the route of the line. The results of the survey will be plan and profile drawings, which will be used to spot the poles. After exact positions have been fixed, a stake will be driven to indicate the center of the structure or pole.

- **Clearing Right-of-Way and Road Access** – The right-of-way will be cleared of all obstructions that will interfere with the operation of the power line. A strip of land will be cleared on each side of the centerline of the transmission line by cutting or trimming the trees and brush. All trees and brush should be cut 3 inches or less from the ground line so that the passage of trucks and tractors will not be hindered. The cut trees and brush will be disposed of by chipping or spreading, burning, or hauling away. Disposal of the debris by burning, or otherwise, will be accomplished in accordance with State and local laws and regulations without creating a hazard or nuisance. The right-of-way should be treated with chemical spray to retard the growth of brush or trees that could endanger the operation of the transmission line.

- **Installing Pole Footings and Foundations** – Pole sites will be properly graded in accordance with the specifications. Usually the slope of the grade will not be more than 3:1. All topsoil should be removed before grading the pole location.

- **Utilities Modification Plan** – The construction contractor will prepare a utilities modification and relocation plan before the start of construction. The plan will identify chain of command rules for notification of authorities and appropriate actions and responsibilities to ensure the safety of the public and workers and include a description of how utilities infrastructure will be modified or relocated and identification of precise alignment where utility lines will be relocated. The plan will be circulated to the potentially affected service system providers for review and approval before the start of construction activities. Worker education training in response to such situations will be conducted by the contractor.

- The contractor will stage utility line modifications and relocations in a manner that minimizes interruption of service.

- In accordance with the STNF LRMP, relocated power lines less than 35 kV and telephone lines on USFS land within the STNF will be buried unless the STNF VQO can be met without burying, geologic conditions make burying infeasible, or burying will produce greater long-term site disturbance.

- **Traffic Control and Safety Assurance Plan** – Reclamation will implement Mitigation Measure Trans-1 as described in EIS Chapter 20, "Transportation and Traffic," to reduce adverse effects of road closures and detours or partial road closures on access to local streets and adjacent uses.

Implementation of this mitigation measure would reduce Impact Util-2 (CP1) to a less-than-significant level.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impacts Util-3 (CP2) through Util-10 (CP2). Mitigation is provided below for other impacts of CP2 on utilities and service systems.

Mitigation Measure Util-1 (CP2): Implement Procedures to Avoid Damage to or Temporary Disruption of Service This mitigation measure is identical to Mitigation Measure Util-1 (CP1). Implementation of this mitigation measure would reduce Impact Util-1 (CP2) to a less-than-significant level.

Mitigation Measure Util-2 (CP2): Adopt Measures to Minimize Infrastructure Relocation Impacts This mitigation measure is identical to Mitigation Measure Util-2 (CP1). Implementation of this mitigation measure would reduce Impact Util-2 (CP2) to a less-than-significant level.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply and Anadromous Fish Survival

No mitigation is required for Impacts Util-3 (CP3) through Util-10 (CP3). Mitigation is provided below for other impacts of CP3 on utilities and service systems.

Mitigation Measure Util-1 (CP3): Implement Procedures to Avoid Damage to or Temporary Disruption of Service This mitigation measure is identical to Mitigation Measure Util-1 (CP1). Implementation of this mitigation measure would reduce Impact Util-1 (CP3) to a less-than-significant level.

Mitigation Measure Util-2 (CP3): Adopt Measures to Minimize Infrastructure Relocation Impacts This mitigation measure is identical to

Mitigation Measure Util-2 (CP1). Implementation of this mitigation measure would reduce Impact Util-2 (CP3) to a less-than-significant level.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

No mitigation is required for Impacts Util-3 (CP4 and CP4A) through Util-10 (CP4 and CP4A). Mitigation is provided below for other impacts of CP4 or CP4A on utilities and service systems.

Mitigation Measure Util-1 (CP4 and CP4A): Implement Procedures to Avoid Damage to or Temporary Disruption of Service This mitigation measure is identical to Mitigation Measure Util-1 (CP1). Implementation of this mitigation measure would reduce Impact Util-1 (CP4 and CP4A) to a less-than-significant level.

Mitigation Measure Util-2 (CP4 and CP4A): Adopt Measures to Minimize Infrastructure Relocation Impacts This mitigation measure is identical to Mitigation Measure Util-2 (CP1). Implementation of this mitigation measure would reduce Impact Util-2 (CP4 and CP4A) to a less-than-significant level.

CP5 – 18.5-Foot Dam Raise, Combination Plan

No mitigation is required for Impacts Util-3 (CP5) through Util-10 (CP5). Mitigation is provided below for other impacts of CP5 on utilities and service systems.

Mitigation Measure Util-1 (CP5): Implement Procedures to Avoid Damage to or Temporary Disruption of Service This mitigation measure is identical to Mitigation Measure Util-1 (CP1). Implementation of this mitigation measure would reduce Impact Util-1 (CP5) to a less-than-significant level.

Mitigation Measure Util-2 (CP5): Adopt Measures to Minimize Infrastructure Relocation Impacts This mitigation measure is identical to Mitigation Measure Util-2 (CP1). Implementation of this mitigation measure would reduce Impact Util-2 (CP5) to a less-than-significant level.

21.3.6 Cumulative Effects

Chapter 3, “Considerations for Describing the Affected Environment and Environmental Consequences,” gives an overview of the cumulative effects analysis, including significance criteria, and discusses the relationship of this analysis to the CALFED Programmatic Cumulative Impacts Analysis. Table 3-1, “Present and Reasonably Foreseeable Future Actions Included in the Analysis of Cumulative Impacts, by Resource Area,” in Chapter 3, lists the projects considered quantitatively and qualitatively within the cumulative impacts analysis. This cumulative impacts analysis accounts for potential project impacts combined with the impacts of existing facilities, conditions, land uses, and reasonably foreseeable actions expected to occur in the study area on a qualitative and quantitative level. None of the projects listed in Table

3-1 under Quantitative Analysis would have effects on utilities or service systems in the primary study area or have effects in extended study area that contribute to cumulative impacts of the SLWRI since no impacts have been identified in the extended study area. This analysis is based on the projects listed in Table 3-1 under Qualitative Analysis.

Past, present, and reasonably foreseeable future projects (see Table 3-1) would generate construction-related solid waste. Example projects in the Study Area include the Moody Quarry Flats, Mountain Gate at Shasta Mixed-Use Area Plan, and the Antlers Bridge Replacement. As discussed in Impact Util-3 (CP1–CP5), affected landfills have sufficient capacity to accommodate project-generated solid waste, and are also expected to have sufficient capacity to accommodate reasonably foreseeable development in addition to project waste. Therefore, none of the action alternatives would contribute to cumulative effects related to solid waste disposal.

Implementing the proposed SLWRI alternatives would not have a significant cumulative effect on utilities and service systems in the primary study area. As discussed above, construction activities associated with CP1–CP5 could inadvertently damage utilities and public service systems infrastructure. In addition, utilities and service systems could be temporarily disrupted to accommodate construction activities. These effects would be of greater magnitude and longer in duration with the larger dam raises. Thus, the effects of CP2 would be similar to but greater than those of CP1 and similar to but less than those of CP3–CP5. Although Mitigation Measure Util-1 would reduce these project-level effects, they would not be eliminated. In addition to the projects identified by the City of Shasta Lake (Moody Flats Quarry EIR and Mountain Gate at Shasta Mixed-Use Area Plan EIR) in their comments on the DEIS, there are two present or reasonably foreseeable future actions, the Antlers Bridge replacement and the Iron Mountain Restoration Plan located in the immediate vicinity of Shasta Lake. With respect to projects currently undergoing CEQA review, these projects are still in the planning phase and there is uncertainty as to what if any action alternatives may be selected, therefore they are not considered as reasonably foreseeable. The Antlers Bridge and Iron Mountain project do have the potential to damage or disrupt utilities and public service systems infrastructure. The Antlers Bridge replacement is currently under construction and is expected to be completed in 2015, which is before implementation of any of the action alternatives would begin. With respect to the Iron Mountain Mine Restoration Plan, it is unlikely that this activity would occur simultaneously with the action alternatives. Therefore, construction activities related to implementation of the proposed SLWRI alternatives would not contribute considerably to significant cumulative impacts related to utility impacts.

The effects of CP1–CP5 on utilities and service systems would diminish with distance from the project construction sites and would also not have

cumulatively considerable effects on utilities and public service systems downstream from Red Bluff (i.e., in the extended study area).

Chapter 22
Public Services

22.1 Affected Environment

This section describes the affected environment related to public services for the dam and reservoir modifications proposed under SLWRI action alternatives. The public services addressed are fire protection, emergency services, law enforcement, and schools. Utilities, sewer services, and water supply are analyzed in Chapter 21, "Utilities and Service Systems," of this EIS.

Because of the potential influence of the proposed modification of Shasta Dam and water deliveries over a large geographic area, the SLWRI includes both a primary study area and an extended study area. The primary study area has been further divided into the Shasta Lake and vicinity portion and the upper Sacramento River (Shasta Dam to Red Bluff) portion. The extended study area has been further divided into the lower Sacramento River and Delta portion, and the CVP/SWP service areas portion.

The public services setting for Shasta Lake and vicinity consists of the portion of Shasta County above Shasta Dam. Public services needs in this region are influenced by rugged, mountainous terrain, rural lakeside communities, and Shasta Lake. The public services setting for the upper Sacramento River portion of the primary study area consists of Shasta County below Shasta Dam and Tehama County. Public services needs in this area are influenced by topography and population densities. Four incorporated cities—the Cities of Shasta Lake, Redding, Anderson, and Red Bluff—create an urban setting in the otherwise rural upper Sacramento Valley, which is characterized by rolling hills with mountains to the north, east, and west.

The public services setting for the extended study area consists of 24 counties downstream from Red Bluff and encompasses all areas served by the CVP and the SWP.

Table 22-1 lists the public service providers considered in this EIS.

Table 22-1. Key Public Service Providers

Fire Protection Services
U.S. Forest Service
California Department of Forestry and Fire Protection
Shasta County Fire Department
Tehama County Fire Department
Redding Fire Department
Shasta Lake Fire Protection District
Anderson Fire Protection District
Red Bluff Fire Department
Corning Volunteer Fire Department
Emergency Services
California Highway Patrol
California Office of Emergency Services
Shasta County Sheriff's Office
Tehama County Sheriff's Department
Shasta Area Safety Communications Agency
Shasta Regional Medical Center
Mercy Medical Center Redding
Shasta Community Health Center
St. Elizabeth Community Hospital
Law Enforcement
U.S. Forest Service
U.S. Bureau of Land Management
California Highway Patrol
California Department of Fish and Wildlife
Shasta County Sheriff's Office
Tehama County Sheriff's Department
Red Bluff Police Department
Corning Police Department
Schools
Gateway Unified School District

22.1.1 Fire Protection Services

Fire protection services consist of fire suppression, emergency dispatching, specialized training, fire prevention, fire safety education, and emergency medical response. Chapter 9 (Hazards and Hazardous Materials and Waste) describes the fire risk and provides historic fire data for the primary and extended study areas.

Shasta Lake and Vicinity

The Shasta County Fire Department (SCFD) and the California Department of Forestry and Fire Protection (Cal Fire) respond to nonwildland fires in the Shasta Lake and vicinity portion of the primary study area. The Shasta Lake Fire Protection District (SLFPD) is the first responder in the event of an emergency within the City of Shasta Lake. Nonwildland fires consist of structural, chemical, petroleum, electrical, vehicle, and other fires that involve human-made materials. Cal Fire and USFS are responsible primarily for wildland fires, which consist of fires in vegetated areas such as forests, chaparral, and grassland.

Cal Fire and USFS generally respond according to established jurisdictional boundaries. Under an agreement with the U.S. Department of the Interior, Bureau of Land Management (BLM), Cal Fire provides fire protection resources for lands managed by BLM throughout the primary study area. Additionally, a fire protection agreement between Cal Fire and USFS provides for the sharing of fire protection resources to augment the capabilities of each agency (USFS 1995). In practice, SCFD, Cal Fire, and USFS provide mutual assistance when needed.

The National Interagency Fire Center, located in Boise, Idaho, assists with wildland fire suppression nationwide. The center represents a collaboration among seven Federal agencies: the Bureau of Indian Affairs, BLM, USFS, USFWS, the National Park Service, the National Weather Service, and the Office of Aircraft Services. These agencies work together to coordinate and support wildland fire and disaster operations. Cal Fire and the California Emergency Management Agency (Cal EMA) (formerly Governor's Office of Emergency Services (OES)) work closely with these agencies to manage wildland fire operations.

Upper Sacramento River (Shasta Dam to Red Bluff)

Fire protection services in the upper Sacramento River portion of the primary study area are similar to those in the Shasta Lake and vicinity portion. SCFD and the Tehama County Fire Department (TCFD) are responsible primarily for nonwildland fires, and Cal Fire and USFS respond primarily to wildland fires.

In Shasta County, the Redding Fire Department, SCFD, and Cal Fire have mutual aid agreements to ensure adequate fire protection services and to share resources. Under these agreements, the agencies respond to emergencies in Shasta County that are in adjacent jurisdictions.

Fire departments serving the unincorporated areas of Shasta County include 1 SCFD station that is housed in Redding, 12 community fire districts, and 19 volunteer fire companies. Cal Fire operates several fire stations during the off-season winter months, through an agreement with BLM and local fire departments. The community fire districts operate autonomously; the remaining

fire departments, fire stations, and the Shasta County Fire District fall under the jurisdiction of SCFD.

The Cities of Shasta Lake, Redding, and Anderson are incorporated cities in Shasta County. Fire protection in Redding is provided by the Redding Fire Department, which has 8 fully equipped stations and 72 full-time employees. The SLFPD provides fire protection with the City of Shasta Lake, supported by 3 fire stations with 27 employees. The Anderson Fire Protection District provides service to Anderson and operates 2 fire stations with 15 employees.

Shasta and Tehama counties share fire protection resources along their shared county line, through a mutual aid agreement. Like SCFD, TCFD has mutual aid agreements with local fire protection agencies that operate in the county. One difference between Shasta and Tehama counties is the level of integration with Cal Fire: TCFD is fully integrated with Cal Fire, which administers fire protection services in all unincorporated areas of the county except for the areas covered by the Gerber and Capay fire protection districts.

TCFD provides fire protection services for the residents of Tehama County through a network of 16 fire stations and 15 volunteer fire companies. Five of the stations, Los Molinos, Corning, Bowman, El Camino, and Antelope, are staffed 24 hours a day, year round. The distribution of stations places most residents of Tehama County within 5 road miles of a responding fire station.

Red Bluff and Corning are incorporated cities in Tehama County; both cities provide fire protection services for their residents. Fire protection in Red Bluff is provided by the Red Bluff Fire Department. The Corning Volunteer Fire Department, which employs full-time staff assisted by volunteers, provides fire protection for the incorporated area of Corning.

Other fire protection services in Tehama County include the Gerber Fire Protection District, Lassen Volcanic National Park, Capay Fire Protection District, and Cottonwood Fire Protection District.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Fire protection services in the extended study area are similar to those discussed for the primary study area. However, urban population densities are higher in parts of the extended study area, which influences the types and extent of the fire protection services that are provided. Cities and counties in the extended study area provide fire protection services primarily for nonwildland fires, and Cal Fire and USFS provide fire protection services primarily for wildland fires.

22.1.2 Emergency Services

Emergency services consist of emergency preparation, response, and recovery efforts. Emergencies range from calls for medical assistance to individuals, to large-scale disasters, such as evacuations resulting from wildland fires and floods.

Shasta Lake and Vicinity

The Shasta County Sheriff's Office (SCSO) is responsible for coordinating emergency services on Shasta Lake and in the unincorporated areas of Shasta County upstream from Shasta Dam. Large-scale emergency services are handled by SCSO, in cooperation with the State emergency response network run by Cal EMA. As of 1996, OES (now Cal EMA) had designated emergency service "Operational Areas" for all California counties, cities, and special districts (e.g., school, water, and waste reclamation districts). Shasta Lake and vicinity is located in the Region 3 Operational Area, which consists of 12 Northern California counties. Emergency services providers can be called on to assist with emergencies that occur in their designated region and to assist the Central and South emergency services regions. Cal Fire, USFS, BLM, the Federal Emergency Management Agency, and the American Red Cross also provide assistance in large-scale emergencies.

SCSO provides emergency services, including patrol boats and deputies, at Shasta Lake from a substation at Bridge Bay Marina. Medical aid is provided by Shasta County fire departments and private ambulance companies, including land and air ambulance services, based in the Redding area.

Upper Sacramento River (Shasta Dam to Red Bluff)

Emergency services in the upper Sacramento River area are similar to those described in the previous section. SCSO is responsible for coordinating emergency services in the Shasta County part of the upper Sacramento River area, and the Tehama County Sheriff's Department is responsible for coordinating emergency services in the Tehama County part. Both county agencies coordinate emergency services with Cal EMA and serve as the emergency services headquarters during declared public emergencies.

A number of emergency services agencies in Shasta County have formed a joint-powers agency, called the Shasta Area Safety Communications Agency, to consolidate emergency services related to fire, medical services, and law enforcement. Current participants include the Redding Fire Department, the Redding Police Department, and SCSO. American Medical Response, Redding Medical Center, and Mercy Medical Center in Redding participate in the Shasta Area Safety Communications Agency under a contractual agreement for ambulance services. Emergency medical response is also provided by St. Elizabeth Community Hospital in Red Bluff.

The Tehama County Sheriff's Department is responsible for emergency services coordination in Tehama County. In addition, TCFD responds to some medical emergencies in Tehama County.

The California Highway Patrol (CHP), Northern Division, provides ground and air support for emergencies along the Interstate 5 (I-5) corridor and State highways throughout the primary study area. CHP maintains two A-star helicopters and two Cessna airplanes that are used to assist other agencies with search and rescue, and fire response. In addition, CHP assists with traffic control during emergencies.

Emergency services in the upper Sacramento River area are also supplemented by Cal Fire, USFS, the Federal Emergency Management Agency, and the American Red Cross.

Several hospitals and other facilities in Shasta and Tehama County provide emergency and urgent care services. Shasta Regional Medical Center, Mercy Medical Center Redding, and Shasta Community Health Center are located in Redding and serve the Shasta Lake and Redding areas. St. Elizabeth Community Hospital is located in Red Bluff and serves Tehama County.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Emergency services in the extended study area are similar to those discussed for the primary study area. Cities and counties in the extended study area are primarily responsible for providing emergency services, and they receive assistance from regional, State, and Federal agencies for emergencies that require resources beyond the capability of the local jurisdiction.

22.1.3 Law Enforcement

Law enforcement services consist of crime prevention, investigation, and apprehension of lawbreakers and include duties to keep the peace and protect life and property. Law enforcement agencies often enter into cooperative aid agreements with neighboring or overlapping law enforcement jurisdictions to consolidate resources and facilitate communication.

Shasta Lake and Vicinity

Law enforcement services in the Shasta Lake and vicinity portion of the primary study area are provided by SCSO, CHP, CDFW, BLM, and USFS. In general, the nature of an offense or law enforcement duty establishes jurisdiction. SCSO has primary responsibility for conflicts between people and most violations of State law, CHP handles most traffic violations, CDFW enforces State fish and game laws, and BLM/USFS handle violations of Federal law.

Agencies responsible for law enforcement on Shasta Lake and the surrounding area carry out their duties from several locations. SCSO operates a substation in the City of Shasta Lake with nine assigned deputies and another substation in Lakehead with two resident deputies. Because of the nature and volume of human activity around Shasta Lake, SCSO also maintains a substation at Bridge Bay Marina, located on the main dock above the store. SCSO's boat dock is located on the main dock near the substation. Services provided by SCSO include search and rescue, safety patrol boats, boating safety education, emergency services, and animal control.

USFS and BLM use Federal law enforcement officers with jurisdiction on Federal lands. USFS and BLM do not assume the Sheriff's responsibilities; instead, they enforce the Federal codes that govern public behavior on lands managed by USFS and BLM. The CDFW Northern District enforcement unit is based in Redding and provides law enforcement related to State fish and game laws in Shasta, Trinity, and Tehama counties.

Traffic law enforcement along I-5, State routes, and State highways is provided primarily by the Northern Division of CHP. CHP operates several offices in the primary study area, including offices in Redding and Red Bluff.

Upper Sacramento River (Shasta Dam to Red Bluff)

Reclamation's Security, Safety and Law Enforcement (SSLE) Office, located in Denver, is responsible for protecting the public, Reclamation employees, and Reclamation facilities through the development and implementation of an integrated security, safety, and law enforcement program. The SSLE Office manages security, safety, and law enforcement for Reclamation programs and projects such as Shasta Dam; develops Reclamation-wide policies and guidelines governing these programs; and provides oversight of program execution in Reclamation field offices.

SCSO provides law enforcement services for the unincorporated areas of Shasta County. County law enforcement operations are based in Redding. Sheriff substations are located in Burney, the City of Shasta Lake, and Shingletown. The incorporated cities of Redding and Anderson provide law enforcement services for their residents. USFS and BLM use Federal law enforcement officers with jurisdiction on Federal lands.

The Tehama County Sheriff's Department office is located in Red Bluff. The sheriff is the chief law enforcement officer of Tehama County, with jurisdiction throughout the unincorporated county, the incorporated cities, and State-owned property. The incorporated cities of Red Bluff and Corning provide law enforcement services for their residents.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Law enforcement services in the extended study area are similar to those discussed for the primary study area. Counties maintain sheriff's departments that have jurisdiction within the county boundaries, and incorporated cities maintain police departments that have jurisdiction within the city limits. However, urban population densities are higher in parts of the extended study area, which influences the types and extent of law enforcement services provided. USFS and BLM use Federal law enforcement officers with jurisdiction on Federal lands.

22.1.4 Schools

School districts are autonomous entities responsible for providing educational services for elementary, middle school, and high school students. Districts elect their own governing boards and appoint their own superintendents. County offices of education assist the school districts with administrative and curricular support.

Shasta Lake and Vicinity

No schools are located in the Shasta Lake and vicinity portion of the primary study area. The Gateway Unified School District serves residents in this area and previously operated Canyon Elementary in Lakehead. This school, however, is currently closed.

Upper Sacramento River (Shasta Dam to Red Bluff)

School districts in the upper Sacramento River area serve students in levels kindergarten through grade 12. Shasta County is served by 25 school districts, and Tehama County is served by 21 school districts. The California Community College system provides continuing education services at locations in Shasta County and Tehama County. Simpson University, located in Redding, also provides college-level educational services.

The Gateway Unified School District operates several schools in Shasta County. Mountain Lakes High School (grades 10 through 12) and Shasta Lake Alternative School (kindergarten through grade 12) are located at the northeast corner of the intersection of Lake Boulevard and Shasta Dam Boulevard.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Educational services in the extended study area are similar to those discussed for the primary study area. Cities and counties form school districts to provide educational services for children between 6 and 18 years of age. Numerous community colleges and 4-year colleges and universities are also located in the extended study area. Urban population densities are higher in parts of the extended study area, which influences the variety of educational services provided.

22.2 Regulatory Framework

22.2.1 Federal

Shasta-Trinity National Forest Land and Resource Management Plan

USFS personnel conduct their responsibilities for regulating the use of and protecting national forest lands under Title 36 and sections of Titles 16, 18, and 21 of the Code of Federal Regulations. Public services directives from the Code of Federal Regulations are integrated into the Shasta-Trinity National Forest Land and Resource Management Plan (LRMP), which includes the following topics: fire and fuels management, facilities management, law enforcement, and land management.

The LRMP identifies goals, standards, and guidelines related to public services in Shasta-Trinity National Forest. The following goals, standards, and guidelines related to public services in Shasta-Trinity National Forest have been excerpted from the LRMP (USFS 1995):

Fire and Fuels Goals (LRMP, p. 4-4)

- Achieve a balance of fire suppression capability and fuels management investments that are cost effective and able to meet ecosystem objectives and protection responsibilities.

Fire and Fuels Standards and Guidelines (LRMP, p. 4-17)

- Wildland fires will receive an appropriate suppression response that may range from confinement to control. Unless a different suppression response is authorized in this plan, or subsequent approved plans, all suppression responses will have an objective of "control."

- All wildland fires, on or threatening private land protected by agreement with the State of California, will receive a "control" suppression response.

- Fire prevention efforts will be designed to minimize human-caused wildfires commensurate with the resource values at risk.

Facilities Goals (LRMP, p. 4-4)

- Provide and maintain those administrative facilities that effectively and safely serve the public and USFS workforce.

Facilities Standards and Guidelines (LRMP, p. 4-17)

- Manage, construct, and maintain buildings and administrative sites to meet applicable codes and to provide the necessary facilities to support resource management.

- Closure of roads and/or selected areas to assist in management of Forest resources may be made by regulatory and/or physical devices on the road for the following purpose[s]: safety, fire, and general administrative purposes.

Law Enforcement Goals (LRMP, p. 4-5)

- Establish priority in law enforcement activities as follows: (a) provide for employee and public safety, (b) protect resources and property, (c) provide for the accomplishment of management objectives, and (d) prevent violation of laws and associated loss and damage.

Law Enforcement Standards and Guidelines (LRMP, p. 4-21)

- Protect the public interest by a thorough and aggressive program of violation prevention, violation detection, investigation and apprehension of violators, and prosecution.

U.S. Bureau of Land Management Resource Management Plan

BLM manages a number of public lands adjacent to the Sacramento River corridor downstream from Shasta Dam. The study area falls under two BLM districts (Northern California and Central California) and the resource management plans (RMP) of three BLM field offices: Redding, Ukiah, and Mother Lode (BLM 2006a). The purpose of BLM's RMPs is to provide overall direction for managing and allocating public resources in each planning area. The RMP for the Redding field office states that any fire occurring on public lands would be suppressed.

22.2.2 State

Standardized Emergency Management Systems

The Standardized Emergency Management Systems law (Government Code Section 8607) directs Cal EMA (formerly OES) to establish, implement, and maintain a coordinated emergency response system. The California Mutual Aid Agreement defines responsibilities and resource sharing between agencies to ensure that adequate resources, facilities, and other support are provided to jurisdictions when their own resources are insufficient to cope with the needs of a given emergency.

California Education Code

The California Education Code provides educational goals and requirements for the educational providers in the state (Title 5 of the California Code of Regulations). It governs school district formation and operation, county board of education authorities and responsibilities, and educational criteria for children between 6 and 18 years of age.

California Fire Plan

The California Fire Plan provides guidance for reducing the risk of wildfire. The following are the basic principles of the fire plan:

- Community involvement
- Community risk assessment
- Development of solutions and implementation of projects

22.2.3 Regional and Local

Shasta County General Plan

The *Shasta County General Plan* (Shasta County 2004) identifies goals, objectives, and policies related to public services in Shasta County. Fire protection and law enforcement services are discussed in the section titled "Fire Safety and Sheriff Protection." Schools are discussed in the section titled "Public Facilities."

Tehama County General Plan Update 2009–2029

The *Tehama County General Plan Update 2009–2029* (Tehama County 2009) identifies goals, objectives, and policies for public services in Tehama County. The public services element of the general plan addresses concerns associated with growth and development as they relate to public services, including schools. The safety element addresses potential dangers and damages associated with fire, floods, earthquakes, landslides, and other hazards.

22.3 Environmental Consequences and Mitigation Measures

22.3.1 Methods and Assumptions

This section addresses potential impacts associated with implementation of the project on the following public services: law enforcement, fire protection, emergency services, and schools. The analysis is based on a review of planning documents applicable to the project area, consultation with various agencies, and field reconnaissance.

22.3.2 Criteria for Determining Significance of Effects

An environmental document prepared to comply with the NEPA must consider the context and intensity of the environmental effects that would be caused by, or result from, the proposed action. Under NEPA, the significance of an effect is used solely to determine whether an EIS must be prepared. An environmental document prepared to comply with the CEQA must identify the potentially significant environmental effects of a project. A "[s]ignificant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project" (State CEQA Guidelines Section 15382). CEQA also requires that the environmental

document propose feasible measures to avoid or substantially reduce significant environmental effects (State CEQA Guidelines, Section 15126.4(a)).

The following significance criteria are based on guidance provided by the State CEQA Guidelines and consider the context and intensity of the environmental effects as required under NEPA. Impacts of an alternative on public services would be significant if project implementation would do any of the following:

- Interfere with emergency services
- Degrade the level of service of a public service
- Require relocating public service facilities
- Require substantial improvements to the facilities or level of staffing of a public service to maintain its existing level of service

22.3.3 Topics Eliminated from Further Consideration

No topics were eliminated from consideration.

22.3.4 Direct and Indirect Effects

No-Action Alternative

The impact discussion for the No-Action Alternative addresses Shasta Lake and vicinity and the upper Sacramento River together because this alternative would not affect land use in any of the primary study area locations. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because the distance from the project area would result in similar impacts.

Shasta Lake and Vicinity, Upper Sacramento River (Shasta Dam to Red Bluff), Lower Sacramento River and Delta, and CVP/SWP Service Areas

Impact PS-1 (No-Action): Disruption of Public Services Under the No-Action Alternative, no new facilities would be constructed in the primary or extended study areas, and no changes in Reclamation's existing facilities or operations would occur that would directly or indirectly result in the disruption of public services in the project area. Therefore, no impact would occur. Mitigation is not required for the No-Action Alternative.

Impact PS-2 (No-Action): Degraded Level of Public Services Under the No-Action Alternative, no new facilities or infrastructure would be constructed in the primary or extended study areas and no changes in Reclamation's existing facilities or operations would occur that would directly or indirectly result in degraded levels of public services in the project area. Therefore, no impact would occur. Mitigation is not required for the No-Action Alternative.

Impact PS-3 (No-Action): Relocation of Public Service Facilities Under the No-Action Alternative, no new facilities would be constructed in the primary or extended study areas and no changes in Reclamation's existing facilities or

operations would occur that would directly or indirectly result in the relocation of public service facilities in the project area. Therefore, no impact would occur. Mitigation is not required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

The impact discussion for CP1 addresses Shasta Lake and vicinity and upper Sacramento River together because impacts from construction activities would affect both areas. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because their distance from the project area would result in similar impacts.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact PS-1 (CP1): Short-Term Disruption of Public Services Project construction could result in short-term disruption of emergency services response as well as short-term disruption to school bus services throughout the Gateway Unified School District. Short-term traffic delays and access restrictions would require traffic controls and coordination with public services agencies. Although Reclamation would implement measures to lessen short-term disruption of public services, this impact would be potentially significant.

Construction activities associated with enlarging Shasta Dam and related infrastructure (e.g., road relocations, bridge replacements) near the dam and near relocation sites for utilities, roads, and structures could temporarily disrupt transportation and circulation patterns in the vicinity, which could affect emergency services response and school bus service. Emergency preparedness, emergency communications, and emergency supplies, including food and shelter for emergency crews and public services staff, could also be affected by project implementation because of temporary increases in the work force.

Direct impacts could include disruption of traffic flows and street operations through temporary lane closures, detours, blockages, and restrictions on curbside parking; these impacts could result in delays for emergency services vehicles and school buses traveling through or around construction zones. In addition, project construction could cause short-term interruptions in power and telecommunications services, which could affect emergency response capabilities in the primary study area.

Construction activities that could disrupt emergency services and school bus service in the primary study area include road and bridge replacement, telecommunications facility replacement, power facility replacement, vegetation clearing for utility relocation, structure removal, marina relocation, and emergency services facility relocation. Reclamation estimates that construction activities for CP1 would take 4.5 years.

Routes proposed for transporting construction materials to the dam consist of I-5 and local roads, particularly Shasta Dam Boulevard and Lake Boulevard. These routes are used primarily by Reclamation personnel to access the Shasta Dam facilities, by visitors and tourists, and by residents of the City of Shasta Lake. At this time, no detours or lane closures are proposed for the portions of Shasta Dam Boulevard and Lake Boulevard that serve the City of Shasta Lake. Road closures would likely be required adjacent to the facilities in the immediate vicinity of Shasta Dam and Reclamation's Northern California Area Office.

The Gateway Unified School District covers Shasta Lake and vicinity and portions of the upper Sacramento River area. Project construction could result in traffic delays and the need to reroute local traffic to ensure public health and safety. School bus routes could be temporarily affected by road closures and detours during project construction in communities around Shasta Lake.

Several roads around Shasta Lake would be affected by infrastructure, utility, and marina relocation activities. These activities could require road closures, detours, or traffic restrictions.

Emergency supplies and resources that could be affected by project implementation include food, shelter for emergency crews and local residents, and public services staff and equipment. Project construction activities are located within commuting distance of Redding, where ample food and shelter are available in emergencies. The Cal EMA network could supplement local emergency services staffing and equipment levels. However, Cal EMA may not be able to provide assistance when wildfires in the state require Cal EMA resources.

Construction activities at Shasta Dam and various locations surrounding Shasta Lake could affect emergency response capabilities throughout Shasta County (i.e., in a portion of the upper Sacramento River area) because the areas share emergency services resources and responsibilities.

In summary, project construction could result in short-term disruption of school bus services throughout the Gateway Unified School District. Short-term traffic delays and access restrictions would require traffic controls and coordination with public services agencies. Therefore, this impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

Impact PS-2 (CP1): Degraded Level of Public Services Project implementation could temporarily degrade local public resources. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services would not be substantially degraded by construction activities, this impact would be potentially significant.

Project implementation could result in short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. This conclusion is based on the size of the project and proposed locations for construction activity associated with infrastructure alterations. The relocation of infrastructure combined with possible consolidation of recreational facilities (e.g., USFS administrative facilities, campgrounds, boat ramps, marinas) could result in changing demands for public services. Project construction activities proposed around Shasta Lake could require local, State, and Federal agencies to change the locations of some public services, which could affect the areas where the public services are currently located.

Project implementation could also result in degraded levels of public services in the upper Sacramento River portion of the primary study area because the Shasta Lake area and parts of the upper Sacramento River area share public services. Project construction activities at Shasta Lake could require the use of public services resources that could be needed simultaneously for public services assistance in the upper Sacramento River area.

Reclamation estimates that CP1 would take 4.5 years to complete. Public services levels that are increased as a result of the project would return to pre-project levels once construction activities were completed. However, project implementation could temporarily degrade local public resources. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

Impact PS-3 (CP1): Relocation of Public Services The project would require relocation of some public service facilities in the Shasta Lake and vicinity portion of the primary study area. No public services facilities in the upper Sacramento River portion of the primary study area would need to be relocated. This impact would be less than significant.

The Whiskeytown-Shasta-Trinity National Recreation Area is managed by USFS, which has several facilities throughout the reservoir area. Two USFS facilities would be inundated and thus would require relocation or replacement. The work station located in the Lakeshore area would be inundated by raising Shasta Dam and would have to be relocated to an area above the new full pool. The new facility would contain all of the features that exist at the current facility. The inundated facility would be demolished and hauled to waste. At Turntable Bay, another USFS facility would be inundated by the raising of Shasta Dam. Additional space at Turntable Bay would allow for the facility to be relocated on fill in the current location. Also, the SCSO substation and dock at the Bridge Bay Marina could need to be relocated within the marina complex. Reclamation would construct the replacement facilities before abandonment and demolition of the existing facilities, thereby ensuring that levels of public services provided by these facilities would not be adversely affected by the relocation process. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact PS-4 (CP1): Short-Term Disruption of Public Services Project implementation would not disrupt public services in the extended study area because of the distance of the extended study area from project elements that could affect public services. The northern end of the extended study area would be more than 30 miles from the nearest project construction activities. Emergency services providers with mutual aid agreements that could be called on to assist with emergencies resulting from project activities are located in the primary study area. Project construction activities in the primary study area that could disrupt public services would be too far removed from the extended study area to disrupt emergency services or law enforcement serving areas south of Red Bluff. Project implementation would not disrupt school bus service in the extended study area because school districts located in the extended study area would not operate school bus routes in or near project construction activities. Therefore, no impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact PS-5 (CP1): Degraded Levels of Public Services Construction activities are not expected to affect public service levels in the extended study area. Existing facilities, personnel, and equipment in the extended study area could provide short-term assistance for project-related public services needs without degrading public services levels in the extended study area. This impact would be less than significant.

The northern end of the extended study area would be more than 30 miles from the nearest project construction activities. Public services providers with mutual aid agreements that could be called on to assist with law enforcement, fire suppression, or other emergencies resulting from project activities are located in the primary study area. Project construction activities around Shasta Lake are too far removed from the extended study area to disrupt public services below Red Bluff. Public services providers located in the extended study area could be called on by Cal EMA to assist with large-scale emergencies in the primary study area that resulted from project implementation. However, existing facilities, personnel, and equipment in the extended study area would be adequate to maintain current levels of service while providing assistance to the primary study area.

Indirect impacts on public services in the extended study area could result from traffic accidents associated with the transport of project materials and workers. Some project materials and workers could originate in the extended study area, requiring northbound travel to the primary study area. At this time, Reclamation estimates that the project would employ 350 workers. Project-related travel that would likely occur on I-5, the railway, or via air transport is not anticipated to result in accidents in the extended study area that would require significant response from law enforcement, fire protection, or emergency services providers; however, the fact that traffic accidents resulting from project-related travel could occur in the extended study area means that the possibility of

travel-related accidents would exist. Existing facilities, personnel, and equipment in the extended study area are expected be adequate to maintain current levels of service while providing assistance for any such accidents.

Existing facilities, staff, and equipment in the extended study area would be capable of providing short-term assistance for project-related public services needs without degrading levels of public services in the extended study area. Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact PS-6 (CP1): Relocation of Public Services Facilities Project implementation would not result in the relocation of public services facilities in the extended study area. Therefore, public services in the extended study area would not be affected by relocation of public services facilities. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

The impact discussion for CP2 addresses Shasta Lake and vicinity and the upper Sacramento River together because impacts from construction activities would affect both areas. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because their distance from the project area would result in similar impacts.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact PS-1 (CP2): Short-Term Disruption of Public Services Project construction could temporarily disrupt transportation and circulation patterns, which could affect emergency services response and school bus service. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded by construction activities, this impact would be potentially significant.

Construction activities associated with enlarging Shasta Dam and related infrastructure (e.g., road relocations, bridge replacements) near the dam and near the relocation sites for utilities, roads, and structures could temporarily disrupt transportation and circulation patterns in the vicinity of Shasta Lake, which could affect emergency services response and school bus service. Emergency preparedness, emergency communications, and emergency supplies (e.g., food, shelter for emergency crews, public services staff) could also be affected by project implementation.

Impacts related to short-term disruption of emergency services that would result from implementing the 12.5-foot dam raise (CP2) are similar to those identified for the 6.5-foot dam raise (Impact PS-1 (CP1)). However, the duration of the impacts would be longer for CP2 because construction activities associated with

the 12.5-foot dam raise would take more time than under the 6.5-foot dam raise. The 12.5-foot dam raise would require significantly more concrete and is anticipated to take 6 more months to construct than the 6.5-foot dam raise (CP1).

The increased amount of infrastructure demolition and relocation activity associated with CP2 would also require more time than under CP1. More structures would need to be demolished and relocated, and additional power and telecommunication lines would need to be relocated. Additional septic systems and wells would also require demolition and relocation, and 20 additional road segments would need to be realigned for CP2. The increased construction activity in the Shasta Lake and vicinity portion of the primary study area under CP2 would extend the duration of potential disruption to emergency services and school bus service in that area. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

Impact PS-2 (CP2): Degraded Levels of Public Services Project implementation could cause short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services would not be substantially degraded, this impact would be potentially significant.

Project implementation could result in short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. This conclusion is based on the size of the project and proposed locations for construction activity associated with infrastructure alterations. The relocation of infrastructure combined with possible consolidation of recreational facilities (e.g., campgrounds, boat ramps, marinas) could result in changing demands for public services. Project construction activities proposed around Shasta Lake could require local, State, and Federal agencies to change the locations of some public services, which could affect the areas where the resources are currently located.

This impact would be similar to Impact PS-2 (CP1). However, the impacts would last longer for CP2 than CP1 because more time would be needed to complete project construction under the 12.5-foot dam raise. Reclamation estimates that CP2 would take 5 years to complete. Project implementation could temporarily degrade local public services. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

Impact PS-3 (CP2): Relocation of Public Services Facilities This impact would be similar to Impact PS-3 (CP1). Facility relocation would not degrade levels of public services when the public service agencies relocated to their new facilities. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact PS-4 (CP2): Short-Term Disruption of Public Services This impact would be similar to Impact PS-4 (CP1). Project implementation would not disrupt public services in the extended study area because of the distance of the extended study area from project elements that could affect public services. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact PS-5 (CP2): Degraded Levels of Public Services This impact would be similar to Impact PS-5 (CP1). Project construction activities are not expected to affect public services levels in the extended study area. Existing facilities, staff, and equipment in the extended study area would be capable of providing short-term assistance for project-related public services needs without degrading levels of public services in the extended study area. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact PS-6 (CP2): Relocation of Public Services Facilities This impact would be identical to Impact PS-6 (CP1). Project implementation would not result in the relocation of public service facilities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

The impact discussion for CP3 addresses Shasta Lake and vicinity and the upper Sacramento River together because impacts from construction activities would affect both areas. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because their distance from the project area would result in similar impacts.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact PS-1 (CP3): Short-Term Disruption of Public Services Project construction could temporarily disrupt transportation and circulation patterns, which could affect emergency services response and school bus service. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded by construction activities, this impact would be potentially significant.

Construction activities associated with enlarging Shasta Dam and the related infrastructure (e.g., road relocations, bridge replacements) near the dam and near the relocation sites for utilities, roads, and structures could temporarily disrupt transportation and circulation patterns in the vicinity, which could affect emergency services response and school bus service. Emergency preparedness, emergency communications, and emergency supplies (food, shelter for

emergency crews, public services staff) could also be affected by project implementation.

This impact would be similar to Impact PS-1 (CP1). However, the impact would last longer for CP3 because construction activities associated with the 18.5-foot dam raise would take more time than for the 6.5-foot dam raise. Reclamation estimates that the 18.5-foot dam raise would take 5 years. The 18.5-foot dam raise would require significantly more concrete and is anticipated to take 6 more months to construct than the 6.5-foot dam raise (CP1). The increased amount of infrastructure demolition and relocation activity associated with CP3 would also require more time than for CP1. Almost twice as many structures would need to be demolished and relocated, and additional power and telecommunication lines would require removal and relocation. Additional septic systems and wells would be abandoned and relocated, and 25 more road segments would be realigned. The increased construction activity at Shasta Dam and in the surrounding area would extend the time of potential disruption to emergency services. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

Impact PS-2 (CP3): Degraded Levels of Public Services Project implementation could cause short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded, this impact would be potentially significant.

Project implementation could result in short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. This conclusion is based on the size of the project and proposed locations for construction activity associated with infrastructure alterations. The relocation of infrastructure, combined with possible consolidation of recreational facilities (e.g., campgrounds, boat ramps, marinas), could result in changing demands for public services. Project construction activities proposed around Shasta Lake could require local, State, and Federal agencies to change the locations of some public services, which could affect the areas where the public services are currently located.

This impact would be similar to Impact PS-2 (CP1). However, the impact would last longer for CP3 than for CP1 because more time would be needed to complete project construction for the 18.5-foot dam raise. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

Impact PS-3 (CP3): Relocation of Public Services Facilities This impact would be similar to Impact PS-3 (CP1). Facilities relocation would not degrade levels of public services while the public services agencies are relocating to new

facilities. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact PS-4 (CP3): Short-Term Disruption of Public Services This impact would be similar to Impact PS-4 (CP1). Project implementation would not disrupt public services in the extended study area because of the distance of the extended study area from project elements that could affect public services. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact PS-5 (CP3): Degraded Levels of Public Services This impact would be similar to Impact PS-5 (CP1). Project construction activities are not expected to affect public services levels in the extended study area. Existing facilities, staff, and equipment in the extended study area would be capable of providing short-term assistance for project-related public services needs without degrading levels of public services in the extended study area. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact PS-6 (CP3): Relocation of Public Services Facilities This impact would be identical to Impact PS-6 (CP1). Project implementation would not result in the relocation of public services facilities in extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

The impact discussion for CP4 and CP4A addresses Shasta Lake and vicinity and the upper Sacramento River together because impacts from construction activities would affect both areas. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because their distance from the project area would result in similar impacts.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact PS-1 (CP4 and CP4A): Short-Term Disruption of Public Services
Project construction could temporarily disrupt transportation and circulation patterns, which could affect emergency services response and school bus service. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded by construction activities, this impact would be potentially significant for CP4 and CP4A.

This impact would be similar to Impact PS-1 (CP3). Construction activities associated with enlarging Shasta Dam and related infrastructure (e.g., road relocations, bridge replacements) near the dam and near the relocation sites for

utilities, roads, and structures could temporarily disrupt transportation and circulation patterns in the vicinity of Shasta Lake, which could affect emergency services response and school bus service. Emergency preparedness, emergency communications, and emergency supplies (e.g., food, shelter for emergency crews, public services staff) could also be affected by project implementation. In addition, gravel augmentation and the habitat restoration activities along the upper Sacramento River would slightly, but not substantially, increase the potential for short-term disruption of public services in the primary study area.

This impact would be potentially significant for CP4. Mitigation for this impact is proposed in Section 22.3.5.

This impact would be potentially significant for CP4A. Mitigation for this impact is proposed in Section 22.3.5.

Impact PS-2 (CP4 and CP4A): Degraded Levels of Public Services Project implementation could cause short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded, this impact would be potentially significant.

This impact would be similar to Impact PS-2 (CP3). Project implementation could result in short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. This conclusion is based on the size of the project and proposed locations for construction activity associated with infrastructure alterations. The relocation of infrastructure, combined with possible consolidation of recreational facilities (e.g., campgrounds, boat ramps, marinas), could result in changing demands for public services. Project construction proposed around Shasta Lake could require local, State, and Federal agencies to change the location of some public services, which could affect the areas where the public services are currently located. In addition, gravel augmentation and the habitat restoration activities along the upper Sacramento River would slightly, but not substantially, increase the potential for degradation of public services.

This impact would be potentially significant for CP4. Mitigation for this impact is proposed in Section 22.3.5.

This impact would be potentially significant for CP4A. Mitigation for this impact is proposed in Section 22.3.5.

Impact PS-3 (CP4 and CP4A): Relocation of Public Services Facilities This impact would be similar to Impact PS-3 (CP1). Facilities relocation would not

degrade levels of public services while the public services agencies are relocating to new facilities.

This impact would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas

Impact PS-4 (CP4 and CP4A): Short-Term Disruption of Public Services This impact would be similar to Impact PS-4 (CP1). Project implementation would not disrupt public services in the extended study area because of the distance of the extended study area from project elements that could affect public services. Therefore no impact would occur for CP4 or CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact PS-5 (CP4 and CP4A): Degraded Levels of Public Services This impact would be similar to Impact PS-5 (CP1). Project construction activities are not expected to affect public services levels in the extended study area. Existing facilities, staff, and equipment in the extended study area would be capable of providing short-term assistance for project-related public services needs without degrading levels of public services in the extended study area.

This impact would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact PS-6 (CP4 and CP4A): Relocation of Public Services Facilities This impact would be identical to Impact PS-6 (CP1). Project implementation would not result in the relocation of public services facilities in the extended study area. No impact would occur for CP4 or CP4A. Mitigation for this impact is not needed, and thus not proposed.

CP5 – 18.5-Foot Dam Raise, Combination Plan

The impact discussion for CP5 addresses Shasta Lake and vicinity and the upper Sacramento River together because impacts from construction activities would affect both areas. It also addresses the lower Sacramento River and Delta and the CVP/SWP service areas together because their distance from the project area would result in similar impacts.

Shasta Lake and Vicinity and Upper Sacramento River (Shasta Dam to Red Bluff)

Impact PS-1 (CP5): Short-Term Disruption of Public Services Project construction could temporarily disrupt transportation and circulation patterns, which could affect emergency services response and school bus service.

Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded by construction activities, this impact would be potentially significant.

This impact would be similar to Impact PS-1 (CP3). Construction activities associated with enlarging Shasta Dam and related infrastructure (e.g., road relocations, bridge replacements) near the dam and near relocation sites for utilities, roads, and structures could temporarily disrupt transportation and circulation patterns in the vicinity, which could affect emergency services response and school bus service. Emergency preparedness, emergency communications, and emergency supplies (e.g., food, shelter for emergency crews, public service staff) could also be affected by project implementation. In addition, gravel augmentation and the habitat restoration activities along the upper Sacramento River would slightly, but not substantially, increase the potential for short-term disruption of public services in the primary study area. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

Impact PS-2 (CP5): Degraded Levels of Public Services Project implementation could cause short-term degradation of levels of public services, including law enforcement, fire protection, and emergency services. Although Reclamation would provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services were not substantially degraded, this impact would be potentially significant.

This impact would be similar to Impact PS-2 (CP3). Project implementation could result in short-term degradation of levels of public services, including impacts on law enforcement, fire protection, and emergency services. This conclusion is based on the size of the project and proposed locations for construction activity associated with infrastructure alterations. Project construction activities proposed around Shasta Lake could require local, State, and Federal agencies to change the location of some public services, which could affect the areas where the public services are currently located. In addition, gravel augmentation and the habitat restoration activities along the upper Sacramento River would slightly, but not substantially, increase the potential for degradation of public services. This impact would be potentially significant. Mitigation for this impact is proposed in Section 22.3.5.

Impact PS-3 (CP5): Relocation of Public Services Facilities This impact is similar to Impact PS-3 (CP1). Facilities relocation would not degrade levels of public service while the public service agencies are relocating to new facilities. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta and CVP/SWP Service Areas
Impact PS-4 (CP5): Short-Term Disruption of Public Services This impact would be similar to Impact PS-4 (CP1). Project implementation would not disrupt public services in the extended study area because of the distance of the extended study area from project elements that could affect public services. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact PS-5 (CP5): Degraded Levels of Public Services This impact would be similar to Impact PS-5 (CP1). Project construction activities are not expected to affect public services levels in the extended study area. Existing facilities, staff, and equipment in the extended study area would be capable of providing short-term assistance for project-related public services needs without degrading levels of public services in the extended study area. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact PS-6 (CP5): Relocation of Public Services Facilities This impact would be identical to Impact PS-6 (CP1). Project implementation would not result in the relocation of public services facilities in the extended study area. No impact would occur. Mitigation for this impact is not needed, and thus not proposed.

22.3.5 Mitigation Measures

Table 22-2 presents a summary of mitigation measures for public services.

Table 22-2. Summary of Mitigation Measures for Public Services

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact PS-1: Disruption of Public Services (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure PS-1: Coordinate and Assist Public Services Agencies.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact PS-2: Degraded Level of Public Services (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure PS-2: Provide Support to Public Services Agencies.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact PS-3: Relocation of Public Service Facilities (Shasta Lake and Vicinity and Upper Sacramento River)	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS

Table 22-2. Summary of Mitigation Measures for Public Services (contd.)

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact PS-4: Short-Term Disruption of Public Services (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	NI	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	NI	NI	NI	NI	NI
Impact PS-5: Degraded Levels of Public Services (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact PS-6: Relocation of Public Services Facilities (Lower Sacramento River, Delta, CVP/SWP Service Areas)	LOS before Mitigation	NI	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	NI	NI	NI	NI	NI

Key:
CP = Comprehensive Plan
CVP = Central Valley ProjectLOS = level of significance
LTS = less than significant
NI = no impact
PS = potentially significant
SWP = State Water Project

No-Action Alternative

No mitigation measures are required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impacts PS-3 (CP1) through PS-6 (CP1). Mitigation is provided below for impacts of CP1 related to short-term disruption of public services (PS-1) and degraded levels of public services in the primary study area (PS-2).

Mitigation Measure PS-1 (CP1): Coordinate and Assist Public Services Agencies Reclamation will coordinate all proposed road closures, detours, and traffic control measures with the (SCSO) and Tehama County Sheriff's Office, which are the designated Cal EMA (formerly OES) headquarters for the primary study area.

Reclamation will appoint a public liaison to communicate construction schedules, road closures, and project activities to the public. The liaison will organize and conduct public meetings for the purpose of communicating project information. The liaison will meet with all affected public services agencies to coordinate public meetings and information exchanges.

Reclamation will obtain all necessary permits and/or authorizations from public services agencies for matters requiring agency approval and/or cooperation.

Reclamation will meet with public services agencies to determine traffic controls for infrastructure, utility, and structure relocation.

Reclamation will develop and implement a monitoring plan to track the effectiveness of this mitigation measure, and will make adjustments, if necessary.

Traffic Control and Safety Assurance Plan Reclamation will implement Mitigation Measure Trans-1 as described in Chapter 20, "Transportation and Traffic," to reduce adverse effects of road closures and detours or partial road closures on access to local streets and adjacent uses.

Implementation of this mitigation measure would reduce Impact PS-1 (CP1) to a less-than-significant level.

Mitigation Measure PS-2 (CP1): Provide Support to Public Services Agencies Reclamation will provide affected public services providers (e.g., law enforcement, fire protection, emergency services) with sufficient funding and support to ensure that levels of public services are not substantially degraded by construction activities. Reclamation will coordinate with affected providers to develop a mutual understanding of the amount and schedule of financial and administrative support required to reduce this impact to a less-than-significant level.

Reclamation will develop and implement a monitoring plan to track the effectiveness of this mitigation measure, and will make adjustments, if necessary.

Implementation of this mitigation measure would reduce Impact PS-2 (CP1) to a less-than-significant level.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impacts PS-3 (CP2) through PS-6 (CP2). Mitigation is provided below for the impacts of CP2 related to short-term disruption of public services (PS-1) and degraded levels of public services (PS-2) in the primary study area.

Mitigation Measure PS-1 (CP2): Coordinate and Assist Public Services Agencies This mitigation measure is identical to Mitigation Measure PS-1 (CP1). Implementation of this mitigation measure would reduce Impact PS-1 (CP2) to a less-than-significant level.

Mitigation Measure PS-2 (CP2): Provide Support to Public Services Agencies This mitigation measure is identical to Mitigation Measure PS-2 (CP1). Implementation of this mitigation measure would reduce Impact PS-2 (CP2) to a less-than-significant level.

CP3 – 18.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation is required for Impacts PS-3 (CP3) through PS-6 (CP3). Mitigation is provided below for the impacts of CP3 related to short-term disruption of public services (PS-1) and degraded levels of public services (PS-2) in the primary study area.

Mitigation Measure PS-1 (CP3): Coordinate and Assist Public Services Agencies This mitigation measure is identical to Mitigation Measure PS-1 (CP1). Implementation of this mitigation measure would reduce Impact PS-1 (CP3) to a less-than-significant level.

Mitigation Measure PS-2 (CP3): Provide Support to Public Services Agencies This mitigation measure is identical to Mitigation Measure PS-2 (CP1). Implementation of this mitigation measure would reduce Impact PS-2 (CP3) to a less-than-significant level.

CP4 and CP4A -18.5 Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

No mitigation is required for Impacts PS-3 (CP4 and CP4A) through PS-6 (CP4 and CP4A). Mitigation is provided below for the impacts of CP4 and CP4A related to short-term disruption of public services (PS-1) and degraded levels of public services (PS-2) in the primary study area.

Mitigation Measure PS-1 (CP4 and CP4A): Coordinate and Assist Public Services Agencies This mitigation measure identical to Mitigation Measure PS-1 (CP1). Implementation of this mitigation measure would reduce Impact PS-1 (CP4 and CP4A) to a less-than-significant level.

Mitigation Measure PS-2 (CP4 and CP4A): Provide Support to Public Services Agencies This mitigation measure is identical to Mitigation Measure PS-2 (CP1). Implementation of this mitigation measure would reduce Impact PS-2 (CP4 and CP4A) to a less-than-significant level.

CP5 – 18.5-Foot Dam Raise, Combination Plan

No mitigation is required for Impacts PS-3 (CP5) through PS-6 (CP5). Mitigation is provided below for the impacts of CP5 related to short-term disruption of public services (PS-1) and degraded levels of public services (PS-2) in the primary study area.

Mitigation Measure PS-1(CP5): Coordinate and Assist Public Services Agencies This mitigation measure is identical to Mitigation Measure PS-1 (CP1). Implementation of this mitigation measure would reduce Impact PS-1 (CP5) to a less-than-significant level.

Mitigation Measure PS-2 (CP5): Provide Support to Public Services Agencies This mitigation measure is identical to Mitigation Measure PS-2

(CP1). Implementation of this mitigation measure would reduce Impact PS-2 (CP5) to a less-than-significant level.

22.3.6 Cumulative Effects

Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," gives an overview of the cumulative effects analysis, including significance criteria, and discusses the relationship of this analysis to the CALFED Programmatic Cumulative Impacts Analysis. Table 3-1, "Present and Reasonably Foreseeable Future Actions Included in the Analysis of Cumulative Impacts, by Resource Area," in Chapter 3, lists the projects considered quantitatively and qualitatively within the cumulative impacts analysis. This cumulative impacts analysis accounts for potential project impacts combined with the impacts of existing facilities, conditions, land uses, and reasonably foreseeable actions expected to occur in the study area on a qualitative and quantitative level. None of the projects listed in Table 3-1 under Quantitative Analysis would have effects on public services in the primary study area or have effects in extended study area that contribute to cumulative impacts of the SLWRI since no impacts have been identified in the extended study area. This analysis is based on the projects listed in Table 3-1 under Qualitative Analysis.

Past and present projects that could affect public services relate to construction projects, land use developments, dam construction, and recreation development. Projects listed in Table 3-1 that may have a cumulative effect on public services in the primary study area include the Antlers Bridge Replacement, Moody Flats Quarry, and the Iron Mountain Restoration Plan. SLWRI is not expected to have cumulative impacts on public services in the extended study area.

Implementing the proposed SLWRI alternatives would not have a significant cumulative effect on public services in the primary study area. As described above, CP1– CP5 would result in short-term disruption of public services, would degrade the levels of public services provided, and would require the relocation of public services facilities in the primary study area. These effects would be of greater magnitude and duration with the larger dam raises. Thus, effects of CP2 would be similar to but greater than those of CP1, and similar to but less than those of CP3–CP5. Although Mitigation Measures PS-1 and PS-2 would enhance the coordination of public services during project implementation, the adverse effects of CP1–CP5 would not be eliminated, particularly regarding short-term disruption of public services. Only three of the present or reasonably foreseeable future actions, Antlers Bridge Replacement, Moody Flats Quarry, and the Iron Mountain Restoration Plan, are located in the immediate vicinity of Shasta Lake and would have the potential to result in short-term disruption of public services, would degrade the levels of public services provided, or would require the relocation of public services facilities in the primary study area. The Antlers Bridge replacement is currently under construction and is expected to be completed in 2015, before any of the action alternatives would begin. With respect to the Iron Mountain Mine Restoration

Plan, this activity would be unlikely to occur simultaneously with the action alternatives. The Moody Flats Quarry project Draft EIR is currently being prepared by the CEQA Lead Agency, it is uncertain when actions may occur. Therefore, construction activities related to implementation of the proposed SLWRI alternatives would not contribute considerably to significant cumulative impacts on public services.

The effects of CP1–CP5 on public services would diminish with distance from project construction sites, and the alternatives would not have cumulatively considerable impacts on public services downstream from Red Bluff (i.e., in the extended study area).

Chapter 23
Power and Energy

This chapter describes the environmental and regulatory settings of power and energy, as well as environmental consequences and mitigation measures, as they pertain to the SLWRI action alternatives. The discussion of power and energy of the existing conditions and the potential impacts of the program alternatives on power and energy encompass the Pit 7 Powerplant upstream from Shasta Reservoir as well as the CVP/SWP water service areas and associated facilities.

23.1 Affected Environment

Shasta Lake is an integral part of the CVP, and the proposed changes in storage and releases affect system operations throughout the CVP. This change in CVP operations and the dedication of a portion of the storage in Shasta Lake to operate for the SWP affect the operations of the entire SWP system. Locally, the potential changes in operations would likely affect the upstream Pit 7 Powerplant.

The CVP is a multipurpose project with 20 storage facilities, 5 pumping plants, 11 hydroelectric powerplants, and 500 miles of major canals, as well as conduits, tunnels, and related facilities. As mandated, the power generation of the CVP is first dedicated to meeting the project use requirements of the CVP facilities. Because the CVP generates more power than it uses, the excess power is marketed through the Western Area Power Administration (Western).

The SWP is a multipurpose project with 32 storage facilities. Major SWP facilities include 17 pumping plants, 8 hydroelectric powerplants, and 660-plus miles of aqueducts and pipelines. Because the SWP uses more energy than it generates from its hydroelectric facilities, DWR has exchange agreements with other utility companies and has developed other power resources. DWR sells surplus power, when it is available, to minimize the net cost of pumping energy.

For a more in-depth description of the affected environment, see the *Power and Energy Technical Report*.

23.1.1 Shasta Lake and Vicinity

The Shasta Division of the CVP contains Shasta Dam, Lake, and Powerplant, and Keswick Dam, Reservoir, and Powerplant; it captures water from the Sacramento River basin. Shasta Powerplant is located just below Shasta Dam as part of the Shasta Division. Water from the dam is released through five 15-foot penstocks leading to the 5 main generating units and 2 station service units with

a maximum generation capacity of 710 megawatts (MW). Shasta Powerplant is a peaking plant and generally runs when demand for electricity is high. The remaining energy is marketed to customers in Northern California. The 2007 net annual generation of Shasta Powerplant was 1,914,175 megawatt-hours (MWh).

23.1.2 Upper Sacramento River (Shasta Dam to Red Bluff Pumping Plant)

CVP powerplants located downstream from Shasta Reservoir but upstream from the Red Bluff Pumping Plant are Trinity, Lewiston, Judge Francis Carr, and Spring Creek powerplants of the Trinity River Division and Keswick Powerplant of the Shasta Division. The Trinity River Division captures headwaters from the Trinity River basin and diverts surplus water to the Sacramento River.

Trinity Dam stores water from the Trinity River in Trinity Reservoir and makes releases to the Trinity River through Trinity Powerplant. Downstream, Lewiston Dam makes minimum required releases to the Trinity River through Lewiston Powerplant and diverts water into Clear Creek Tunnel and through Judge Francis Carr Powerplant to Whiskeytown Reservoir. Some Whiskeytown Reservoir releases are made through Spring Creek Power Conduit and Powerplant into Keswick Reservoir in the Shasta Division. The remaining releases from Whiskeytown Reservoir are made to Clear Creek. Releases from Keswick Reservoir are made through Keswick Powerplant to the Sacramento River.

Keswick Powerplant belongs to the Shasta Division, is located at Keswick Dam, and has 3 generating units with a total capacity of 117 MW. Keswick Powerplant is a run-of-the-river facility, creating Shasta Powerplant’s afterbay and providing uniform flows to the Sacramento River.

23.1.3 Lower Sacramento River and Delta

Two CVP powerplants, Folsom and Nimbus, are located between Red Bluff Pumping Plant and the Delta. Both powerplants belong to the Folsom Unit on the American River.

Folsom Powerplant is a peaking powerplant, located at the foot of Folsom Dam on the north side of the American River. Water from the dam is released through three 15-foot-diameter penstocks to 3 generating units with a maximum capacity of 215 MW. Folsom Dam was constructed by USACE and, on completion, was transferred to Reclamation for coordinated operation as an integral part of the CVP.

Nimbus Dam forms Lake Natoma to act as an afterbay for Folsom Powerplant. It allows dam operators to coordinate power generation and flows in the lower American River channel during normal reservoir operations. Nimbus Powerplant, with 2 units and a maximum capacity of 17 MW, is a run-of-the-river facility and provides station service backup for Folsom Powerplant.

23.1.4 CVP/SWP Service Areas

There are a number of generation facilities and pumping facilities in the greater CVP/SWP service areas, beyond the specific geographies discussed above. These facilities are discussed below.

CVP Generation Facilities

The CVP powerplants located in the CVP south-of-Delta service area include New Melones Powerplant in the New Melones Unit of the CVP East Side Division, and the William R. Gianelli and O'Neill Pumping-Generating Plants in the San Luis Unit of the CVP West San Joaquin Division. The latter two, with dual functions of generating electricity and pumping water, are jointly owned by Reclamation and DWR.

New Melones Dam was completed in 1979, and inundated the original Melones Dam and created New Melones Reservoir on the Stanislaus River. New Melones Powerplant, located on the north bank immediately downstream from the dam, is a peaking plant. The powerplant contains 2 units and a maximum capacity of 383 MW.

The San Luis Unit, part of both the CVP and SWP, was authorized in 1960. Reclamation and the State of California constructed and operate this unit jointly; 45 percent of the total cost was contributed by the Federal government and the remaining 55 percent by the State of California. The joint-use facilities are O'Neill Dam and Forebay, B.F. Sisk San Luis Dam, San Luis Reservoir, William R. Gianelli Pumping-Generating Plant, Dos Amigos Pumping Plant, Los Banos and Little Panoche Reservoirs, and San Luis Canal from O'Neill Forebay to Kettleman City, together with the necessary switchyard facilities. The Federal-only portion of the San Luis Unit includes O'Neill Pumping-Generating Plant and Intake Canal, Coalinga Canal, Pleasant Valley Pumping Plant, and San Luis Drain.

San Luis Reservoir serves as the major storage reservoir, and O'Neill Forebay acts as an equalizing basin for the upper stage, dual-purpose pumping-generating plant. O'Neill Pumping-Generating Plant takes water from the Delta-Mendota Canal and discharges it into the O'Neill Forebay, where the California Aqueduct (SWP feature) flows directly. William R. Gianelli Pumping-Generating Plant lifts water from O'Neill Forebay and discharges it into San Luis Reservoir. During releases from the reservoir, these plants generate electric power by reversing flow through the turbines. Water for irrigation is released into the San Luis Canal and flows by gravity to Dos Amigos Pumping Plant, where the water is lifted more than 100 feet to permit gravity flow to the canal terminus at Kettleman City. The SWP canal system continues to southern coastal areas.

O'Neill Pumping-Generating Plant consists of an intake channel, leading off the Delta-Mendota Canal, and six pumping-generating units, with a total capacity of about 14 MW. Normally, these units operate as pumps to lift water from 45 to

53 feet into O'Neill Forebay; each unit can discharge 700 cubic feet per second (cfs) and has a rating of 6,000 horsepower (hp). Water is occasionally released from the forebay to the Delta-Mendota Canal, and these units then operate as generators.

William R. Gianelli Pumping-Generating Plant, the joint Federal-State facility located at San Luis Dam, lifts water by pump-turbines from O'Neill Forebay into San Luis Reservoir. During the irrigation season, water is released from San Luis Reservoir back through the pump-turbines to the forebay and energy is reclaimed. Each of the eight pumping-generating units has a capacity of 63,000 hp as a motor and 53 MW as a generator. As a pumping plant to fill San Luis Reservoir, each unit lifts 1,375 cfs at a design dynamic head of 290 feet. As a generating plant, each unit passes 2,120 cfs at a design dynamic head of 197 feet.

SWP Generation Facilities

Among the eight SWP hydroelectric powerplants, three powerplants are located in the Lake Oroville vicinity and the remaining in the south-of-Delta area.

Lake Oroville, the SWP's largest reservoir, stores winter and spring runoff from the Feather River watershed and releases water for SWP needs. These releases generate power at three powerplants: Edward Hyatt Pumping-Generating Plant, Thermalito Diversion Dam Powerplant, and Thermalito Pumping-Generating Plant (Oroville Facilities). DWR schedules hourly releases through the Oroville Facilities to maximize the amount of energy produced when power values are highest. Because the downstream water supply does not depend on hourly releases, water released for power in excess of local and downstream requirements is conserved by pump-back operation during off-peak times into Lake Oroville. Energy prices primarily dictate hourly operations for the power generation facilities.

The remaining five SWP powerplants are the jointly owned William R. Gianelli Pumping-Generating Plant, Alamo Powerplant, Mojave Siphon Powerplant, Devil Canyon Powerplant, and Warne Powerplant. They generate about one-sixth of the total energy used by the SWP. Alamo Powerplant uses the 133-foot head between Tehachapi Afterbay and Pool 43 of the California Aqueduct to generate electricity. Mojave Siphon Powerplant generates electricity from water flowing downhill after its 540-foot lift by Pearblossom Pumping Plant. Devil Canyon Powerplant generates electricity with water from Silverwood Lake, with more than 1,300 feet of head, the highest water head[1] in a powerplant in

[1] Potential hydropower generation is a function of the hydraulic net head and rate of fluid flow. The net head is the actual head available for power generation and is used for computing the energy generated. The net head is the gross head minus the head losses due to intake structures, penstocks, and outlet works. The gross or static head is the vertical distance between the tailwater elevation and the forebay water surface elevation (i.e., the height of water in the reservoir relative to its height after discharge). The head losses are generally assumed to be 2 to 10 percent of the gross head, depending on the configuration of the powerhouse structure.

the SWP system. Warne Powerplant uses the 725-foot drop from Peace Valley Pipeline to generate electricity with its Pelton wheel turbines.

CVP Pumping Facilities

CVP pumping plants that move water from the Delta to CVP service areas in the Central Valley include C.W. "Bill" Jones Pumping Plant, O'Neill and William R. Gianelli Pumping-Generating Plants, Dos Amigo Pumping Plant, and SWP Banks Pumping Plant. Reclamation constructed and operates C.W. "Bill" Jones Pumping Plant. Harvey O. Banks Pumping Plant is an SWP facility; however, Reclamation has access to its pumping capacity by use of the Joint Point of Diversion, described in the State Water Resources Control Board's Water Right Decision 1641. The remaining plants, described previously, are joint-use facilities between the two agencies under the San Luis Unit.

C.W. "Bill" Jones Pumping Plant, formerly Tracy Pumping Plant, is a component of the CVP Delta Division. Construction of the plant started in 1947 and was completed in 1951, with an inlet channel, pumping plant, and discharge pipes. Delta water is lifted 197 feet and is carried about 1 mile into the Delta-Mendota Canal. Each of the 6 pumps at C.W. "Bill" Jones Pumping Plant is powered by a 22,500-hp motor and is capable of pumping 767 cfs. The intake canal includes the C.W. "Bill" Jones Fish Screen, which was built to intercept downstream migrant fish to be returned to the main channel, then to resume their journey to the ocean.

Dos Amigos Pumping Plant is a joint CVP/SWP facility, located 17 miles south of O'Neill Forebay on the San Luis Canal. It lifts water 113 feet to permit gravity flow to the terminus of San Luis Canal at Kettleman City. The plant contains 6 pumping units, each capable of delivering 2,200 cfs at 125 feet of head.

SWP Pumping Facilities

Among the SWP pumping plants, plants that historically consumed most of the energy are William R. Gianelli Pumping-Generating Plant (SWP share), Harvey O. Banks Pumping Plant, Dos Amigos Pumping Plant (SWP share), Ira J. Chrisman Pumping Plant, and A.D. Edmonston Pumping Plant.

Harvey O. Banks Pumping Plant is located 2.5 miles southwest of Clifton Court Forebay on the California Aqueduct. The plant is the first pumping plant for the California Aqueduct and the South Bay Aqueduct. It provides the necessary head[2] for water in the California Aqueduct to flow for approximately 80 miles south, past O'Neill Forebay and San Luis Reservoir to Dos Amigos Pumping Plant (another jointly owned facility, as previously described). Harvey O. Banks Pumping Plant initially flows into Bethany Reservoir, where the South Bay

[2] In pumping plants, the design head is the gross head plus the head losses due to intake structures.

Aqueduct truly begins. The design head ranges between 236 and 252 feet and installed capacity is 10,670 cfs with 333,000 hp.

Along the California Aqueduct, Pearblossom, Chrisman, and Edmonston pumping plants historically consumed the highest amount of energy. Pearblossom Pumping Plant lifts water about 540 feet and discharges it 3,479 feet above mean sea level (msl), the highest point along the entire California Aqueduct. Chrisman and Edmonston pumping plants provide 524 and 1,970 feet of lift, respectively, to convey California Aqueduct water across the Tehachapi Mountains.

23.2 Regulatory Framework

There are two categories of regulatory framework for hydropower: Federal regulations for CVP hydroelectric operations, and State regulations for the SWP.

23.2.1 Federal

Reclamation operates the CVP system for the management of floodwater, irrigation and municipal and industrial (M&I) water supply, fish and wildlife enhancement, hydropower generation, recreation, and water quality, under various acts authorizing specific projects and with other laws, permits, and enabling legislation (see the *Hydrology, Hydraulics, and Water Management Technical Report* in the Physical Resources Appendix for details).

The power generated by the CVP is marketed through contracts with Western. Western, created in 1977 under the U.S. Department of Energy Organization Act, markets and transmits electric power throughout 15 western states. Western's Sierra Nevada Customer Service Region (also known as the Sierra Nevada Region) markets and transmits power generated from the CVP and the Washoe Project in excess of CVP use.

The 2004 Marketing Plan for the Sierra Nevada Region specifies the terms and conditions under which Western markets power from the CVP and the Washoe Project that began on January 1, 2005. This marketing plan resulted in the existing power marketing contract between Western and the CVP that expires on December 31, 2024.

23.2.2 State

DWR is currently seeking a new 50-year hydroelectric license from the Federal Energy Regulatory Commission to operate the Oroville Facilities. The Final EIS and Final EIR are available for the general public review. The initial Federal Energy Regulatory Commission license for the Oroville Facilities, issued on February 11, 1957, expired on January 31, 2007. Currently, the Oroville Facilities are operating under a license that was issued by the Federal Energy

Regulatory Commission, effective February 1, 2007, and being renewed each year in anticipation of issuance of the new 50-year license.

23.2.3 Regional and Local

No known regional or local regulations govern power and energy resources.

23.3 Environmental Consequences and Mitigation Measures

The purpose of this section is to provide information about hydropower generation, energy use, and impacts on existing hydropower facilities from the SLWRI study alternatives described in the EIS. Hydropower modeling for the EIS was conducted to identify potential impacts from the SLWRI on hydropower generation and consumption at CVP and SWP facilities, which are operated by Reclamation and DWR, respectively. This section describes the analytical methodology used to calculate, for all alternatives, the hydropower generation and pumping energy required at existing CVP and SWP hydropower facilities. This chapter also describes criteria for determining significant impacts associated with the SLWRI alternatives, and lists those impacts.

23.3.1 Methods and Assumptions

Council on Environmental Quality regulations and the State CEQA Guidelines address NEPA and CEQA requirements for describing the potential environmental consequences of alternatives in an EIS and EIR, respectively. NEPA and CEQA requirements guide the assessments presented in this section. Appendix F of the State CEQA Guidelines addresses energy conservation, and NEPA directs that energy requirements and conservation potential are to be evaluated. This impact assessment is based on quantitative data regarding changes to hydropower resources that could occur under the program alternatives in geographic locales within the study area.

Several modeling tools were used for the SLWRI hydropower analysis. The CalSim-II model was used to simulate project operations and LongTermGen (LTGen), Version 1.18 and State Water Project Power (SWPPower), BST April 2010 Version power tools were used to quantify the hydropower generation and pumping energy associated with each alternative. A spreadsheet postprocessor was used to evaluate impacts to the Pit 7 Powerplant.

Power Modeling Tools

Energy estimates were made using the Benchmark Study Team (BST) power modeling tools LTGen, Version 1.18, and SWP Power, BST April 2010 Version, for CVP and SWP facilities, respectively. LTGen and SWP Power use operations data from CalSim-II simulations to predict energy generation and consumption throughout the CVP and SWP. Methods applied to evaluate power generation are discussed below.

For each alternative, outputs from CalSim-II simulation were input to LTGen and SWP Power, to simulate power generation and consumption throughout the CVP and SWP systems, respectively. These CalSim-II outputs included reservoir releases, conveyance flow rates, and end-of-month reservoir storage data. Both LTGen and SWP Power are monthly models. Their simulation periods are from October 31, 1921 to September 30, 2003.

In LTGen and SWP Power, energy generation is a function of turbine configuration, reservoir release, net head, and duration of generation. Net head is the actual head available for power generation; it is reservoir water surface elevation (a function of storage) minus tailrace elevation (a function of release).

Similarly, the calculation of energy required for pumping in both models is a function of pump configuration, pumping rate, pumping head (i.e., net head with hydraulic losses), and duration of pumping. Detailed descriptions of LTGen and SWP Power are included in Chapter 8 of the Modeling Appendix.

CalSim-II

CalSim-II is the application of the Water Resources Integrated Modeling System software to the CVP/SWP. This application was jointly developed by Reclamation and DWR for planning studies related to CVP/SWP operations. The primary purpose of CalSim-II is to evaluate the water supply reliability of the CVP and SWP at current and/or future levels of development (e.g., 2005 or 2030), with and without various assumed future facilities, and with different modes of facility operations. Geographically, the model covers the drainage basin of the Delta, and CVP/SWP exports to the San Francisco Bay Area, San Joaquin Valley, Central Coast, and Southern California.

CalSim-II typically simulates system operations for an 82-year period, using a monthly time step. The model assumes that facilities, land use, water supply contracts, and regulatory requirements are constant over this period, representing a fixed level of development (e.g., 2005 or 2030). The historical flow record from October 1921 to September 2003, adjusted for the influences of land use changes and upstream flow regulation, is used to represent the possible range of water supply conditions. Major Central Valley rivers, reservoirs, and CVP/SWP facilities are represented by a network of arcs and nodes. CalSim-II uses a mass balance approach to route water through this network. Simulated flows are mean flows for the month; reservoir storage volumes correspond to end-of-month storage.

Monthly CalSim-II model results are intended to be used for comparative purposes. It is important to differentiate between “absolute” or “predictive” modeling applications and “comparative” applications. In “absolute” applications, the model is run once to predict a future outcome; errors or assumptions in formulation, system representation, data, and operational criteria all contribute to total error or uncertainty in model results. In “comparative” applications, the model is run twice, once to represent a baseline condition (no

project) and a second time with a specific change (project) to assess the change in the outcome due to the input change. In this comparative mode (the mode used for this EIS), the difference between the two simulations is of principal importance. Potential errors or uncertainties that exist in the "no project" simulation are also present in the "project" simulation, such that their impacts are reduced when assessing the change in outcomes.

Spreadsheet Postprocessors

For analysis of impacts from each alternative on generation from the Pit 7 Powerplant, a spreadsheet postprocessor was used in lieu of a model. Since no model was available for Pit 7 Powerplant operations, an evaluation of potential impacts of the SLWRI alternatives, as simulated using CalSim-II on recent historical data, was used instead.

The spreadsheet postprocessor interpolated CalSim-II output for Shasta Reservoir storage to determine the reservoir water surface elevation. The water surface elevations for each alternative were compared to historical Pit 7 Powerplant tailwater elevations, to calculate the change in net head at the Pit 7 Powerplant. Changes in net head at the Pit 7 Powerplant were assumed to be small enough so that turbine/generator efficiencies would be unaffected. For each alternative, the monthly generation was determined by multiplying historical average monthly generation by the ratio of the alternative-reduced net head compared to the historical net head (assumed to be 200 feet, based on historical average) raised to the 1.5 power.

23.3.2 Criteria for Determining Significance of Effects

The thresholds of significance for impacts to power and energy are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. An alternative would be considered to have a potentially significant impact on regional hydropower production if the change in the average annual energy generation or consumption (over the 82-year period of simulation) by the CVP/SWP is greater than 5 percent, as shown in Table 23-1.

A threshold of 5 percent was selected as the threshold of significance for hydroelectric generation for several reasons, including seasonal and annual hydrologic variability, short-term operations decisions that may affect water level in storage, and regional power market demands and prices that may dictate hydropower facilities operations. All these factors could contribute to potentially substantial variations in hydropower generation on a monthly or annual basis. As a result, generation variations of less than 5 percent would not be considered significant. Significance statements are relative to both existing conditions (2005) and future conditions (2030), unless stated otherwise.

Table 23-1. Impact Indicators and Significance Criteria for Energy Generation and Usage

Impact Indicator	Significance Criterion
Shasta Powerplant Energy Generation	Decrease in average annual Shasta Powerplant hydropower generation of more than 5 percent.
CVP System Energy Generation	Decrease in average annual CVP system hydropower generation of more than 5 percent.
SWP System Energy Generation	Decrease in average annual SWP system hydropower generation of more than 5 percent.
CVP System Pumping Energy Use	Increase in average annual CVP system pumping energy use of more than 5 percent.
SWP System Pumping Energy Use	Increase in average annual SWP system pumping energy use of more than 5 percent.
Pit 7 Powerplant Energy Generation	Decrease in average annual Pit 7 hydropower generation of more than 5 percent.

Key:
CVP = Central Valley Project
SWP = State Water Project

Shasta Powerplant Energy Generation

Changes in Shasta Powerplant operations due to any of the SLWRI alternatives could directly affect hydropower generation caused by changes in head and flow available for hydropower generation. A significant reduction in energy generation at Shasta Powerplant could require purchase of energy to meet CVP pumping energy demands, or a reduction in power revenue.

CVP System Energy Generation

Changes in CVP operations due to any of the SLWRI alternatives could result in reoperation of other CVP hydropower generation facilities, and could result in a systemwide decrease in CVP hydropower generation. A significant reduction in CVP energy generation could require purchase of energy to meet CVP pumping energy demands, or a reduction in power revenue.

SWP System Energy Generation

Changes in SWP operations due to any of the SLWRI alternatives could result in reoperation of SWP generation facilities, and could result in a systemwide decrease in SWP hydropower generation. A significant reduction in SWP energy generation could require purchase of energy to meet SWP pumping energy demands, or a reduction in power revenue.

CVP Pumping Energy Use

Changes in CVP operations due to any of the SLWRI alternatives could result in changes in operations of the CVP pumping plants. A significant increase in CVP system pumping energy use could require purchase of energy to meet CVP pumping energy demands, or a reduction in power revenue.

SWP Pumping Energy Use

Changes in SWP operations due to any of the SLWRI alternatives could result in changes in operations of the SWP pumping plants. A significant increase in SWP system pumping energy use could require purchase of energy to meet SWP pumping energy demands, or a reduction in power revenue.

Pit 7 Powerplant Energy Generation

The Pit 7 Powerplant is owned and operated by the Pacific Gas and Electric Company. Increases in Shasta Lake water surface elevations could increase the tailwater elevation below the Pit 7 Powerplant, reducing the net head and decreasing generation.

23.3.3 Direct and Indirect Effects

This section describes the environmental consequences of the SLWRI comprehensive plans, and proposed mitigation measures for any impacts determined to be significant or potentially significant. All comprehensive plans are compared to a baseline to allow evaluation of potential impacts. For the existing condition, a 2005 level of development CalSim-II simulation without any Shasta enlargement is used as baseline. Similarly, for the future condition a 2030 level of development CalSim-II simulation, the No-Action Alternative, is used as a baseline. Each of the comprehensive plans where simulated using the same levels of development. This was done so that any changes from the baseline hydropower generation or consumption can be attributed to the alternative. Detailed tables of the monthly energy generation and energy consumption associated with each comprehensive plan are included in Attachment 18 of the Modeling Appendix.

The No-Action Alternative and the SLWRI comprehensive plans are described in the following subsections. Potential effects of the existing condition, No-Action Alternative, and various SLWRI comprehensive plans on energy generation and usage are also described.

No-Action Alternative

Under the No-Action Alternative, the Federal government would take reasonably foreseeable actions, as discussed in Chapter 2, “Alternatives,” but would take no additional action toward implementing a specific plan to help increase anadromous fish survival in the upper Sacramento River, nor would help address the growing water reliability issues in California. Shasta Dam would not be modified, and the CVP would continue operating similar to the existing condition. Changes in regulatory conditions and water supply demands would result in differences in flows on the Sacramento River and in the Delta between existing and future conditions. Possible changes include the following:

- Firm Level 2 Federal refuge deliveries
- SWP deliveries based on full Table A amounts
- Full implementation of the Grassland Bypass Project
- Implementation of salinity management actions similar to the Vernalis Adaptive Management Plan

- Implementation of the South Bay Aqueduct Improvement and Enlargement Project
- Increased San Joaquin River diversions for water users in the Stockton Metropolitan Area after completion of the Delta Water Supply Project
- Increased Sacramento River diversions by Freeport Regional Water Project agencies
- San Joaquin River Restoration Program Full Restoration Flows

This alternative is used as a basis of comparison for future condition comparisons. Table 23-2 summarizes the simulated average annual hydropower generation and energy use for the No-Action Alternative.

Table 23-2. Simulated Average Annual Energy Generation and Use for No-Action Alternative

	Existing (GWh)	No Action (GWh)	Change (GWh)	Percent Change
Impact Hydro-1 – Decrease in Shasta Powerplant Energy Generation	2,151	2,154	3	0%
Impact Hydro-2 – Decrease in CVP System Energy Generation	4,927	4,914	-13	0%
Impact Hydro-3 – Decrease in SWP System Energy Generation	4,427	4,513	86	2%
Impact Hydro-4 – Increase in CVP System Pumping Energy Use	1,201	1,184	-17	-1%
Impact Hydro-5 – Increase in SWP System Pumping Energy Use	7,600	7,933	333	4%
Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation	529	529	0	0%

Note: Change and no action values may not sum to existing values due to rounding.
Key:
% = percent
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

Impact Hydro-1 (No-Action): Decrease in Shasta Powerplant Energy Generation Simulated annual average Shasta Powerplant energy generation for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be an increase in simulated average annual generation of 3 gigawatt-hour (GWh) (0 percent). This impact would be beneficial. Mitigation is not required for the No-Action Alternative.

Impact Hydro-2 (No-Action): Decrease in CVP System Energy Generation Simulated average annual CVP system energy generation for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be a decrease in simulated average annual energy generation of 12 GWh (0 percent). This impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Impact Hydro-3 (No-Action): Decrease in SWP System Energy Generation Simulated average annual CVP system energy generation for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be an increase in simulated average annual energy generation of 86 GWh (2 percent). This impact would be beneficial. Mitigation is not required for the No-Action Alternative.

Impact Hydro-4 (No-Action): Increase in CVP System Pumping Energy Use Simulated average annual CVP pumping energy use for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be an increase in simulated average annual pumping energy use of 17 GWh (1 percent). This impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Impact Hydro-5 (No-Action): Increase in SWP System Pumping Energy Use Simulated average annual SWP pumping energy use for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be an increase in simulated average annual pumping energy use of 333 GWh (4 percent). This impact would be less than significant. Mitigation is not required for the No-Action Alternative.

Impact Hydro-6 (No-Action): Decrease in Pit 7 Powerplant Energy Generation Simulated average annual Pit 7 Powerplant energy generation for the No-Action Alternative is shown in Table 23-2. Under the No-Action Alternative, there would be no change in simulated average annual energy generation at the Pit 7 Powerplant. Therefore, no impact would occur. Mitigation is not required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

CP1 focuses on increasing water supply reliability and increasing anadromous fish survival. This plan primarily consists of raising Shasta Dam by 6.5 feet, which, in combination with spillway modifications, would increase the height of the reservoir's full pool by 8.5 feet and enlarge the total storage capacity in the reservoir by 256,000 acre-feet. The existing temperature control device (TCD) would also be extended to achieve efficient use of the expanded cold-water pool. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years[3] and critical years, when 70,000 acre-feet and 35,000

[3] Throughout this document, water year types are defined according to the Sacramento Valley Index Water Year Hydrologic Classification unless specified otherwise.

acre-feet, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing M&I deliveries. CP1 would help reduce future water shortages by increasing drought year and average year water supply reliability for agricultural, and municipal and industrial (M&I) deliveries. In addition, the increased depth and volume of the cold-water pool in Shasta Reservoir would contribute to improving seasonal water temperatures for anadromous fish in the upper Sacramento River. Table 23-3 summarizes the simulated average annual hydropower generation and energy use for CP1.

Table 23-3. Simulated Average Annual Energy Generation and Use for CP1

	Existing (GWh)	CP1 (GWh)	Change		Future (GWh)	CP1 (GWh)	Change	
			(GWh)	Percent			GWh	Percent
Impact Hydro-1 – Decrease in Shasta Energy Generation	2,151	2,191	40	2%	2,154	2,194	40	2%
Impact Hydro-2 – Decrease in CVP System Energy Generation	4,927	4,966	39	1%	4,914	4,955	40	1%
Impact Hydro-3 – Decrease in SWP System Energy Generation	4,427	4,440	13	0%	4,513	4,527	14	0%
Impact Hydro-4 – Increase in CVP System Pumping Energy Use	1,201	1,203	3	0%	1,184	1,191	7	1%
Impact Hydro-5 – Increase in SWP System Pumping Energy Use	7,600	7,642	42	1%	7,933	7,979	46	1%
Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation	529	524	-4	-1%	529	525	-4	-1%

Note:
Change and no action values may not sum to existing values due to rounding.
Key:
% = percent
CP = Comprehensive Plan
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

Impact Hydro-1 (CP1): Decrease in Shasta Powerplant Energy Generation
Simulated average annual Shasta Powerplant energy generation for CP1 is shown in Table 23-3. Under CP1, there would be an increase in simulated average annual generation under both existing and future levels of 40 GWh (2 percent). In addition to increased hydropower generation, CP1 would provide increased capacity benefits (i.e., the rate at which power can be generated) and ancillary services, which provide the ability to manage the electric grid in a reliable manner. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-2 (CP1): Decrease in CVP System Energy Generation
Simulated average annual CVP system generation for CP1 is shown in Table 23-3. Under CP1, there would be an increase in simulated average annual

energy generation of 39 GWh (1 percent) and 40 GWh (1 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-3 (CP1): Decrease in SWP System Energy Generation
Simulated average annual SWP system generation for CP1 is shown in Table 23-3. Under CP1, there would be an increase in simulated average annual energy generation of 13 GWh (0 percent) and 14 GWh (0 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-4 (CP1): Increase in CVP System Pumping Energy Use
Simulated average annual CVP pumping energy use for CP1 is shown in Table 23-3. Under CP1, there would be an increase in simulated average annual pumping energy use of 3 GWh (0 percent) and 7 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-5 (CP1): Increase in SWP System Pumping Energy Use
Simulated average annual SWP pumping energy use for CP1 is shown in Table 23-3. Under CP1, there would be an increase in simulated average annual pumping energy use of 42 GWh (1 percent) and 46 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-6 (CP1): Decrease in Pit 7 Powerplant Energy Generation
Simulated average annual Pit 7 generation for CP1 is shown in Table 23-3. Under CP1, the 6.5-foot Shasta Dam raise option, the operating range of net head would decrease from about 173 to 204 feet to about 168 to 193 feet, an approximately 4 percent decrease in net head. Under CP1, there would be a decrease in simulated average annual generation of about 4 GWh (1 percent) and 4 GWh (1 percent) under existing and future levels, respectively. Reclamation will provide in kind power in a method that will be determined after congressional authorization, to offset the reduced generation at Pit 7 Dam and facilities. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

As with CP1, CP2 focuses on increasing water supply reliability and increasing anadromous fish survival. CP2 primarily consists of raising Shasta Dam by 12.5 feet, which, in combination with spillway modifications, would increase the height of the reservoir's full pool by 14.5 feet and enlarge the total storage capacity in the reservoir by 443,000 acre-feet. The existing TCD would also be extended to achieve efficient use of the expanded cold-water pool. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 120,000 acre-feet and 60,000 acre-feet,

respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing M&I deliveries. CP2 would help reduce future water shortages by increasing drought year and average year water supply reliability for agricultural and M&I deliveries. In addition, the increased depth and volume of the cold-water pool in Shasta Reservoir would contribute to improving seasonal water temperatures for anadromous fish in the upper Sacramento River. Table 23-4 summarizes the simulated average annual hydropower generation and energy use for CP2.

Table 23-4. Simulated Average Annual Energy Generation and Use for CP2

	Existing (GWh)	CP2 (GWh)	Change		Future (GWh)	CP2 (GWh)	Change	
			GWh	Percent			GWh	Percent
Impact Hydro-1 – Decrease in Shasta Powerplant Energy Generation	2,151	2,221	70	3%	2,154	2,221	67	3%
Impact Hydro- 2 – Decrease in CVP System Energy Generation	4,927	4,998	71	1%	4,914	4,983	69	1%
Impact Hydro- 3 – Decrease in SWP System Energy Generation	4,427	4,444	17	0%	4,513	4,535	22	0%
Impact Hydro- 4 – Increase in CVP System Pumping Energy Use	1,201	1,206	5	1%	1,184	1,194	10	1%
Impact Hydro-5 – Increase in SWP System Pumping Energy Use	7,600	7,660	60	1%	7,933	8,005	72	1%
Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation	529	520	-9	-2%	529	522	-7	-1%

Note:
Change and no action values may not sum to existing values due to rounding.
Key:
% = percent
CP = Comprehensive Plan
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

Impact Hydro-1 (CP2): Decrease in Shasta Powerplant Energy Generation
Simulated average annual Shasta Powerplant energy generation for CP2 is shown in Table 23-4. Under CP2, there would be an increase in simulated average annual generation of 70 GWh (3 percent) and 67 GWh (3 percent) under existing and future levels, respectively. In addition to increased hydropower generation, CP2 would provide increased capacity benefits (i.e., the rate at which power can be generated) and ancillary services, which provide the

ability to manage the electric grid in a reliable manner. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-2 (CP2): Decrease in CVP System Energy Generation
Simulated average annual CVP system generation for CP2 is shown in Table 23-4. Under CP2, there would be an increase in simulated average annual energy generation of 71 GWh (1 percent) and 69 GWh (1 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-3 (CP2): Decrease in SWP System Energy Generation
Simulated average annual SWP system generation for CP2 is shown in Table 23-4. Under CP2, there would be an increase in simulated average annual energy generation of 17 GWh (0 percent) and 22 GWh (0 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-4 (CP2): Increase in CVP System Pumping Energy Use
Simulated average annual CVP pumping energy use for CP2 is shown in Table 23-4. Under CP2, there would be an increase in simulated average annual pumping energy use of 5 GWh (1 percent) and 10 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-5 (CP2): Increase in SWP System Pumping Energy Use
Simulated average annual SWP pumping energy use for CP2 is shown in Table 23-4. Under CP2, there would be an increase in simulated average annual pumping energy use of 60 GWh (1 percent) and 72 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-6 (CP2): Decrease in Pit 7 Powerplant Energy Generation
Simulated average annual Pit 7 generation for CP2 is shown in Table 23-4. Under CP2 the operating range of net head would decrease from about 173 to 204 feet to about 168 to 193 feet, an approximately 4 percent decrease in net head. Under CP2, there would be a decrease in simulated average annual generation of about 9 GWh (2 percent) and 7 GWh (1 percent) under existing and future levels, respectively. Reclamation will provide in kind power in a method that will be determined after congressional authorization, to offset the reduced generation at Pit 7 dam and facilities. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

CP3 focuses on increasing agricultural water supply reliability while also increasing anadromous fish survival. This plan primarily consists of raising Shasta Dam by 18.5 feet, which, in combination with spillway modifications,

would increase the height of the reservoir's full pool by 20.5 feet and enlarge the total storage capacity in the reservoir by 634,000 acre-feet. The existing TCD would also be extended to achieve efficient use of the expanded cold-water pool. Because CP3 focuses on increasing agricultural water supply reliability, none of the increased storage capacity in Shasta Reservoir would be reserved for increasing M&I deliveries. Operations for water supply, hydropower, and environmental and other regulatory requirements would be similar to existing operations, with the additional storage retained for water supply reliability and to expand the cold-water pool for downstream anadromous fisheries. Simulations of CP3 did not involve any changes to the modeling logic for deliveries or flow requirements; all rules for water operations were updated to include the new storage but were not otherwise changed. Table 23-5 summarizes the simulated average annual hydropower generation and energy use for CP3.

Table 23-5. Simulated Average Annual Energy Generation and Use for CP3

	Existing (GWh)	CP3 (GWh)	Change		Future (GWh)	CP3 (GWh)	Change	
			GWh	Percent			GWh	Percent
Impact Hydro-1 – Decrease in Shasta Powerplant Energy Generation	2,151	2,248	97	5%	2,154	2,249	95	4%
Impact Hydro-2 – Decrease in CVP System Energy Generation	4,927	5,025	98	2%	4,914	5,009	95	2%
Impact Hydro-3 – Decrease in SWP System Energy Generation	4,427	4,429	2	0%	4,513	4,508	-5	0%
Impact Hydro-4 – Increase in CVP System Pumping Energy Use	1,201	1,214	13	1%	1,184	1,209	25	2%
Impact Hydro-5 – Increase in SWP System Pumping Energy Use	7,600	7,606	6	0%	7,933	7,917	-16	0%
Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation	529	514	-15	-3%	529	514	-15	-3%

Note:
Change and no action values may not sum to existing values due to rounding.
Key:
% = percent
CP = Comprehensive Plan
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

Impact Hydro-1 (CP3): Decrease in Shasta Powerplant Energy Generation
Simulated average annual Shasta Powerplant energy generation for CP3 is shown in Table 23-5. Under CP3, there would be an increase in simulated average annual generation of 97 GWh (5 percent) and 95 GWh (4 percent) under existing and future levels, respectively. In addition to increased hydropower generation, CP3 would provide increased capacity benefits (i.e., the rate at which power can be generated) and ancillary services, which provide the

ability to manage the electric grid in a reliable manner. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-2 (CP3): Decrease in CVP System Energy Generation
Simulated average annual CVP system generation for CP3 is shown in Table 23-5. Under CP3, there would be an increase in simulated average annual energy generation of 98 GWh (2 percent) and 95 GWh (2 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-3 (CP3): Decrease in SWP System Energy Generation
Simulated average annual SWP system generation for CP3 is shown in Table 23-5. Under CP3, there would be an increase in simulated average annual energy generation of 2 GWh (0 percent) under the existing level and a decrease of 5 GWh (0 percent) under the future level. This impact would be beneficial under the existing level and less than significant under the future level. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-4 (CP3): Increase in CVP System Pumping Energy Use
Simulated average annual CVP pumping energy use for CP3 is shown in Table 23-5. Under CP3, there would be an increase in simulated average annual pumping energy use of 13 GWh (1 percent) and 25 GWh (2 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-5 (CP3): Increase in SWP System Pumping Energy Use
Simulated average annual SWP pumping energy use for CP3 is shown in Table 23-5. Under CP3, there would be an increase in simulated average annual pumping energy use of 6 GWh (0 percent) under the existing level and a decrease of 16 GWh (0 percent) under the future level. This impact would be beneficial under the existing level and less than significant under the future level. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-6 (CP3): Decrease in Pit 7 Powerplant Energy Generation
Simulated average annual Pit 7 Powerplant generation for CP3 is shown in Table 23-5. Under CP3 the operating range of net head would decrease to about 156 to 181 feet, an approximate 10 percent reduction in net head. Under CP3, there would be a decrease in simulated average annual generation of 15 GWh (3 percent) under both the existing and future levels. Reclamation will provide in kind power in a method that will be determined after congressional authorization, to offset the reduced generation at Pit 7 dam and facilities. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply Reliability

CP4 and CP4A focus on increasing anadromous fish survival while also increasing water supply reliability. By raising Shasta Dam 18.5 feet, in combination with spillway modifications, CP4 or CP4A would increase the height of the reservoir full pool by 20.5 feet and enlarge the total storage capacity in the reservoir by 634,000 acre-feet. The existing TCD would also be extended to achieve efficient use of the expanded cold-water pool. The additional storage created by the 18.5-foot dam raise would be used to improve the ability to meet temperature objectives and habitat requirements for anadromous fish during drought years and increase water supply reliability.

For CP4, about 378,000 acre-feet of the increased reservoir storage space, would be dedicated to increasing the supply of cold water for anadromous fish survival purposes. Operations for the remaining portion of increased storage (approximately 256,000 acre-feet) would be the same as for CP1, with 70,000 acre-feet and 35,000 acre-feet reserved to specifically focus on increasing M&I deliveries during dry and critical years, respectively. CP4 also includes augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River for fisheries benefit. Table 23-6 summarizes the simulated average annual hydropower generation and energy use for CP4.

Table 23-6. Simulated Average Annual Energy Generation and Use for CP4

	Existing (GWh)	CP4 (GWh)	Change		Future (GWh)	CP4 (GWh)	Change	
			GWh	Percent			GWh	Percent
Impact Hydro-1 – Decrease in Shasta Powerplant Energy Generation	2,151	2,269	118	5%	2,154	2,273	119	6%
Impact Hydro-2 – Decrease in CVP System Energy Generation	4,927	5,044	117	2%	4,914	5,033	119	2%
Impact Hydro-3 – Decrease in SWP System Energy Generation	4,427	4,440	13	0%	4,513	4,527	14	0%
Impact Hydro-4 – Increase in CVP System Pumping Energy Use	1,201	1,203	3	0%	1,184	1,191	7	1%
Impact Hydro-5 – Increase in SWP System Pumping Energy Use	7,600	7,642	42	1%	7,933	7,979	46	1%
Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation	529	513	-16	-3%	529	513	-16	-3%

Note:
Change and no action values may not sum to existing values due to rounding.
Key:
% = percent
CP = Comprehensive Plan
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

For CP4A, about 191,000 acre-feet of the increased reservoir storage space, would be dedicated to increasing the supply of cold water for anadromous fish survival purposes. Operations for the remaining portion of increased storage (approximately 443,000 acre-feet) would be the same as for CP2, with 120,000 acre-feet and 60,000 acre-feet reserved to specifically focus on increasing M&I deliveries during dry and critical years, respectively. CP4A also includes augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River for fisheries benefit. Table 23-7 summarizes the simulated average annual hydropower generation and energy use for CP4A.

Table 23-7. Simulated Average Annual Energy Generation and Use for CP4A

	Existing (GWh)	CP4A (GWh)	Change		Future (GWh)	CP4A (GWh)	Change	
			GWh	Percent			GWh	Percent
Impact Hydro-1 – Decrease in Shasta Powerplant Energy Generation	2151	2261	110	5%	2154	2261	107	5%
Impact Hydro-2 – Decrease in CVP System Energy Generation	4,927	5,037	111	2%	4,914	5,023	109	2%
Impact Hydro-3 – Decrease in SWP System Energy Generation	4427	4444	17	0%	4513	4535	22	0%
Impact Hydro-4 – Increase in CVP System Pumping Energy Use	1,201	1,206	5	1%	1,184	1,194	10	1%
Impact Hydro-5 – Increase in SWP System Pumping Energy Use	7600	7660	60	1%	7933	8005	72	1%
Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation	529	513	-15	-3%	529	514	-15	-3%

Note:
Change and no action values may not sum to existing values due to rounding.
Key:
% = percent
CP = Comprehensive Plan
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

Impact Hydro-1 (CP4 and CP4A): Decrease in Shasta Powerplant Energy Generation Simulated average annual Shasta Powerplant energy generation for CP4 is shown in Table 23-6 and in Table 23-7 for CP4A.

Under CP4, there would be an increase in simulated average annual generation of 118 GWh (5 percent) and 119 GWh (6 percent) under existing and future levels, respectively. In addition to increased hydropower generation, CP4 would provide increased capacity benefits (i.e., the rate at which power can be generated) and ancillary services, which provide the ability to manage the electric grid in a reliable manner. This impact would be beneficial for CP4. Mitigation for this impact is not needed, and thus not proposed.

Under CP4A, there would be an increase in simulated average annual generation of 110 GWh (5 percent) and 107 GWh (5 percent) under existing and future levels, respectively. In addition to increased hydropower generation, CP4A would provide increased capacity benefits (i.e., the rate at which power can be generated) and ancillary services, which provide the ability to manage the electric grid in a reliable manner. This impact would be beneficial for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-2 (CP4 and CP4A): Decrease in CVP System Energy Generation Simulated average annual CVP system generation for CP4 is shown in Table 23-6. Under CP4, there would be an increase in simulated average annual energy generation of 117 GWh (2 percent) and 119 GWh (2 percent) under existing and future levels, respectively. This impact would be beneficial for CP4. Mitigation for this impact is not needed, and thus not proposed.

Simulated average annual CVP system generation for CP4A is shown in Table 23-7. Under CP4A, there would be an increase in simulated average annual energy generation of 111 GWh (2 percent) and 109 GWh (2 percent) under existing and future levels, respectively. This impact would be beneficial for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-3 (CP4 and CP4A): Decrease in SWP System Energy Generation Simulated average annual SWP system generation for CP4 is shown in Table 23-6. Under CP4, there would be an increase in simulated average annual energy generation of 13 GWh (0 percent) and 14 GWh (0 percent) under existing and future levels, respectively. This impact would be beneficial for CP4. Mitigation for this impact is not needed, and thus not proposed.

Simulated average annual CVP system generation for CP4A is shown in Table 23-7. Under CP4A, there would be an increase in simulated average annual energy generation of 17 GWh (0 percent) and 22 GWh (0 percent) under existing and future levels, respectively. This impact would be beneficial for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-4 (CP4 and CP4A): Increase in CVP System Pumping Energy Use Simulated average annual CVP pumping energy use for CP4 is shown in Table 23-6. Under CP4, there would be an increase in simulated average annual pumping energy use of 3 GWh (0 percent) and 7 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

Simulated average annual CVP pumping energy use for CP4A is shown in Table 23-7. Under CP4A, there would be an increase in simulated average annual pumping energy use of 5 GWh (1 percent) and 10 GWh (1 percent)

under existing and future levels, respectively. This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-5 (CP4 and CP4A): Increase in SWP System Pumping Energy Use Simulated average annual SWP pumping energy use for CP4 is shown in Table 23-6. Under CP4, there would be an increase in simulated average annual pumping energy use of 42 GWh (1 percent) under both the existing and future levels. This impact would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

Simulated average annual SWP pumping energy use for CP4A is shown in Table 23-7. Under CP4A, there would be an increase in simulated average annual pumping energy use of 60 GWh (1 percent) and 72 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-6 (CP4 and CP4A): Decrease in Pit 7 Powerplant Energy Generation Simulated average annual Pit 7 Powerplant generation for CP4 is shown in Table 23-6. Under CP4 the operating range of net head would decrease to about 156 to 181 feet, an approximate 10 percent reduction in net head. Under CP4, there would be a decrease in simulated average annual generation of 16 GWh (3 percent) under both the existing and future levels. Reclamation will provide in kind power in a method that will be determined after congressional authorization, to offset the reduced generation at Pit 7 dam and facilities. This impact would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

Simulated average annual Pit 7 Powerplant generation for CP4A is shown in Table 23-7. Under CP4A the operating range of net head would decrease to about 156 to 181 feet, an approximate 10 percent reduction in net head. Under CP4A, there would be a decrease in simulated average annual generation of 15 GWh (3 percent) under both the existing and future levels. Reclamation will provide in kind power in a method that will be determined after congressional authorization, to offset the reduced generation at Pit 7 dam and facilities. This impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

CP5 – 18.5-Foot Dam Raise, Combination Plan

CP5 primarily focuses on increasing water supply reliability, anadromous fish survival, Shasta Lake area environmental resources, and recreation opportunities. By raising Shasta Dam 18.5 feet, in combination with spillway modifications, CP5 would increase the height of the reservoir full pool by 20.5 feet and enlarge the total storage capacity in the reservoir by 634,000 acre-feet. The existing TCD would be extended to achieve efficient use of the expanded cold-water pool. Shasta Dam operational guidelines would continue essentially

unchanged, except during dry years and critical years, when 150,000 acre-feet and 75,000 acre-feet, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing M&I deliveries. CP5 also includes constructing additional fish habitat in and along the shoreline of Shasta Lake and along the lower reaches of its tributaries; augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River; and increasing recreation opportunities at Shasta Lake. CP5 would help reduce future water shortages by increasing drought year and average year water supply reliability for agricultural and M&I deliveries. In addition, the increased depth and volume of the cold-water pool in Shasta Reservoir would contribute to improving seasonal water temperatures for anadromous fish in the upper Sacramento River. Table 23-8 summarizes the simulated average annual hydropower generation and energy use for CP5.

Table 23-8. Simulated Average Annual Energy Generation and Use for CP5

	Existing (GWh)	CP5 GWh)	Change		Future (GWh)	CP5 (GWh)	Change	
			GWh	Percent			GWh	Percent
Impact Hydro-1 – Decrease in Shasta Powerplant Energy Generation	2,151	2,247	96	4%	2,154	2,247	93	4%
Impact Hydro-2 – Decrease in CVP System Energy Generation	4,927	5,021	95	2%	4,914	5,007	93	2%
Impact Hydro-3 – Decrease in SWP System Energy Generation	4,427	4,449	22	0%	4,513	4,537	24	1%
Impact Hydro-4 – Increase in CVP System Pumping Energy Use	1,201	1,207	7	1%	1,184	1,200	16	1%
Impact Hydro-5 – Increase in SWP System Pumping Energy Use	7,600	7,674	74	1%	7,933	8,018	85	1%
Impact Hydro-6 – Decrease in Pit 7 Powerplant Energy Generation	529	514	-15	-3%	529	514	-15	-3%

Note:
Change and no action values may not sum to existing values due to rounding.
Key:
% = percent
CP = Comprehensive Plan
CVP = Central Valley Project
GWh = gigawatt-hour
SWP = State Water Project

Impact Hydro-1 (CP5): Decrease in Shasta Powerplant Energy Generation
Simulated average annual Shasta Powerplant energy generation for CP5 is shown in Table 23-8. Under CP5, there would be an increase in simulated average annual generation of 96 GWh (4 percent) and 93 GWh (4 percent) under existing and future levels, respectively. In addition to increased hydropower generation, CP5 would provide increased capacity benefits (i.e., the rate at which power can be generated) and ancillary services, which provide the ability to manage the electric grid in a reliable manner. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-2 (CP5): Decrease in CVP System Energy Generation
Simulated average annual CVP system generation for CP5 is shown in Table 23-8. Under CP5, there would be an increase in simulated average annual energy generation of 95 GWh (2 percent) and 93 GWh (2 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-3 (CP5): Decrease in SWP System Energy Generation
Simulated average annual SWP system generation for CP5 is shown in Table 23-8. Under CP5, there would be an increase in simulated average annual energy generation of 22 GWh (0 percent) and 24 GWh (1 percent) under existing and future levels, respectively. This impact would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-4 (CP5): Increase in CVP System Pumping Energy Use
Simulated average annual CVP pumping energy use for CP5 is shown in Table 23-8. Under CP5, there would be an increase in simulated average annual pumping energy use of 7 GWh (1 percent) and 16 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-5 (CP5): Increase in SWP System Pumping Energy Use
Simulated average annual SWP pumping energy use for CP5 is shown in Table 23-7. Under CP5, there would be an increase in simulated average annual pumping energy use of 74 GWh (1 percent) and 85 GWh (1 percent) under existing and future levels, respectively. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

Impact Hydro-6 (CP5): Decrease in Pit 7 Powerplant Energy Generation
Simulated average annual Pit 7 Powerplant generation for CP5 is shown in Table 23-8. Under CP5 the operating range of net head would decrease to about 156 to 181 feet, an approximate 10 percent reduction in net head. Under CP5, there would be a decrease in simulated average annual generation of 15 GWh (3 percent) under both the existing and future levels. Reclamation will provide in kind power in a method that will be determined after congressional authorization, to offset the reduced generation at Pit 7 dam and facilities. This impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

23.3.4 Mitigation Measures

Table 23-9 presents a summary of impacts and mitigation measures for power and energy. No potentially significant impacts have been identified; therefore, no mitigation is required.

Table 23-9. Summary of Impacts and Mitigation Measures – Power and Energy

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact Hydro-1: Decrease in Shasta Powerplant Energy Generation	LOS before Mitigation	B	B	B	B	B	B
	Mitigation Measure	None required	No mitigation needed; thus, none proposed.				
	LOS after Mitigation	B	B	B	B	B	B
Impact Hydro-2: Decrease in CVP System Energy Generation	LOS before Mitigation	LTS	B	B	B	B	B
	Mitigation Measure	None required	No mitigation needed; thus, none proposed.				
	LOS after Mitigation	LTS	B	B	B	B	B
Impact Hydro-3: Decrease in SWP System Energy Generation	LOS before Mitigation	B	B	B	LTS	B	B
	Mitigation Measure	None required	No mitigation needed; thus, none proposed.				
	LOS after Mitigation	B	B	B	LTS	B	B
Impact Hydro-4: Increase in CVP System Pumping Energy Use	LOS before Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required	No mitigation needed; thus, none proposed.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Hydro-5: Increase in SWP System Pumping Energy Use	LOS before Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required	No mitigation needed; thus, none proposed.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Hydro-6: Decrease in Pit 7 Powerplant Energy Generation	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required	No mitigation needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS

Key:
B = Beneficial
CP = Comprehensive Plan
CVP = Central Valley Project
LOS = Level of Significance
LTS = Less than Significant
SWP = State Water Project

23.3.5 Cumulative Effects

Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," discusses overall cumulative impacts methodology related to the action alternatives, including the relationship to the CALFED Bay-Delta Program Programmatic EIS/EIR cumulative impacts analysis, qualitative and quantitative assessment, past and future actions in the study area, and significance criteria. Table 3-1, "Present and Reasonably Foreseeable Future Actions Included in the Analysis of Cumulative Impacts, by Resource Area," lists the present and reasonably foreseeable future projects considered quantitatively and qualitatively within the cumulative impacts analysis.

Actions which are included quantitatively in this cumulative effects analysis are those that are reasonably foreseeable, including actions with current authorization, secured funding for design and construction, and environmental permitting and compliance activities that are substantially complete. As described in Chapter 2, "Alternatives," Section 2.2, "No-Action Alternative," the NEPA No-Action alternative includes all reasonably foreseeable actions

included quantitatively in the cumulative effects analysis, but excludes effects for project actions. The future with-project conditions combine project actions with the actions included in the No-Action Alternative (2030 baseline). Therefore, quantitative impact assessments for the future with-project conditions presented in this chapter in Section 23.3.3, "Direct and Indirect Effects," also serve as the quantitative impacts assessments for the cumulative effects analysis. A list of projects included in the Final EIS No-Action Alternative and future with-project impact analyses is located in the Modeling Appendix, Chapter 2, Table 2-1.

Past and present projects that have affected power and energy resources in the primary and extended study area include new hydropower projects, FERC hydropower relicensing projects, regulatory actions, and fisheries flow requirements. Projects which do not meet the parameters of reasonably foreseeable for inclusion in this quantitative cumulative effects analysis but which may have past, present, or reasonably foreseeable cumulative impacts in combination with the proposed project may be included in the cumulative impacts analysis qualitatively. Projects and actions considered include, but are not limited to, the San Joaquin River Restoration Program, Bay Delta Conservation Plan (BDCP), Yuba Salmon Forum Fish Passage Program, Increased Hydropower Generation Capacity at Lewiston Dam, PG&E Pit River 3,4 and 5 Hydroelectric Projects License Implementation, PG&E McCloud and Pit Rivers 6 and 7 FERC relicensing projects and the DWR Oroville Facilities FERC Relicensing.

The effects of climate change on operations at Shasta Lake could potentially result in changes to power and energy. As described in the Climate Change Modeling Appendix, climate change could result in higher reservoir releases in the winter and early spring due to an increase in runoff during these times. Similarly, climate change could result in lower reservoir inflows and Sacramento tributary flows during the late spring and summer due to a decreased snow pack. This reduction in inflow and tributary flow could result in Shasta Lake storage being reduced due to both a reduced ability to capture flows and an increased need to make releases to meet downstream requirements.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

When combined with other past, present, and reasonably foreseeable future projects, a change in river flows and reservoir elevations would be likely. Since Shasta Reservoir is operated to meet flow and water quality requirements in the Sacramento River and Delta, any new project or program along the Sacramento River and in the Delta could potentially impact the CVP and SWP facility hydropower generation and consumption of CP1. With the implementation of many of the projects, Shasta Reservoir could be reoperated, which would result in changes to the Sacramento River flow regime and reservoir elevations, and could cause a potentially significant impact on CVP/SWP facility hydropower generation and consumption. Additionally, several of the projects listed in Table

3-1 would have an impact on energy generation and energy use, such as the BDCP and various FERC relicensing projects. CP1 has an overall net negative energy value; therefore CP1 would make a cumulatively considerable incremental contribution to a significant cumulative impact on energy consumption and generation.

As stated previously, effects of climate change on operations of Shasta Lake could include increased inflows and releases at certain times of the year, and decreased inflows and storage at other times. The additional storage associated with CP1 would potentially diminish these effects and allow Shasta Lake to capture some of the increased runoff in the winter and early spring for release in late spring and summer. Additionally, the increased storage volume would allow Shasta Lake to maintain greater storage and potentially greater hydropower generation. Therefore, the addition of anticipated effects of climate change would not result in CP1 having a significant cumulative impact.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

When combined with other past, present, and reasonably foreseeable future projects, a change in river flows and reservoir elevations would be likely. Since Shasta Reservoir is operated to meet flow and water quality requirements in the Sacramento River and Delta, any new project or program along the Sacramento River and in the Delta could potentially impact the CVP and SWP facility hydropower generation and consumption of CP2. With the implementation of many of the projects, Shasta Reservoir could be reoperated, which would result in changes to the Sacramento River flow regime and reservoir elevations, and could cause a potentially significant impact on CVP/SWP facility hydropower generation and consumption. However, CP2 has a net beneficial impact on energy consumption and energy generation and therefore would not have a cumulatively considerable incremental contribution to the significant cumulative impact.

As stated previously, effects of climate change on operations of Shasta Lake could include increased inflows and releases at certain times of the year, and decreased inflows and storage at other times. The additional storage associated with CP2 would potentially diminish these effects and allow Shasta Lake to capture some of the increased runoff in the winter and early spring for release in late spring and summer. Additionally, the increased storage volume would allow Shasta Lake to maintain greater storage and potentially greater hydropower generation. Therefore, the addition of anticipated effects of climate change would not result in CP2 having a significant cumulative impact.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

When combined with other past, present, and reasonably foreseeable future projects, a change in river flows and reservoir elevations would be likely. Since Shasta Reservoir is operated to meet flow and water quality requirements in the

Sacramento River and Delta, any new project or program along the Sacramento River and in the Delta could potentially impact the CVP and SWP facility hydropower generation and consumption of CP3. With the implementation of many of the projects, Shasta Reservoir could be reoperated, which would result in changes to the Sacramento River flow regime and reservoir elevations, and could cause a potentially significant impact on CVP/SWP facility hydropower generation and consumption. However, CP3 has a net beneficial impact on energy consumption and energy generation and therefore would not have a cumulatively considerable incremental contribution to the significant cumulative impact.

As stated previously, effects of climate change on operations of Shasta Lake could include increased inflows and releases at certain times of the year, and decreased inflows and storage at other times. The additional storage associated with CP3 would potentially diminish these effects and allow Shasta Lake to capture some of the increased runoff in the winter and early spring for release in late spring and summer. Additionally, the increased storage volume would allow Shasta Lake to maintain greater storage and potentially greater hydropower generation. Therefore, the addition of anticipated effects of climate change would not result in CP3 having a significant cumulative impact.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply Reliability

When combined with other past, present, and reasonably foreseeable future projects, a change in river flows and reservoir elevations would be likely. Since Shasta Reservoir is operated to meet flow and water quality requirements in the Sacramento River and Delta, any new project or program along the Sacramento River and in the Delta could potentially impact the CVP and SWP facility hydropower generation and consumption of CP4 or CP4A. With the implementation of many of the projects, Shasta Reservoir could be reoperated, which would result in changes to the Sacramento River flow regime and reservoir elevations, and could cause a potentially significant impact on CVP/SWP facility hydropower generation and consumption. However, CP4 and CP4A have a net beneficial impact on energy consumption and energy generation and therefore would not have a cumulatively considerable incremental contribution to the significant cumulative impact.

As stated previously, effects of climate change on operations of Shasta Lake could include increased inflows and releases at certain times of the year, and decreased inflows and storage at other times. The additional storage associated with CP4 or CP4A would potentially diminish these effects and allow Shasta Lake to capture some of the increased runoff in the winter and early spring for release in late spring and summer. Additionally, the increased storage volume would allow Shasta Lake to maintain greater storage and potentially greater hydropower generation. Therefore, the addition of anticipated effects of climate change would not result in CP4 or CP4A having a significant cumulative impact.

CP5 – 18.5-Foot Dam Raise, Combination Plan

When combined with other past, present, and reasonably foreseeable future projects, a change in river flows and reservoir elevations would be likely. Since Shasta Reservoir is operated to meet flow and water quality requirements in the Sacramento River and Delta, any new project or program along the Sacramento River and in the Delta could potentially impact the CVP and SWP facility hydropower generation and consumption of CP5. With the implementation of many of the projects, Shasta Reservoir could be reoperated, which would result in changes to the Sacramento River flow regime and reservoir elevations, and could cause a potentially significant impact on CVP/SWP facility hydropower generation and consumption. However, CP5 has a net beneficial impact on energy consumption and energy generation and therefore would not have a cumulatively considerable incremental contribution to the significant cumulative impact.

As stated previously, effects of climate change on operations of Shasta Lake could include increased inflows and releases at certain times of the year, and decreased inflows and storage at other times. The additional storage associated with CP5 would potentially diminish these effects and allow Shasta Lake to capture some of the increased runoff in the winter and early spring for release in late spring and summer. Additionally, the increased storage volume would allow Shasta Lake to maintain greater storage and potentially greater hydropower generation. Therefore, the addition of anticipated effects of climate change would not result in CP5 having a significant cumulative impact.

Chapter 24
Environmental Justice

24.1 Affected Environment

24.1.1 Minority and Low-Income Populations

The environmental setting of a project area can be viewed from both a geographic perspective and a human perspective. The physical environment provides a geographical context for the populations to be evaluated in this EIS. The human perspective encompasses race, ethnic origin, and economic status of affected groups.

The intent of an environmental justice evaluation under Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low Income Populations* (1994), is to identify communities and groups that meet environmental justice criteria, and suggest strategies to reduce potential adverse impacts of projects on affected groups.

In its guide to environmental justice under NEPA, the Council on Environmental Quality (CEQ) (1997) encourages agencies to consider all of the following groups in the scoping process:

- Religious organizations
- Newspapers, radio, and other media
- Civic associations
- Minority business associations
- Environmental and environmental justice organizations
- Legal aid providers
- Homeowners', tenants', and neighborhood watch groups
- Federal, State, local, and tribal governments
- Rural cooperatives
- Business and trade organizations

- Community and social service organizations
- Universities, colleges, vocational, and other schools
- Labor organizations
- Civil rights organizations
- Local schools and libraries
- Senior citizens' groups
- Public health agencies and clinics

Shasta Lake and Vicinity

This section reviews minority and low-income communities situated near the reservoir, and those that directly depend on it for social, economic, cultural, historic, occupational, recreational, or other needs deemed significant by these communities.

County-level data are used for this analysis given the large size of the project impact area comprised largely of rural areas and the fact that localized areas within the counties are not likely to differ appreciably in their minority and low-income population makeup. For example, the closest incorporated city to Shasta Dam within Shasta County is the City of Shasta Lake. Shasta Lake's percentage of minority (nonwhite) residents in 2010 was 13.9 percent, compared to 16.6 percent for the county as a whole, and the percentage of low-income residents in Shasta Lake was 20.5 percent compared to 15.5 percent for the county as a whole.

Table 24-1 depicts a historically white population in Shasta County that is slowly diversifying and income levels consistently below the statewide average, resulting in relatively higher poverty rates among all ethnic groups. In 2010, the population of Shasta County was approximately 16.6 percent minority (nonwhite) and approximately 17.7 percent low-income, compared to statewide populations of 42.4 percent minority and 15.5 percent low-income. The slightly higher local poverty rate is not meaningfully greater than the statewide rate.

Lakehead-Lakeshore Community The Lakehead-Lakeshore community is located along Shasta Lake's northernmost reach, the Sacramento River Arm. Lakehead, an unincorporated seasonal community of approximately 1,500 residents (U.S. Census Bureau 2010a), is adjacent to Interstate 5 and includes typical services found near a major interstate highway. Lakehead provides a variety of campgrounds, boat ramps, and marinas. The Lakehead community includes low-income and minority residents and workers who could be affected by project construction and changes in outdoor recreation patterns resulting from the project.

Tourism and Outdoor Recreation Industry Shasta Lake and its vicinity are recreation destinations that draw visitors from throughout California. Most facilities in the area depend on Shasta Lake to draw visitors and customers. The tourism and outdoor recreation service industries are included in this discussion because this group includes a community of lower-paid service workers that could be affected by project actions related to Shasta Dam. A change in recreation opportunities could affect employment and revenue patterns, as well as social and recreational opportunities for minority or low-income residents. With the exception of Lakehead, the settlement and recreation-related development along Shasta Lake falls within unincorporated Shasta County. Residents and workers are dispersed throughout Shasta County, and affected minority and low-income communities are reflected in demographic data for Shasta County as shown in Table 24-1.

Table 24-1. Ethnicity, Income, and Poverty Trends in Shasta and Tehama Counties and California

Topic	Shasta County	Tehama County	State of California
Race/Ethnicity			
White, 2010	153,726	51,721	21,453,934
White, 2000–2010 (% change)	5.4	8.8	6.4
Black or African American, 2010	1,548	406	2,299,072
Black or African American, 2000–2010 (% change)	26.4	27.7	1.6
American Indian, including Alaskan Natives, 2010	4,950	1,644	362,801
American Indian, including Alaskan Natives, 2000–2010 (% change)	9.3	41.3	8.8
Asian or Pacific Islander, 2010	4,662	732	5,005,393
Asian or Pacific Islander, 2000–2010 (% change)	37.0	47.9	31.2
Two or more races (total), 2010	7,846	2,702	1,815,384
Two or more races (total), 2000–2010 (% change)	38.6	42.3	12.9
Hispanic Origin (any race), 2010	14,878	13,906	14,013,719
Hispanic Origin (any race), 2000–2010 (% change)	65.3	56.8	27.8

Table 24-1. Ethnicity, Income, and Poverty Trends in Shasta and Tehama Counties and California (contd.)

Topic	Shasta County	Tehama County	State of California
Income/Poverty			
Median Household Income, 2000	$34,335	$31,206	$47,493
Median Household Income, 2010	$42,931	$39,392	$59,641
% Change, 2000–2010	25.0	26.2	25.5
% of Individuals Below Poverty Level, 2000	15.4	17.3	14.2
% of Individuals Below Poverty Level, 2010	17.7	19.5	15.5
% Change, 2000–2010	2.3	2.2	1.3
% of Children (< 18) Below Poverty Level, 2000	21.0	24.0	19.0
% of Children (< 18) Below Poverty Level, 2010	23.4	27.9	21.6
% Change, 2000–2010	2.4	3.9	2.6

Sources: U.S. Census Bureau 2002a, 2002b, 2002c, 2009a, 2010b

Areas of Native American Concern As described in Chapter 14, "Cultural Resources," the Sacramento River and its major tributaries, particularly the Pit and McCloud rivers, were the focus of intensive Native American occupation during historic times, with a variety of religious, economic, historic, and other values identified here for Native American groups. Ten groups, including those listed by the Native American Heritage Commission, represent Native American interests in the study area. They include Grindstone Indian Rancheria, Paskenta Band of Nomlaki Indians, Pit River Environmental Council, Pit River Tribe of California, Redding Rancheria, Shasta Nation, United Tribe of Northern California, Inc., Winnemem Wintu Tribe, Wintu Educational and Cultural Council, and the Wintu Tribe of Northern California.

The Winnemem Wintu have identified important localities within the study area, many of which are locations where ceremonies are regularly conducted. Along the McCloud River, these include Children's Rock, Coyote Rock, Dekkas Rock, doctoring pools near Nawtawaket Creek, Eagle Rock and Samwel Cave, Hirz Bay, *Kaibai* village, North Gray Rocks, Puberty Rock, Saddle Rock, and *Watawacket* village and spiritual area. Along the Sacramento River, important localities include the Antlers area, Delta area, Doney Creek, Gregory Creek, LaMoine area, Packers Bay, Pollard's area, middle Salt Creek, and Sims area. The Winnemem Wintu have strong traditional and contemporary connections with the land, and their ongoing use of many archaeological and religious sites is fundamental to the well-being of their culture, particularly the education of their youth.

The Winnemem Wintu have also documented the location of some 155 ancestral villages within the Shasta Lake area. At least 81 village locations are known along the lower McCloud River and lower Pit River. An additional 73 villages are known to have existed on the east side of the Sacramento River. These village locations once contained between one and 30 houses each, some had associated cemeteries and each had a power place. Some of these villages are already under the waters of Shasta Lake, while others are just above the current Shasta Lake water level. The Winnemem Wintu have estimated that 120 of the known villages are still accessible (above the current high-water line).

Members of the Pit River Madesi Band stated that 22 ethnographic villages and associated burial grounds are located within the existing reservoir and proposed reservoir areas. One tribal member also noted that several Traditional Cultural Properties (TCP) exist within the Pit 6 and Pit 7 Dam areas.

Upper Sacramento River (Shasta Dam to Red Bluff)

Many social and public services are provided and a range of resource-dependent cultural activities take place in the cities of Shasta Lake, Redding, Anderson, Cottonwood, and Red Bluff. Each of these communities could be affected during project operation as a result of improved flood protection, enhanced water supply reliability, and increased recreational opportunities and spending related to improved salmonid habitat. Redding and Shasta County may be most affected because local residents, businesses, public services, and fiscal resources likely would also be affected by construction-related spending and activities.

Groups affected by the project could include minority and low-income populations such as transient and seasonal workers, Native American and Hispanic/Latino populations, and low-income water and electric utility customers. In 2010, the population of Tehama County was approximately 18.0 percent minority (nonwhite) and 19.5 percent low-income, compared to statewide populations of 42.4 percent minority and 15.5 percent low-income (Table 24-1). Poverty levels in Shasta and Tehama counties were exceeding statewide levels in 2010.

These groups often share the need for a reliable income and low costs of living, access to steady jobs, the need to protect the profitability of businesses that affect their personal income, access to high-quality public services, access to affordable and diverse housing, and a desire to enjoy a high quality of life.

Minority and low-income populations in the upper Sacramento River portion of the primary study area, many of which are employed by local agricultural operations, are especially susceptible to changes in employment opportunities. Changes in water and power supply reliability or delivery costs can have a major effect on the cost of living and on the operating costs and financial health of local businesses and employers. Changes in the frequency and duration of flooding along the Sacramento River and in the Delta also could affect agricultural operations and business owners and employees.

Lower Sacramento River and Delta

As discussed in Chapter 16, "Socioeconomics, Population, and Housing," this portion of the extended study area includes Red Bluff, the largest city in Tehama County with a population of 13,825 in 2010, and nine counties to the south. In 2010, the population of those nine counties totaled 4,226,027 (DOF 2010). The minority population of the nine counties was 42.6 percent overall, which is approximately the same as the statewide populations of 42.4 percent. Glenn County had the lowest proportion of minority populations, while Sacramento and San Joaquin counties had the highest proportion (U.S. Census Bureau 2010c). In 2010, poverty levels in the region ranged from 10 percent to 20 percent, with low-income populations exceeding the 15.5 percent state poverty level in Butte, Glenn, Sacramento, San Joaquin, and Yolo counties (U.S. Census Bureau 2009b).

Regional employment and labor trends are generally consistent with statewide trends. In 2010, approximately 15.6 percent of the labor force in the nine-county area was unemployed, compared to 7.7 percent statewide (U.S. Census Bureau 2009b). Butte, Colusa, Sacramento, San Joaquin, Solano, and Sutter counties registered higher unemployment rates than California as a whole. The counties with the highest unemployment rates in 2010 were characterized by greater dependence on the agricultural industry and less industrial diversity. Five of the six counties with unemployment rates above the statewide average maintained more than 60 percent of their land mass in agricultural production. Unemployment rates tend to be higher in rural areas than in urban areas because farm work is typically seasonal or temporary.

The lower Sacramento River region becomes increasingly urbanized as the river flows past the city of Sacramento and toward the Delta. Along its course, the river passes through low-density agricultural and suburban metropolitan areas and near high-density centers of commerce and culture such as Sacramento. In the Delta, a complex network of highways and urban infrastructure is integrated with canals, dikes, and levees. Heavily engineered water control and conveyance systems have promoted and sustained a successful agriculture industry and protected the region against damaging floods.

CVP/SWP Service Areas

The CVP and SWP service areas include 36 of California's 58 counties, accounting for 91 percent (38,648,090 residents) of California's population in 2010 (DOF 2010). Minority groups have been steadily increasing and such ethnic diversification is expected to continue. As shown in Table 24-1, the population of individuals in California identifying themselves as Asian–Pacific Islander or multiracial experienced double-digit population growth, while those identifying themselves as Black or African American experienced the least amount of growth between 2000 and 2010 (U.S. Census Bureau 2010b). Hispanics are the most numerous minority group in California, and many members of this ethnic group work on farms that receive some or all of their

water from the CVP. In general, rural agricultural counties have smaller minority populations than urban counties.

Poverty levels for both individuals and children increased slightly between 2000 and 2010. The percentage of people below the poverty level is expected to follow national and statewide economic trends. Generally, poverty rates tend to be higher in rural counties than in urban counties. Despite these differences, each of California's major urban areas has pockets of low-income neighborhoods with high poverty (and unemployment) rates. Minority and low-income communities that might be affected by the project include communities adjacent to construction projects, gateway and service communities providing support to construction-related activities, and low-income customers of water and power utilities who might experience higher rates as a result of costs of project-related system improvements.

These residents and workers may be most vulnerable to increases in CVP water and power costs and, conversely, would benefit from improved flood protection and CVP water and power supply reliability. Central Valley farm workers and other workers employed by businesses in the region that supply goods and services to agricultural operations also could benefit.

24.2 Regulatory Framework

24.2.1 Federal

Executive Order 12898

The purpose of Executive Order 12898 (part of which is excerpted in the introduction to this chapter) is to identify and address the disproportionate placement of adverse environmental, economic, social, or health impacts from Federal actions and policies on minority and/or low-income communities. This order requires lead agencies to evaluate impacts on minority or low-income populations during preparation of environmental and socioeconomic analyses of projects or programs that are proposed, funded, or licensed by Federal agencies.

In addition to the direction referenced above, Executive Order 12898 includes the following requirements:

- Each Federal agency shall conduct its programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons (including populations) from participation in, denying persons (including populations) the benefits of, or subjecting persons (including populations) to discrimination under, such programs, policies, and activities, because of their race, color, or national origin. *(Section 2-2)*

- Each Federal agency shall work to ensure that public documents, notices, and hearings relating to human health or the environment are concise, understandable, and readily accessible to the public. *(Section 5-5(c))*

In addition, the presidential memorandum accompanying the executive order states that "(e)ach Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA of 1969."

Two documents provide some measure of guidance to agencies required to implement Executive Order 12898. The first is *Environmental Justice Guidance Under the National Environmental Policy Act* (December 1997), published by CEQ. The second document, the *Final Guidance for Incorporating Environmental Justice Concerns* (April 1998) published in the U.S. Environmental Protection Agency's NEPA Compliance Analysis, serves as a guide for incorporating environmental justice goals into preparation of the EIS under NEPA. These documents provide specific guidelines for assessing environmental justice effects associated with a proposed Federal project.

24.2.2 State

There are no State plans, policies, regulations, or laws related to environmental justice applicable to the project. However, Senate Bill 115 (Chapter 690, Statutes of 1999), signed into law in 1999, defined environmental justice in statute and established the Governor's Office of Planning and Research as the coordinating agency for State environmental justice programs (California Government Code, Section 65040.12). This law further required the California Environmental Protection Agency to develop a model environmental justice mission statement for boards, departments, and offices within the agency by January 1, 2001 (Public Resources Code, Sections 72000–72001). The purpose of this program is to inform decision-makers by providing guidance on environmental justice issues.

24.2.3 Regional and Local

There are no regional or local plans, policies, regulations, or laws related to environmental justice applicable to the project.

24.3 Environmental Consequences and Mitigation Measures

This section describes the potential environmental consequences of the project alternatives as they relate to environmental justice. This analysis relies on demographic data provided in the *Socioeconomics, Population, and Housing Technical Report* and incorporates that information as necessary to describe potential effects on minority and low-income communities.

24.3.1 Methods and Assumptions

According to CEQ and U.S. Environmental Protection Agency guidelines established to assist Federal and State agencies, a minority population is present in a project area if (1) the minority population of the affected area exceeds 50 percent, or (2) the minority-population percentage of the affected area is meaningfully greater than the minority-population percentage in the general population or other appropriate unit of geographic analysis. By the same rule, a low-income population exists if the project area consists of 50 percent or more people living below the poverty threshold, as defined by the U.S. Census Bureau, or is meaningfully greater than the poverty percentage of the general population or other appropriate unit of geographic analysis.

The CEQ guidance indicates that when agencies determine whether environmental effects are disproportionately high and adverse, they are to consider whether there is or would be an impact on the natural or physical environment (as defined by NEPA) that would adversely affect a minority population or low-income population.

None of the published guidelines define the term "disproportionately high and adverse," but CEQ includes a nonquantitative definition stating that an effect is disproportionate if it appreciably exceeds the risk or rate to the general population (CEQ 1997).

The following population characteristics are considered in this analysis:

- Race and ethnicity
- Per-capita income as it relates to the poverty level

The relevant demographic data were obtained from the U.S. Census Bureau and the California Department of Finance. Data are presented at the county level to accommodate the geographic size of each portion of the study area.

In this analysis, a county is considered to have a minority population if its nonwhite population is greater than 50 percent or is meaningfully larger than the general (statewide) nonwhite population. Low-income areas are defined as counties in which the percentage of the population below poverty status exceeds 50 percent, or is meaningfully greater than the general population (average statewide poverty level). Based on these criteria, Shasta and Tehama counties are not considered environmental justice communities. Within the lower Sacramento and Delta area, minority populations exceed 50 percent in Colusa, Sacramento, San Joaquin, Solano, Sutter, and Yolo counties. Although the minority population in the lower Sacramento River and Delta area is projected to exceed 50 percent by 2020, the 63.8 percent representation would not be meaningfully greater than the statewide minority population, which is projected to be 62.5 percent. Within the CVP and SWP service areas, there are some low-income populations; however, these areas are so expansive that they are

considered synonymous with the entire state of California for environmental justice purposes.

Native American Outreach

Public and stakeholder coordination meetings were conducted on behalf of Reclamation with Native American tribal groups whose traditional territories overlap the primary study area. Seven tribal groups were invited to an information meeting held on April 4, 2007, in Redding, California. The purpose of the meeting was to provide general information about the project, initiate Section 106 consultation with groups desiring to participate in the project, and introduce Elena Nilsson as the Native American Tribal Coordination study lead. Invitations were sent to the Grindstone Rancheria, Paskenta Rancheria, Pit River Tribe, Redding Rancheria, Shasta Nation, Winnemem Wintu, and the Wintu Tribe and Toyon-Wintu Center. The meeting was attended by representatives from the Winnemem Wintu and the Madesi Band of the Pit River Tribe.

Between August 2007 and March 2008, nine meetings were held with Native American groups whose traditional territories overlap with the primary study area. These included meetings and/or workshops with groups and individuals representing major tribes and/or extended family groups in the Shasta/Redding area regarding potential effects on cultural resources from a plan to enlarge Shasta Dam. The purposes of the meetings were to solicit, clarify, and document major concerns and issues regarding the project, and to establish a preferred method/approach to maintaining effective communication during the remainder of the project study and in future endeavors. Five groups participated in these meetings: Grindstone Indian Rancheria (one meeting), Paskenta Band of Nomlaki Indians (one meeting), Pit River Tribe (three meetings), Shasta Nation (one meeting), and Winnemem Wintu (three meetings).

24.3.2 Criteria for Determining Disproportionately High and Adverse Effects

To make a finding that disproportionately high and adverse effects would likely fall on minority or low-income populations, three conditions must be met simultaneously:

- There must be a minority or low-income population in the impact zone.
- A high and adverse impact must exist.
- The impact must be disproportionately high and adverse on the minority or low-income population.

24.3.3 Topics Eliminated from Further Consideration

No topics related to environmental justice that are included in the significance criteria listed above have been eliminated from further consideration. All relevant topics are analyzed below.

Effects on sites considered sacred by local Native American communities in the upper Sacramento River portion of the primary study area and the lower Sacramento River and Delta and CVP and SWP service areas have been eliminated from further discussion. No impacts on these resources are anticipated as a result of changes in Shasta Dam operations (i.e., storage and release scenarios). Furthermore, any construction activities near sites considered sacred by local Native American communities would require mitigation as stated in Chapter 14 "Cultural Resources," including compliance with Section 106 of the National Historic Preservation Act (NHPA). As a result, no disproportionately high and adverse effects on Native American populations would be expected; therefore, potential effects related to this topic in these geographic regions are not discussed further in this EIS.

24.3.4 Direct and Indirect Effects

No-Action Alternative

Shasta Lake and Vicinity

Impact EJ-1 (No-Action): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake Communities at Shasta Lake and in the vicinity would remain below minority and low-income thresholds as they relate to environmental justice. Adverse construction-related impacts would be avoided, and construction-related employment opportunities and gains within local economies would not be realized. Existing adverse effects on minority or low-income populations do not constitute a disproportionately high and adverse impact. No disproportionately high and adverse effects on minority or low-income populations would occur.

Shasta County would maintain its steady population growth under the No-Action Alternative. Between 1990 and 2010, the population increased by 25.3 percent, with total population projected to reach 196,087 by 2020 (DOF 2010, 2012). The minority (nonwhite) population, including the Winnemem Wintu Tribe and other Native Americans, is projected to account for 16.6 percent of the total population in Shasta County in 2020, slightly more than the current 14.3 percent representation, but less than the 62.5 percent minority population projected statewide for 2020.

As described in Table 24-1, the poverty level in Shasta County increased by 2.3 percent during 2000 to 2010, and unemployment rates in Shasta County were mostly steady during 2000 to 2010, fluctuating between 6.0 and 8.1 percent. However, the poverty and unemployment rates are expected to decrease as the economy recovers. Employment opportunities continue to be provided in the region by major employment sectors such as trade, transportation, and utilities; government; educational, and health services; and leisure and hospitality industries (see Chapter 16, "Socioeconomics, Population, and Housing"). Professional and business services and education and health services are

projected to be the leading growth industries in Shasta County; these are also the top two anticipated growth industries statewide. No disproportionately high or adverse impacts on minority or low-income communities are anticipated under the No-Action Alternative. Mitigation is not required for the No-Action Alternative.

Impact EJ-2 (No-Action): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in the Vicinity of Shasta Lake Shasta Dam would not be enlarged; no infrastructure would be removed, modified, or relocated; and no changes in Reclamation's Shasta Lake operations would occur. No disproportionately high and adverse effects on Native American populations would occur.

Under the No-Action Alternative, Shasta Dam would not be enlarged; no infrastructure would be removed, modified, or relocated; and no changes in Reclamation's Shasta Lake operations would occur. Therefore, there would be no effect on several locations in the vicinity of Shasta Lake that are considered sacred by local Native American communities. No disproportionately high and adverse effects on Native American populations would occur. Mitigation is not required for the No-Action Alternative.

Upper Sacramento River (Shasta Dam to Red Bluff)
Impact EJ-3 (No-Action): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area Communities in the upper Sacramento River portion of the primary study area would remain below minority and low-income thresholds for environmental justice. The No-Action Alternative would not cause long-term operational changes; therefore, communities adjacent to the Sacramento River would not be affected by long-term changes to environmental and recreational conditions. Construction-related gains within this area would not be realized. Existing adverse effects on minority or low-income populations would not be disproportionately high and adverse. No disproportionately high and adverse effects on minority or low-income populations would occur.

Tehama County would maintain its steady population growth under the No-Action Alternative. Between 1990 and 2010, the population increased by 27.2 percent, with total population projected to reach 68,769 by 2020 (DOF 2010). The minority (nonwhite) population is projected to account for 31 percent of the total population in Tehama County in 2020, an increase of nearly 7 percent from the current 23.9 percent level, but less than the 62.5 percent minority population projected statewide for 2020.

As described in Chapter 16, "Socioeconomics, Population, and Housing," during 2000 to 2010, the poverty level in Tehama County increased by 2.2 percent and unemployment rates in Tehama County fluctuated between 6.4 and 8.8 percent. Tehama County is similar to neighboring Shasta County in employment and income trends, and dominant employment sectors. Projected

growth industries differ between the two counties, however; Tehama County is projected to experience economic growth in construction and information services (see Chapter 16, "Socioeconomics, Population, and Housing"). These sectors are the third and fifth largest anticipated growth areas statewide.

Because the No-Action Alternative would not change existing or projected future conditions, it would not have a disproportionately high or adverse effect on minority or low-income communities. Mitigation is not required for the No-Action Alternative.

Lower Sacramento River and Delta

Impact EJ-4 (No-Action): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area Some communities within the lower Sacramento River and Delta portion of the extended study area contain minority and low-income populations above environmental justice thresholds; however, continuing the existing and projected future conditions under the No-Action Alternative would not affect those populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

The lower Sacramento River and Delta portion of the extended study area includes Butte, Colusa, Contra Costa, Glenn, Sacramento, San Joaquin, Solano, Sutter, and Yolo counties. In 2010, the population of the nine-county region was 4,226,027. This number is expected to grow by 47.5 percent to 6,294,088 by 2020 (DOF 2010, 2012). The minority (nonwhite) population is projected to account for 63.8 percent of the total population in the lower Sacramento River and Delta area by 2020, with minority populations exceeding 50 percent in Colusa, Sacramento, San Joaquin, Solano, Sutter, and Yolo counties. Although the minority population in the lower Sacramento River and Delta area is projected to exceed 50 percent by 2020, the 63.8 percent representation would not be meaningfully greater than the statewide minority population, which is projected to be 62.5 percent.

In 2010, poverty levels in the nine-county region ranged from 10 percent to 20 percent, with low-income populations exceeding the 15.5 percent statewide poverty level in Butte, Glenn, Sacramento, San Joaquin, and Yolo counties (U.S. Census Bureau 2009b). Employment and labor trends in the lower Sacramento River and Delta portion of the extended study area are generally consistent with statewide trends. In 2010, approximately 15.6 percent of the labor force in the nine-county area was classified as unemployed, compared to a statewide total of 7.7 percent. Butte, Colusa, Sacramento, San Joaquin, Solano, and Sutter counties registered higher unemployment rates than the state as a whole in 2010. Generally, the counties with the highest unemployment rates in 2010 were characterized by greater dependence on the agricultural industry and less industrial diversity. Five of the six counties with unemployment rates above the statewide average maintained more than 60 percent of their land mass in

agricultural production. Unemployment rates tend to be higher in rural areas than in urban areas because farm work is typically seasonal or temporary.

The lower Sacramento River and Delta portion of the extended study area has some low-income populations and some counties with a higher unemployment rate than the statewide average. However, the No-Action Alternative would not change the existing or projected future conditions. Therefore, the No-Action Alternative would not have disproportionately high and adverse effects on minority or low-income populations. Mitigation is not required for the No-Action Alternative.

CVP/SWP Service Areas

Impact EJ-5 (No-Action): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas

Some communities within the CVP and SWP service areas contain minority and low-income populations above environmental justice thresholds; however, adverse effects on CVP and SWP customers within these communities do not constitute a disproportionately high and adverse impact. Continuing the existing and projected future conditions under the No-Action Alternative would not affect these populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

The CVP and SWP service areas are so expansive that they may be considered synonymous with the entire state of California for environmental justice purposes. Together, the CVP and SWP service areas include 36 of California's 58 counties, accounting for 91 percent (39 million residents) of California's population in 2010. The state's population has increased by almost 30 percent since 1990 and is projected to increase by approximately 32 percent to more than 51 million people by 2020 (DOF 2010). Continued ethnic diversification is expected. Minority groups have been steadily increasing their proportion of the state population. The population of individuals in California identifying themselves as Asian–Pacific Islander or multiracial experienced double-digit population growth, while those identifying themselves as Black or African American experienced the least amount of growth between 2000 and 2010 (U.S. Census Bureau 2010b). Hispanics are the most numerous minority group in California, and many members of this ethnic group work on farms that receive some or all of their water from the CVP. In general, rural agricultural counties have smaller minority populations than urban counties.

Poverty levels for both individuals and children in California increased slightly between 2000 and 2010. The percentage of people below the poverty level in Shasta County is expected to follow national and statewide economic trends. Generally, poverty rates tend to be higher in rural counties than in urban counties. Despite these overall differences, each of the state's major urban areas has pockets of low-income neighborhoods with high poverty rates.

California's total labor force increased just over 2 percent from 2002 to 2005, adding between 100,000 and 200,000 individuals each year. Between 2004 and 2005, the labor force increased by approximately 188,000 individuals. This was the largest annual increase over the 4-year period. California's total labor force exceeded 18.8 million in 2010. The state's unemployment rate was lowest in 2000 (5.0 percent), and has been increasing since 2003. Unemployment in 2010 registered at 7.7 percent, greater than the state's 2001 unemployment rate of 5.4. This observed increase in the unemployment rate at the state level has coincided with similar national employment trends. Like poverty, unemployment rates tend to be lower in urban areas than in rural areas of the state; however, high unemployment rates are often found in low-income neighborhoods of major urban centers.

Although the CVP and SWP service areas have some low-income populations, the No-Action Alternative would not change the existing or projected future conditions. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation is not required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Shasta Lake and Vicinity
Impact EJ-1 (CP1): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake
Communities adjacent to the project construction site may experience temporary or short-term adverse environmental effects because of construction activities and changes in project conditions and operations. However, neither construction-related nor operational effects would disproportionately affect minority or low-income populations in the vicinity of Shasta Lake. Increased employment and income opportunities could also result from project construction activities, and would not be disproportionately distributed among minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

Under this alternative, the dam would be raised by 6.5 feet over a 4.5-year construction period. Residents near Shasta Dam, as well as others who may commute or otherwise travel near construction sites, would be exposed to a range of potentially adverse environmental and public health effects over a 4.5-year construction period (see Engineering Summary Appendix). Temporary and/or short-term adverse noise, visual, and air quality effects could result; in addition, motorists could be delayed, and access to recreation opportunities or local businesses could be temporarily reduced. Negative health effects could also result if hazardous materials were to be accidentally released into the environment during construction.

Nonwhite individuals, including the Winnemem Wintu Tribe and other Native Americans, accounted for 16.6 percent of Shasta County's total population in 2010, well below the 50 percent threshold for a minority population. This percentage is also substantially less than the 2010 statewide nonwhite population of 42.4 percent. Likewise, the poverty rate in Shasta County was 17.7 percent in 2010, well below the 50 percent threshold and slightly greater than the 15.5 percent statewide poverty rate. Therefore, the percentages of minority and low-income individuals in populations in Shasta County are well below threshold levels for a minority or low-income population. Therefore, minority and low-income populations would not be disproportionately affected by these adverse effects.

Increased employment and income opportunities may result from construction under CP1, which could benefit minority and low-income populations. Project construction under CP1 could increase the number of jobs available, or could improve business conditions and incomes for workers who are already employed by businesses that would directly or indirectly benefit from project-related construction spending. The project would require a labor force of 300 people drawn directly from the Shasta Lake area. Most (85 percent) of the construction materials and supplies would be purchased in the vicinity; these materials and supplies would constitute 60 percent of total construction costs. As described above, the percentages of minority and low-income individuals in Shasta County populations are well below threshold levels for minority and low-income populations, and employment effects would not be disproportionately distributed among these groups. Selected minority and low-income individuals may be potentially affected. Such economic and job-related impacts would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Impact EJ-2 (CP1): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in the Vicinity of Shasta Lake The local Native American community has identified several locations in the vicinity of Shasta Lake that they consider to be sacred. Notable among these locations are the Winnemem Wintu's Puberty Rock and the doctoring pools near Nawtawaket Creek and the Pit River Madesi Band's ethnographic villages, associated burial grounds, and several TCPs. CP1 would have a substantial adverse effect on several of these locations in the vicinity of Shasta Lake. Because the Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to these locations, the disturbance or loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

Two tribes, the Winnemem Wintu and the Pit River Madesi Band, live within the vicinity of Shasta Lake, where they continue to actively practice many aspects of their traditional culture. Both groups have related that a complex

cultural landscape of village sites, ceremonial areas, sacred sites, burial sites, and resource areas would be affected directly by CP1.

Two particularly important Winnemem Wintu locations that would be affected by CP1 are Puberty Rock and the doctoring pools near Nawtawaket Creek. CP1 could submerge Puberty Rock for longer periods, restricting the Winnemen Wintu from holding the puberty ceremony at this important location. Relocating the rock to higher ground is not possible; in the Winnemem Wintu's worldview, its location is preordained and connected with the nearby "two sisters" mountain (Bolliboka Mountain). Puberty Rock also marks the location of an extensive village with housepits and burials, situated at Kabyai Creek, west of the McCloud River near the McCloud Campground. CP1 would inundate additional burials at this location, which would require removal and relocation. The Winnemem Wintu have estimated that 120 ancestral villages are still accessible above the current high-water line of Shasta Lake and would be adversely affected by CP1.

Pit River Madesi Band members state that 22 ethnographic villages, associated burial grounds, and several TCPs are located within the existing reservoir and proposed inundation or fluctuation areas.

Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to several locations in the vicinity of Shasta Lake; therefore, the disturbance and loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake. Mitigation for this impact is not proposed because no feasible mitigation (or action alternative) is available to avoid or minimize the high and adverse effect. However, Reclamation is committed to and will comply with the Federal NHPA Section 106 consultation process to avoid, minimize, or mitigate any significant, adverse impacts to cultural resources and historic properties due to CP1, to the extent possible. Additional information on cultural resources mitigation is located in Chapter 14, "Cultural Resources."

Upper Sacramento River (Shasta Dam to Red Bluff)
Impact EJ-3 (CP1): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area
Effects from project-related construction are not anticipated in the upper Sacramento River area downstream from Shasta Dam. In the long term, operational changes resulting from CP1 could reduce the risk of flooding and enhance environmental and recreational conditions in this area. These operational effects would not constitute a disproportionately high and adverse impact on minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

In Tehama County, nonwhite individuals accounted for 18.0 percent of the total population in 2010. This is roughly half of the 50 percent threshold for a

minority population. This level also is substantially less than the statewide nonwhite population of 42.4 percent. The poverty level in Tehama County was 19.5 percent in 2010, also well below the 50 percent threshold and slightly higher than the 15.5 percent statewide poverty rate. From 2000 to 2010, poverty levels in Tehama County increase at a rate of 2.2 percent, outpacing the statewide poverty rate (1.3 percent) by 0.9 percent over approximately the same time. Based on this trend, and the comparatively consistent poverty rates between Tehama County and the statewide population, poverty levels in Tehama County are not meaningfully greater than poverty levels statewide. Therefore, the percentages of minority and low-income individuals in populations in Tehama County are well below threshold levels for minority and low-income populations. Thus, disproportionately high and adverse effects on minority or low-income populations would not occur.

Communities along the upper Sacramento River portion of the primary study area would not be exposed to direct construction-related impacts associated with CP1.

Raising Shasta Dam would add 256,000 acre-feet of cold-water storage to the overall capacity of the reservoir. This operational change would be beneficial for two reasons. CP1 would reduce the risk of flooding downstream from Shasta Dam and consequently reduce potentially adverse social, economic, and environmental effects because of flooding for property owners, businesses, and workers. In addition, CP1 would improve environmental and recreational conditions by enhancing habitat for fish and wildlife, benefiting anglers, hunters, and wildlife viewers.

These beneficial impacts would not be disproportionately distributed among minority and low-income populations, because representation of these groups in the population of Tehama County is well below threshold levels. Selected minority and low-income individuals may be potentially affected; however, these environmental and recreational effects would be beneficial. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta

Impact EJ-4 (CP1): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area Operational effects of CP1 would be similar to those described for the upper Sacramento River portion of the primary study area under Impact EJ-2 (CP1). However, because the beneficial effects (reduction of flooding risk and improved environmental and recreational conditions) would diminish with distance from the project site, the benefits in this area would be less. No disproportionately high or adverse effects on minority or low-income populations would occur.

Operational effects of CP1 on minority and low-income populations in the lower Sacramento River and Delta portion of the extended study area would be similar to those described for the upper Sacramento River portion of the primary

study area under Impact EJ-2 (CP1). However, benefits in the lower Sacramento River and Delta area resulting from the reduced risk of flooding and improved environmental and recreational conditions would be less than described for the upper Sacramento River area because the lower Sacramento River and Delta is located at a greater distance from the project site. Minority and low-income populations would not be disproportionately affected. No disproportionately high or adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

CVP/SWP Service Areas

Impact EJ-5 (CP1): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas Direct construction-related impacts are not anticipated in the CVP and SWP service areas. The project could result in adverse indirect impacts because of water and power rate increases for customers within the CVP and SWP service areas. Employment opportunities and personal incomes may increase because of operational changes that improve the reliability of the water supply and power for businesses and others. Minority and low-income populations would not be disproportionately affected. No disproportionately high and adverse effects on minority or low-income populations would occur.

Utility customers in communities within the CVP and SWP service areas may experience indirect, adverse effects through rate increases as a result of CP1. Project-related water storage and hydroelectric facility improvements may be funded partly through increased rates for water and power services. However, such adverse effects would not disproportionately affect minority or low-income populations.

Operational changes resulting from CP1 may increase employment opportunities and water and power reliability in the CVP and SWP communities, which would be beneficial for individual utility customers and businesses. Selected minority and low-income individuals may be beneficially affected by increased employment opportunities. Such beneficial employment-related impacts would not disproportionately affect minority and low-income populations. Thus, no disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

Shasta Lake and Vicinity

Impact EJ-1 (CP2): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake
Communities adjacent to the project construction site may experience temporary and/or short-term adverse environmental effects because of construction activities and changes in project conditions and operations.

However, neither construction-related nor operational effects would disproportionately affect minority or low-income populations in the vicinity of Shasta Lake. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur.

Effects on minority and low-income populations would be similar to those described above for Impact EJ-1 (CP1), except that the dam would be raised by 12.5 feet and the construction period likely would extend for up to 6 additional months. The beneficial effects and less-than-significant adverse impacts would be similar to those described under Impact EJ-1 (CP1) because the types of work and the predicted workforce would be similar under each alternative. As described under Impact EJ-1 (CP1), the percentages of minority and low-income individuals in populations in Shasta County are well below threshold levels for a minority or low-income population. Therefore, disproportionately high and adverse effects on minority or low-income populations would not occur. Mitigation for this impact is not needed, and thus not proposed.

Impact EJ-2 (CP2): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in the Vicinity of Shasta Lake The local Native American community has identified several locations in the vicinity of Shasta Lake that they consider to be sacred. Notable among these locations are the Winnemem Wintu's Puberty Rock and the doctoring pools near Nawtawaket Creek and the Pit River Madesi Band's ethnographic villages, associated burial grounds, and several TCPs. CP2 would have a substantial adverse effect on several of these locations in the vicinity of Shasta Lake. Because the Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to these locations, the disturbance or loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

This impact would be similar to but slightly greater than Impact EJ-2 (CP1) because the inundation area under CP2 would be slightly greater than under CP1. A disproportionately high and adverse effect on Native American populations would occur. Mitigation for this impact is not proposed because no feasible mitigation (or action alternative) is available to avoid or minimize the high and adverse effect. However, Reclamation is committed to and will comply with the Federal NHPA Section 106 consultation process to avoid, minimize, or mitigate any significant, adverse impacts to cultural resources and historic properties due to CP2, to the extent possible. Additional information on cultural resources mitigation is located in Chapter 14, "Cultural Resources."

Upper Sacramento River (Shasta Dam to Red Bluff)

Impact EJ-3 (CP2): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area Effects from project-related construction are not anticipated in the upper Sacramento River area downstream from Shasta Dam. In the long term,

operational changes resulting from CP2 could reduce the risk of flooding and enhance environmental and recreational conditions in this area. These operational effects would not constitute a disproportionately high and adverse impact on minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-3 (CP1). CP2 would provide 187,000 acre-feet more cold-water storage capacity than CP1. Greater storage capacity would reduce the risk of flooding and, along with increased cold water, would benefit downstream fisheries and recreation resources and users. Also, as described under Impact EJ-3 (CP1), the percentages of minority and low-income individuals in populations in Tehama County are well below threshold levels for minority and low-income populations. Thus, disproportionately high and adverse effects on minority or low-income populations would not occur. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta

Impact EJ-4 (CP2): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area Operational effects of CP2 would be similar to those described for the upper Sacramento River portion of the primary study area under Impact EJ-4 (CP2). However, because the beneficial effects (reduction of flooding risk and improved environmental and recreational conditions) would diminish with distance from the project site, the benefits in this area would be less. No disproportionately high or adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-4 (CP1). Under CP2, reduced flooding and beneficial effects on fisheries and recreation resources also would occur in the lower Sacramento River and Delta portion of the extended study area. However, the beneficial effects would be less than along the upper Sacramento River because benefits would diminish with increasing distance from the project site. As in the upper Sacramento River portion of the primary study area, the additional 187,000 acre-feet of reservoir storage would provide somewhat greater benefits under CP2 than under CP1. Minority and low-income populations would not be disproportionately affected. No disproportionately high or adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

CVP/SWP Service Areas

Impact EJ-5 (CP2): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas Direct construction-related impacts are not anticipated in the CVP and SWP service areas. The project could result in adverse indirect impacts because of water and power rate increases for customers within the CVP and SWP service areas. Employment opportunities and personal incomes may increase because of

operational changes that improve the reliability of the water supply and power for businesses and others. Minority and low-income populations would not be disproportionately affected. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-5 (CP1). Construction costs under CP2 would be greater than under CP1, because of the increased need for construction materials and an additional 6 months of construction. These increased costs would result in slightly greater increases in water and power rates than under CP1. However, such adverse effects would not disproportionately affect minority and low-income populations. Operational benefits would be similar to those of CP1, and minority or low-income populations would not be disproportionately affected. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and Anadromous Fish Survival

Shasta Lake and Vicinity

Impact EJ-1 (CP3): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake

Communities adjacent to the project construction site may experience temporary and/or short-term adverse environmental effects because of construction activities and changes in project conditions and operations. However, neither construction-related nor operational effects would disproportionately affect minority or low-income populations in the vicinity of Shasta Lake. No disproportionately high or adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-1 (CP1). Under CP3, the effects on minority and low-income populations would be similar to those described above for Impact EJ-1 (CP1), except that the dam would be raised by 18.5 feet and the construction period would extend for at least 6 additional months and require an additional 50 construction workers. The beneficial impacts and less-than-significant adverse impacts would be similar to those described under CP1 because the types of work and the predicted workforce would be similar under each alternative. As described under Impact EJ-1 (CP1), the percentages of minority and low-income individuals in populations in Shasta County are well below threshold levels for a minority or low-income population. Therefore, disproportionately high effects on minority or low-income populations would not occur (nor would disproportionately high and beneficial effects). Mitigation for this impact is not needed, and thus not proposed.

Impact EJ-2 (CP3): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in

the Vicinity of Shasta Lake The local Native American community has identified several locations in the vicinity of Shasta Lake that they consider to be sacred. Notable among these locations are the Winnemem Wintu's Puberty Rock and the doctoring pools near Nawtawaket Creek and the Pit River Madesi Band's ethnographic villages, associated burial grounds, and several TCPs. CP3 would have a substantial adverse effect on several of these locations in the vicinity of Shasta Lake. Because the Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to these locations, the disturbance or loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

This impact would be similar to but slightly greater than Impact EJ-2 (CP2) because the inundation area under CP3 would be slightly greater than under CP2. A disproportionately high and adverse effect on Native American populations would occur. Mitigation for this impact is not proposed because no feasible mitigation (or action alternative) is available to avoid or minimize the high and adverse effect. However, Reclamation is committed to and will comply with the Federal NHPA Section 106 consultation process to avoid, minimize, or mitigate any significant, adverse impacts to cultural resources and historic properties due to CP3, to the extent possible. Additional information on cultural resources mitigation is located in Chapter 14, "Cultural Resources."

Upper Sacramento River (Shasta Dam to Red Bluff)

Impact EJ-3 (CP3): Potential Disproportionate High and Adverse Effect on Minority and Low- Income Populations in the Upper Sacramento River Area

Effects from project-related construction are not anticipated in the upper Sacramento River area downstream from Shasta Dam. In the long term, operational changes resulting from CP3 could reduce the risk of flooding and enhance environmental and recreational conditions in this area. These beneficial operational effects would not be disproportionately distributed among minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-3 (CP1). CP3 would provide 378,000 acre-feet more cold-water storage capacity than CP1. Greater storage capacity would reduce the risk of flooding and, along with increased cold water, would benefit downstream fisheries and recreation resources and users. Also, as described under Impact EJ-3 (CP1), the percentages of minority and low-income individuals in populations in Tehama County are well below threshold levels for minority and low-income populations. Thus, disproportionately high and adverse effects on minority or low-income populations would not occur. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta

Impact EJ-4 (CP3): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and

Delta Area Operational effects of CP3 would be similar to those described for the upper Sacramento River portion of the primary study area under Impact EJ-3 (CP3). However, because the beneficial effects (reduction of flooding risk and improved environmental and recreational conditions) would diminish with distance from the project site, the benefits in this area would be less. No disproportionately high or adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-4 (CP1). Under CP3, reduced flooding and beneficial effects on fisheries and recreation resources also would occur in the lower Sacramento River and Delta portion of the extended study area. However, the beneficial effects would be less than along the upper Sacramento River because benefits would diminish with increasing distance from the project site. As in the upper Sacramento River portion of the primary study area, the additional 378,000 acre-feet of reservoir storage would provide somewhat greater benefits under CP3 than under CP1. Minority and low-income populations would not be disproportionately affected. No disproportionately high or adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

CVP/SWP Service Areas

Impact EJ-5 (CP3): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas Direct construction-related impacts are not anticipated in the CVP and SWP service areas. The project could result in adverse indirect impacts because of water and power rate increases for customers within the CVP and SWP service areas. Employment opportunities and personal incomes may increase because of operational changes that improve the reliability of the water supply reliability and power for businesses and others. Minority and low-income populations would not be disproportionately affected. No disproportionately high or adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-5 (CP1). Construction costs under CP3 would be greater than under CP1 because of the increased need for construction materials and an additional 6 months of construction. These increased costs would result in slightly greater increases in water and power rates than under CP1. However, such adverse effects would not disproportionately affect minority and low-income populations. Operational benefits would be similar to those of CP1, and minority and low-income populations would not be disproportionately affected. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

Shasta Lake and Vicinity

Impact EJ-1 (CP4 and CP4A): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake Communities adjacent to the project construction site may experience temporary and/or short-term adverse environmental effects because of construction activities and changes in project conditions and operations. However, neither construction-related nor operational effects would be disproportionately distributed among minority or low-income populations in the vicinity of Shasta Lake. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-1 (CP1). Under CP4 or CP4A, the effects on minority and low-income populations would be similar to those described above for Impact EJ-1 (CP1), except that the dam would be raised by 18.5 feet and the construction period would extend for at least 6 additional months and require an additional 50 construction workers. The beneficial effects and less-than-significant adverse impacts would be similar to those described under CP1 because the types of work and the predicted workforce would be similar under each alternative. As described under Impact EJ-1 (CP1), the percentages of minority and low-income individuals in populations in Shasta County are well below threshold levels for a minority or low-income population. Adverse and beneficial effects would not be disproportionately distributed among minority or low-income populations.

Because adverse and beneficial effects would not be disproportionately distributed among minority or low-income populations, this impact is less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

Because adverse and beneficial effects would not be disproportionately distributed among minority or low-income populations, this impact is less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Impact EJ-2 (CP4 and CP4A): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in the Vicinity of Shasta Lake The local Native American community has identified several locations in the vicinity of Shasta Lake that they consider to be sacred. Notable among these locations are the Winnemem Wintu's Puberty Rock and the doctoring pools near Nawtawaket Creek and the Pit River Madesi Band's ethnographic villages, associated burial grounds, and several TCPs. CP4 and CP4A would have a substantial adverse effect on several of these locations in the vicinity of Shasta Lake. Because the Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance

to these locations, the disturbance or loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

This impact would be similar to Impact EJ-2 (CP3), but the frequency and timing of inundation may vary between CP4 or CP4A and CP3. Additionally, the timing of inundation is different between CP4 and CP4A in that they each dedicate a portion of the new storage in Shasta Lake for fisheries purposes; however, the portion of this dedicated storage varies. The operations proposed for CP4A may result in the sacred sites being inundated less frequently inundated than for CP4 or CP3.

Although the sacred sites may be inundated less frequently under CP4A, both CP4 and CP4A are expected to have a disproportionately high and adverse effects on Native American populations. Mitigation for this impact is not proposed because no feasible mitigation (or action alternative) is available to avoid or minimize the high and adverse effect. However, Reclamation is committed to and will comply with the Federal NHPA Section 106 consultation process to avoid, minimize, or mitigate any significant, adverse impacts to cultural resources and historic properties due to CP4 or CP4A, to the extent possible. Additional information on cultural resources mitigation is located in Chapter 14, "Cultural Resources."

Upper Sacramento River (Shasta Dam to Red Bluff)
Impact EJ-3 (CP4 and CP4A): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area Effects from project-related construction are not anticipated in the upper Sacramento River area downstream from Shasta Dam. In the long term, operational changes resulting from CP4 or CP4A could reduce the risk of flooding and enhance environmental and recreational conditions in this area. These beneficial operational effects would not constitute a disproportionately high and adverse impact on minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

The impact would be similar to Impact EJ-3 (CP1) for CP4 or CP4A. CP4 or CP4A would provide 634,000 acre-feet of additional water storage capacity. Like CP1, CP4 would provide 256,000 acre-feet of active storage in the reservoir. Similar to CP2, CP4A would create 443,000 acre-feet of new active storage capacity. Greater storage capacity would reduce the risk of flooding and, along with increased cold water, would benefit downstream fisheries and recreation resources and users. Also, as described under Impact EJ-3 (CP1), the percentages of minority and low-income individuals in populations in Tehama County are well below threshold levels for minority and low-income populations. Minority and low-income populations would not be disproportionately affected.

No disproportionately high and adverse effects on minority or low-income populations would occur. Therefore, this impact would be less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

No disproportionately high and adverse effects on minority or low-income populations would occur. Therefore, this impact would be less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta

Impact EJ-4 (CP4 and CP4A): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area Operational effects of CP4 or CP4A would be similar to those described for the upper Sacramento River portion of the primary study area under Impact EJ-3 (CP4 and CP4A). However, because the beneficial effects (reduction of flooding risk and improved environmental and recreational conditions) would diminish with distance from the project site, the benefits in this area would be less. No disproportionately high and adverse effects on minority or low-income populations would occur for CP4 or CP4A.

This impact would be similar to Impact EJ-4 (CP1). Under CP4 or CP4A, reduced flooding and beneficial effects on fisheries and recreation resources also would occur in the lower Sacramento River and Delta portion of the extended study area. However, the beneficial effects would be less than along the upper Sacramento River because benefits would diminish with increasing distance from the project site. As in the upper Sacramento River portion of the primary study area, the additional 378,000 acre-feet of dedicated storage for cold water pool for CP4, or the additional 191,000 acre-feet of dedicated storage for cold water pool for CP4A would provide somewhat greater benefits under CP4 or CP4A than under CP1. Minority and low-income populations would not be disproportionately affected.

No disproportionately high or adverse effects on minority or low-income populations would occur. Therefore, this impact is less than significant for CP4. Mitigation for this impact is not needed, and thus not proposed.

No disproportionately high or adverse effects on minority or low-income populations would occur. Therefore, this impact is less than significant for CP4A. Mitigation for this impact is not needed, and thus not proposed.

CVP/SWP Service Areas

Impact EJ-5 (CP4 and CP4A): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas Direct construction-related impacts are not anticipated in the CVP and SWP service areas. The project could result in adverse indirect impacts because of water and power rate increases for customers within the CVP and SWP service areas. Employment opportunities and personal incomes may increase because of operational changes that improve the reliability of the water supply and power

to businesses and others. Minority and low-income populations would not be disproportionately affected. No disproportionately high and adverse effects on minority or low-income populations would occur for CP4 or CP4A.

The impact for CP4 or CP4A would be similar to Impact EJ-5 (CP1) . Construction costs under CP4 or CP4A would be greater than under CP1 because of the increased need for construction materials and an additional 6 months of construction and require an additional 50 construction workers. These increased costs would result in slightly greater increases in water and power rates than under CP1. However, such adverse effects would not disproportionately affect minority and low-income populations. Operational benefits would be similar to those under CP1 for CP4, and to those under CP2 for CP4A, and minority and low-income populations would not be disproportionately affected.

No disproportionately high and adverse effects on minority or low-income populations would occur. Therefore, this impact for CP4 is less than significant. Mitigation for this impact is not needed, and thus not proposed.

No disproportionately high and adverse effects on minority or low-income populations would occur. Therefore, this impact for CP4A is less than significant. Mitigation for this impact is not needed, and thus not proposed.

CP5 – 18.5-Foot Dam Raise, Combination Plan

Shasta Lake and Vicinity

Impact EJ-1 (CP5): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake

Communities adjacent to the project construction site may experience temporary adverse environmental effects because of construction activities and changes in project conditions and operations. However, the construction activity in any specific area would be short-term, and neither construction-related nor operational effects would constitute a high and adverse impact on minority or low-income populations in the vicinity of Shasta Lake. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-1 (CP1). Under CP5, the effects on minority and low-income populations would be similar to those described above for Impact EJ-1 (CP1), except that the dam would be raised by 18.5 feet and the construction period would extend for at least 6 additional months and require an additional 60 construction workers. The beneficial effects and less-than-significant adverse impacts would be similar to those described under CP1 because the types of work and the predicted workforce would be similar under each alternative. As described under Impact EJ-1 (CP1), the percentages of minority and low-income individuals in populations in Shasta County are well below threshold levels for a minority or low-income population. Therefore, minority and low-income populations would not be disproportionately affected.

No disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

Impact EJ-2 (CP5): Potential Disproportionate High and Adverse Effect on Native American Populations from Disturbance or Loss of Sacred Locations in the Vicinity of Shasta Lake The local Native American community has identified several locations in the vicinity of Shasta Lake that they consider to be sacred. Notable among these locations are the Winnemem Wintu's Puberty Rock and the doctoring pools near Nawtawaket Creek and the Pit River Madesi Band's ethnographic villages, associated burial grounds, and several TCPs. CP5 would have a substantial adverse effect on several of these locations in the vicinity of Shasta Lake. Because Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to these locations, the disturbance or loss of resources associated with these locations would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

This impact would be the same as Impact EJ-2 (CP3). Disproportionately high and adverse effects on Native American populations would occur. Mitigation for this impact is not proposed because no feasible mitigation (or action alternative) is available to avoid or minimize the high and adverse effect. However, Reclamation is committed to and will comply with the Federal NHPA Section 106 consultation process to avoid, minimize, or mitigate any significant, adverse impacts to cultural resources and historic properties due to CP5, to the extent possible. Additional information on cultural resources mitigation is located in Chapter 14, "Cultural Resources."

Upper Sacramento River (Shasta Dam to Red Bluff)
Impact EJ-3 (CP5): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area
Effects from project-related construction are not anticipated in the upper Sacramento River area downstream from Shasta Dam. In the long term, operational changes resulting from CP5 could reduce the risk of flooding and enhance environmental and recreational conditions in this area. These operational effects would not constitute a disproportionately high and adverse impact on minority and low-income populations. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-3 (CP1). CP5 would provide 378,000 acre-feet more cold-water storage capacity than CP1. Greater storage capacity would reduce the risk of flooding and, along with increased cold water, would benefit downstream fisheries and recreation resources and users. Also, as described under Impact EJ-3 (CP1), the percentages of minority and low-income individuals in populations in Tehama County are well below threshold levels for minority and low-income populations. Therefore, minority and low-income populations would not be disproportionately affected. No

disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

Lower Sacramento River and Delta

Impact EJ-4 (CP5): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area Operational effects of CP5 would be similar to those described for the upper Sacramento River portion of the primary study area under Impact EJ-3 (CP5). However, because the beneficial effects (reduction of flooding risk and improved environmental and recreational conditions) would diminish with distance from the project site, the benefits in this area would be less. No disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-4 (CP1). Under CP5, reduced flooding and beneficial effects on fisheries and recreation resources also would occur in the lower Sacramento River and Delta portion of the extended study area. However, the beneficial effects would be less than along the upper Sacramento River because benefits would diminish with increasing distance from the project site. As in the upper Sacramento River portion of the primary study area, the additional 378,000 acre-feet of reservoir storage would provide somewhat greater benefits under CP5 than under CP1. Minority and low-income populations would not be disproportionately affected. No disproportionately high or adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

CVP/SWP Service Areas

Impact EJ-5 (CP5): Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas Direct construction-related impacts are not anticipated in the CVP and SWP service areas. The project could result in adverse indirect impacts because of water and power rate increases for customers within the CVP and SWP service areas. Employment opportunities and personal incomes may increase because of operational changes that improve the reliability of the water supply and power for businesses and others. Minority and low-income populations would not be disproportionately affected. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur.

This impact would be similar to Impact EJ-5 (CP1). Construction costs under CP5 would be greater than under CP1 because of increased materials, an additional 6 months of construction, and 60 additional construction workers. These increased costs would result in slightly greater increases in water and power rates than under CP1. However, such adverse effects would not disproportionately affect minority and low-income populations. Operational benefits would be similar to those under CP1, and minority and low-income

populations would not be disproportionately affected. Therefore, no disproportionately high and adverse effects on minority or low-income populations would occur. Mitigation for this impact is not needed, and thus not proposed.

24.3.5 Mitigation Measures

Table 24-2 presents a summary of effects and mitigation measures for environmental justice.

No-Action Alternative

No mitigation measures are needed for this alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation measures are needed for Impacts EJ-1 (CP1), EJ-3 (CP1), EJ-4 (CP1), or EJ-5 (CP1). No feasible mitigation is available for Impact EJ-2 (CP1). The disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in an unmitigable disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

Table 24-2. Summary of Mitigation Measures for Environmental Justice

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact EJ-1: Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Vicinity of Shasta Lake	Effect before Mitigation	NDHA	NDHA	NDHA	NDHA	NDHA	NDHA
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	Effect after Mitigation	NDHA	NDHA	NDHA	NDHA	NDHA	NDHA
Impact EJ- Impact EJ-2: Potential Disproportionate High and Adverse Effect on Native American Populations in the Vicinity of Shasta Lake	Effect before Mitigation	NDHA	DHA	DHA	DHA	DHA	DHA
	Mitigation Measure	None required.	No feasible mitigation is available to reduce impact.				
	Effect after Mitigation	NDHA	DHA	DHA	DHA	DHA	DHA
Impact EJ- Impact EJ-3: Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Upper Sacramento River Area	Effect before Mitigation	NDHA	NDHA	NDHA	NDHA	NDHA	NDHA
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	Effect after Mitigation	NDHA	NDHA	NDHA	NDHA	NDHA	NDHA
Impact EJ- Impact EJ-4: Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the Lower Sacramento River and Delta Area	Effect before Mitigation	NDHA	NDHA	NDHA	NDHA	NDHA	NDHA
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	Effect after Mitigation	NDHA	NDHA	NDHA	NDHA	NDHA	NDHA
Impact EJ- Impact EJ-5: Potential Disproportionate High and Adverse Effect on Minority and Low-Income Populations in the CVP/SWP Service Areas	Effect before Mitigation	NDHA	NDHA	NDHA	NDHA	NDHA	NDHA
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	Effect after Mitigation	NDHA	NDHA	NDHA	NDHA	NDHA	NDHA

Key:
CP = Comprehensive Plan
CVP = Central Valley Project
DHA = Disproportionately high and adverse
NDHA = Not disproportionately high and adverse
SWP = State Water Project

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

No mitigation measures are needed for Impacts EJ-1 (CP2), EJ-3 (CP2), EJ-4 (CP2), or EJ-5 (CP2). No feasible mitigation is available for Impact EJ-2 (CP2). The disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in an unmitigable disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

CP3 – 18.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply

No mitigation measures are needed for Impacts EJ-1 (CP3), EJ-3 (CP3), EJ-4 (CP3), or EJ-5 (CP3). No feasible mitigation is available for Impact EJ-2 (CP3). The disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in an unmitigable disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

No mitigation measures are needed for Impacts EJ-1 (CP4 and CP4A), EJ-3 (CP4 and CP4A), EJ-4 (CP4 and CP4A), or EJ-5 (CP4 and CP4A). No feasible mitigation is available for Impact EJ-2 (CP4 and CP4A). The disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in an unmitigable disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

CP5 – 18.5-Foot Dam Raise, Combination Plan

No mitigation measures are needed for Impacts EJ-1 (CP5), EJ-3 (CP5), EJ-4 (CP5), or EJ-5 (CP5). No feasible mitigation is available for Impact EJ-2 (CP5). The disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in an unmitigable disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake.

24.3.6 Cumulative Effects

Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," gives an overview of the cumulative effects analysis, including significance criteria, and discusses the relationship of this analysis to the CALFED Programmatic Cumulative Impacts Analysis. Table 3-1, "Present and Reasonably Foreseeable Future Actions Included in the Analysis of Cumulative Impacts, by Resource Area," in Chapter 3, lists the projects considered quantitatively and qualitatively within the cumulative impacts analysis. This cumulative impacts analysis accounts for potential project impacts combined with the impacts of existing facilities, conditions, land uses, and reasonably foreseeable actions expected to occur in the study area on a qualitative and quantitative level. None of the projects listed in Table

3-1 under Quantitative Analysis would have disproportional effects on minority or low income populations in the primary study area and the SLWRI would not have adverse impacts in the extended study area, therefore, the following analysis is based on programs and projects listed in Table 3-1 under Qualitative Analysis that would have potential effects in the primary study area as explained below.

In the primary study area (i.e., Shasta Lake and vicinity and the upper Sacramento River from Shasta Dam to Red Bluff), minority and low-income populations are not disproportionately represented. Identified construction effects would be less than significant, and minority and low-income populations would not be disproportionately affected.

Some communities within the extended study area (i.e., the lower Sacramento River and Delta and the CVP and SWP service areas) exceed minority and low-income thresholds. These communities, along with the general population, would benefit from project effects that would reduce future water shortages by improving water supply reliability for both average and drought years. The greatest benefit would be provided by CP3, CP4, CP4A, and CP5, which would provide an additional 634,000 acre-feet of storage capacity. CP1 and CP2 would provide only 256,000 and 443,000 acre-feet of increased storage capacity, respectively, with correspondingly reduced benefits.

Alternatives that would incorporate the greatest increase to dam height would result in the greatest project cost because of higher costs for construction materials and longer construction periods. These increased costs may be reflected in increased utility rates that could be combined with other utility rate increases. Such rate increases would be incremental and would be experienced by the general population, along with minority and low-income communities.

Therefore, the project would not contribute to disproportionate placement of environmental impacts on low-income and minority populations or communities, and no cumulatively considerable impacts would result.

The disturbance or loss of resources associated with locations considered by Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake. Past and present effects to sites of religious and cultural significance are from construction projects, such as Shasta Dam, recreation development and use, and forest management practices. Reasonably foreseeable future projects on Table 3-1 that may affect these resources include but are not limited to Antlers Bridge Replacement Project, which proposes to avoid construction impacts to cultural resources. However due to past and present impacts on these sites, when considered with the effects of the SLWRI, the project would contribute to disproportionate placement of environmental impacts on Native American

populations and would result in a cumulatively considerable incremental contribution to a significant and unavoidable cumulative impact.

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Chapter 25
Wild and Scenic River Considerations for McCloud River

This chapter describes the effects of the dam and reservoir modifications proposed under SLWRI action alternatives on the wild and scenic river values of the lower McCloud River, one of the major tributaries to Shasta Lake.

This chapter differs from the other chapters in this EIS in that it concerns only the McCloud River and does not discuss other portions of the primary study area nor the extended study area. The study area for this chapter consists of the lower McCloud River from the McCloud River Bridge to the confluence with Little Bollibokka Creek (Figure 25-1).

The primary focus of this chapter is the wild and scenic river values of the lower McCloud River, particularly the reach that would periodically be newly inundated if Shasta Dam and Shasta Lake were enlarged. The discussion and analysis concentrate on the values for which the McCloud River has been determined eligible for listing under the Federal Wild and Scenic Rivers Act ((Federal WSRA); Public Law 90-542, as amended; 16 U.S. Code 1271-1287) and for which a portion of the river is protected under the California Public Resources Code (PRC) Section 5093.542. Section 5093.542 was established through enactment of the California Wild and Scenic Rivers Act, as amended (Sections 5093.50 – 5093.70).

This chapter also differs from the other chapters in this EIS; it first provides background information and then discusses the regulatory framework to provide context for the affected environment section.

25.1 Background

Segments of the McCloud River have been determined eligible for listing under the Federal WSRA and are protected under the PRC. The river has not been formally listed as wild and scenic under either the Federal WSRA or PRC and is not part of either the national or State river system.

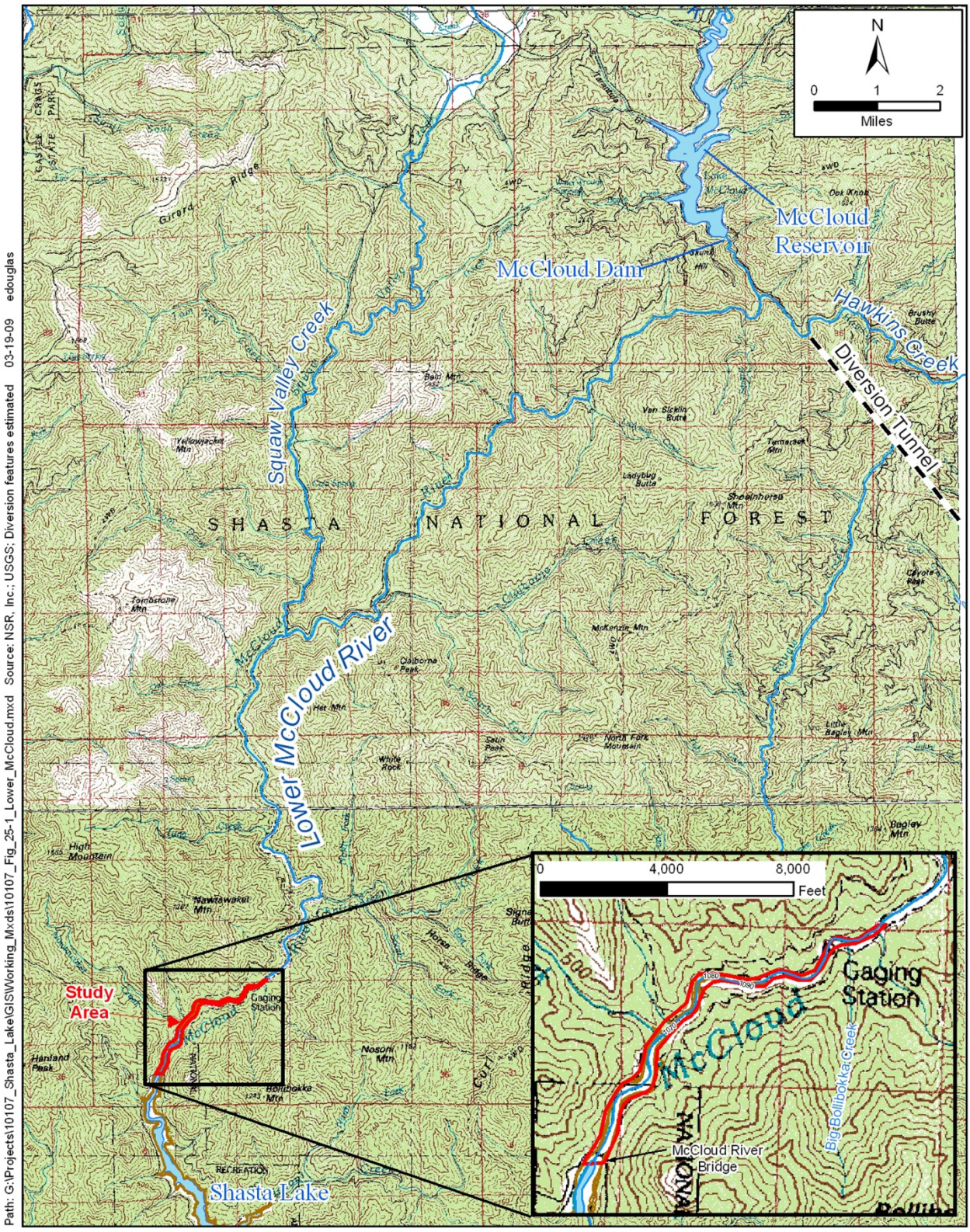

Figure 25-1. Lower McCloud River Study Area

The USFS evaluated the eligibility of the McCloud River for listing as wild and scenic under the Federal WSRA during preparation of the Shasta-Trinity National Forest (STNF) Land and Resource Management Plan (LRMP) in 1994 (USFS 1994). Although the LRMP found the McCloud River eligible for listing, the LRMP direction was to not formally designate any reach of the river as wild and scenic. Instead, the direction was to manage the lower McCloud River under a Coordinated Resource Management Plan (CRMP; USFS 1995a). The CRMP is a coordinated effort between landowners and stakeholders with a vested interest in the river. The CRMP requires its signatories to protect the outstandingly remarkable values (ORV) on lands they own or manage to ensure that the river remains eligible for Federal designation as wild and scenic. The CRMP contains a provision stating that the USFS reserves the right to pursue designation if the CRMP is terminated or fails to protect these values.

The California Natural Resources Agency (Resources Agency) evaluated the McCloud River in the late 1980s (Jones & Stokes Associates 1988) to determine whether it was eligible for listing under the PRC. The Resources Agency study found it eligible, but the California legislature declined to add the river to the California wild and scenic river system. The legislature instead passed an amendment to the California Wild and Scenic Rivers Act to protect the river's free-flowing condition and the river's fishery below McCloud Dam through the PRC.

As described in more detail under "Regulatory Framework," the PRC and Federal WSRA share several similar components: the establishment of a wild and scenic rivers system; the purpose of protecting certain rivers in their "free-flowing" condition; the identification of extraordinary or outstandingly remarkable values that make such rivers eligible for protection; a study process and procedure for including rivers in the system; and classifications of "wild," "scenic," and "recreational." Both the Federal WSRA and PRC prohibit new water impoundments on designated rivers, and both contain directives to government agencies to use their powers to further the policies of the legislation.

The Federal WSRA establishes a larger wild and scenic river corridor—typically at least 0.25 mile on each side of the river—than the PRC and requires Federal agencies to manage the public lands in the corridor to protect the river's free-flowing character and ORVs. In addition, the Federal agency managing rivers that are Federally designated as wild and scenic is required to develop and implement a management plan that will ensure the river's protection. In contrast, the PRC provides protection only to the first line of permanent riparian vegetation and does not require a management plan.

The length of the lower McCloud River that was determined to be eligible for wild and scenic river status differs between the Federal and State evaluations. The USFS defined the lower McCloud River more narrowly than the Resources Agency, considering the portion of the river that is currently periodically

inundated by Shasta Lake – referred to in this chapter as the *transition reach* – as part of the lake rather than part of the river. The USFS defined the lower river as extending from McCloud Dam downstream to an elevation of 1,070 feet mean sea level (msl) (approximately 22 total river miles), which corresponds to the current full-pool elevation of Shasta Lake. The Resources Agency's study report included approximately 5,400 feet of the existing transition reach (down to the McCloud River Bridge) as part of the lower river's segments (approximately 23 total river miles). Both the USFS and Resource Agency documents disclosed that this portion of the reach, protected under the State PRC, does not meet the definition of natural or free flowing because it is downstream of McCloud Dam and some portions of the river offer public access. It is important to note that CDFW designated the Wild Trout Management Area downstream to the boundary of The Nature Conservancy property; the management area did not extend downstream in the reaches primarily controlled by private fishing clubs. The public benefit component of the wild trout fishery is concentrated in the upper 7 miles of the lower McCloud River.

In its evaluation, the USFS divided the McCloud River into 10 segments encompassing 46 total river miles: three segments along the upper McCloud River (24 river miles above McCloud Reservoir) and seven segments along the lower McCloud River (22 river miles below McCloud Dam). Numbering of the upper McCloud River segments began at the headwaters and counted downstream, but numbering of the lower McCloud River segments began at the downstream extent and counted upstream. The USFS concluded that all 10 segments of the McCloud River were eligible for listing as a Federal wild and scenic river because they are free flowing, possess good water quality, and exhibit ORVs in the areas of cultural and historical resources, fisheries, geology, and scenic resources. Part of the lowermost segment – Segment 4 – would be periodically inundated if Shasta Lake is expanded. Segment 4 extends from about 5,400 feet upstream from the McCloud River Bridge, beginning at an elevation of 1,070 feet msl, to about Little Bollibokka Creek. The lower extent of this segment corresponds with the current full-pool elevation of Shasta Lake based on Reclamation geographic information system data. Figure 25-2 shows the downstream extent of Segment 4.

The Resources Agency's report also identified 10 segments, but its evaluation encompassed only 43 total river miles and the numbering of segments began at the headwaters and counted downstream along the entire river. The segments included six along the upper river (20 river miles above McCloud Reservoir) and four along the lower river (23 river miles below McCloud Dam). Eight of the 10 segments were determined eligible for State wild and scenic river status. Segment 10 extends from the McCloud River Bridge to the northern border of Section 9, Township 36 North, Range 3 West, which is just upstream from the river's confluence with Tuna Creek. Approximately 5,400 feet of the transition reach is included in Segment 10; the portion of the transition reach downstream

from the bridge was determined ineligible. The downstream extent of Segment 10 is shown on Figure 25-2.

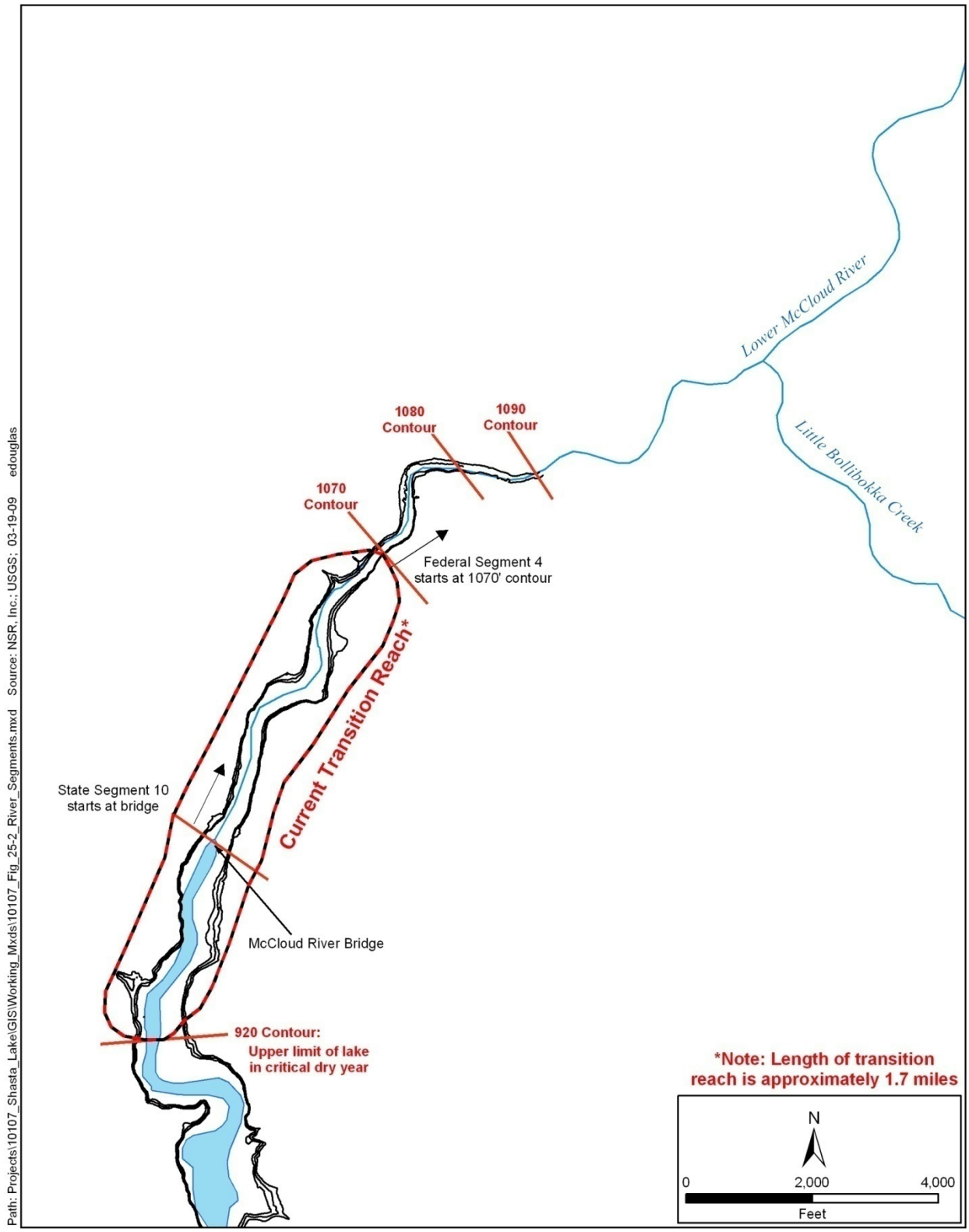

Figure 25-2. Differences in State and Federal Segments and Transition Reach

25.2 Regulatory Framework

25.2.1 Federal

Federal Wild and Scenic Rivers Act

The Federal WSRA, enacted in 1968, established the National Wild and Scenic Rivers System "to preserve rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations." To be eligible for inclusion in the system, a river must be free-flowing and exhibit ORVs. Free-flowing means "existing or flowing in a natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway" (16 United States Code (USC) Section 1286). ORVs are scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values (16 USC Section 1271). Depending on the specific conditions of a river, it may be designated as "wild," "scenic," or "recreation." Different segments of a single river can receive different designations; in other words, some segments can be designated wild, some scenic, and some recreation or combinations of these designations.

The Federal WSRA does not prohibit water developments that may affect portions of rivers that are eligible for inclusion in the National Wild and Scenic Rivers System. Section 5(d)(1) of the act does, however, require that in all planning for the use and development of water and related land resources, consideration be given to potential national wild, scenic, and recreational river areas by all Federal agencies involved.

Through the development and approval of the STNF LRMP, the USFS determined that segments of the McCloud River are eligible for inclusion in the national system; however, the river has not been formally designated and thus is not afforded protections under the Federal WSRA. Instead, the McCloud River CRMP was developed "to protect the [river's] unique and outstandingly remarkable features," thereby maintaining its eligibility.

The USFS evaluation concluded that the lower McCloud River, from McCloud Dam downstream about 22 miles to the river's transition to Shasta Lake at about 1,070 feet msl, provides outstanding cultural, fisheries, and geologic values, and its corridor has been classified as a highly sensitive visual area by the USFS (USFS 1994 and 1995b). The entire river corridor contains prehistoric and historic sites from past use by Indian tribes, late 1800 and early 1900 resorts, and evidence of historic logging. The lower river provides habitat for several salmonid species: bull trout/Dolly Varden (*Salvelinus confluentus*), which is believed to be extinct; rainbow trout (*O. mykiss*), which has been transplanted all over the world; and brown trout (*Salmo trutta*), a non-native species. Collectively, the rainbow and brown trout in the lower McCloud River are considered to be a "blue ribbon trout fishery" (USFS 1994). Outstanding geologic values include rock outcrops, cascades, and pools. Based on the ORVs,

the STNF determined that the lower McCloud River meets the eligibility requirements for designation under the Federal WSRA.

Shasta-Trinity National Forest Land and Resources Management Plan

The STNF LRMP is a forest-wide land use plan developed to guide resource management within the forest (USFS 1995b). For planning purposes, the STNF is divided into six land allocations for which specific management prescriptions are identified. The land allocations include Congressionally Reserved Areas, Late-Successional Reserves, Administratively Withdrawn Areas, Riparian Reserves and Key Watersheds, Matrix Lands, and Adaptive Management Areas. Management areas were identified within the STNF to establish management direction in response to the issues and resources of each distinct area. The Management Area defined for the McCloud River provides resource direction for recreational use, specifically fishing (i.e., fishery) and viewing waterfalls, and management of old-growth habitat. Management of the wild and scenic river ORVs of the McCloud River is deferred to the CRMP.

Coordinated Resource Management Plan

In 1990, certain public agencies and private parties with interests in the management of lands adjacent to the McCloud River executed a memorandum of understanding to pursue preparation of a CRMP. The memorandum was signed by representatives of the USFS, CDFW, The Nature Conservancy, Pacific Gas and Electric Company (PG&E), the Bollibokka Land Company, Crane Mills, McCloud River Co-Tenants, Sierra Pacific Industries, and the Hearst Corporation. In 1991, the same signatories, along with California Trout Inc., signed another memorandum of understanding to establish the framework for and approve the CRMP. The CRMP was adopted in July 1991. In 2007, the property owned by the Bollibokka Land Company was sold to Westlands Water District, which is not a party to the CRMP. Although Reclamation and representatives of Westlands Water District have attended periodic meetings with the CRMP members to provide updates on the SLWRI planning process, neither agency is a party to the CRMP.

The purpose of the CRMP is to protect the ORVs through coordinating the actions of signatory members on their individual properties. The CRMP has no authority, responsibility, or jurisdiction for protection of the ORVs beyond the actions of the signatory members on their properties. The CRMP provides a framework for coordinating management activities among the participants to ensure that the characteristics of the river that make it eligible for Federal wild and scenic river designation are protected.

Under the terms of the CRMP, the USFS “reserves the right to pursue [Federal wild and scenic river] designation” if the CRMP is terminated or significantly impaired or if it fails to protect the values that make the river suitable for such designation. This would occur if, for any reason, the actions of a signatory member of the CRMP on the signatory member’s land failed to protect the ORVs, as described in the CRMP Memorandum of Understanding.

25.2.2 State

California Public Resource Code, Sections 5093.50-5093.70

Sections 5093.50–5093.70 were added to the PRC in 1972, through enactment of the California Wild and Scenic Rivers Act, to preserve certain rivers that possess extraordinary scenic, recreational, fishery, or wildlife values in their free-flowing state. The PRC identifies, classifies, and provides protection for specific rivers or river segments, as approved by the legislature. Rivers or river segments that are specifically identified and classified in the PRC comprise the State Wild and Scenic Rivers System. As described in Section 5093.50, rivers or river segments included in the State system must possess "extraordinary scenic, recreational, fishery, or wildlife values"; the PRC does not define what constitutes "extraordinary."

Various amendments to the California Wild and Scenic Rivers Act have been passed, adding related legislation to the PRC. In 1986, Assembly Bill (AB) 3101 (Statutes 1986, Chapter 894) established a study process to help determine eligibility for potential additions to the State system (PRC Section 5093.547 and Section 5093.548). Additionally, protection for river segments can be provided without formally identifying them as part of the State system.

In 1989, an amendment to the California Wild and Scenic Rivers Act was passed, adding Section 5093.542 to the PRC to protect the McCloud River fishery, which it describes as "one of the finest wild trout fisheries in the state." It further declares that "The continued management of river resources in their existing natural condition represents the best way to protect the unique fishery of the McCloud River" and that "maintaining the McCloud River in its free-flowing condition to protect its fishery is the highest and most beneficial use of the waters of the McCloud River." The amendment provides protection to the McCloud River fishery and its "natural" and "free-flowing" condition from Algoma to the confluence with Huckleberry Creek (upper McCloud River), and 0.25 mile downstream from the McCloud Dam to the McCloud River Bridge (lower McCloud River). Although the Legislature declared that the McCloud River possessed "extraordinary resources" in the context of the PRC, the Legislature's action stopped short of formally designating the river as wild and scenic.

In addition, the State PRC is also relevant to the recently passed Proposition 1, "Water Bond. Funding for Water Quality, Supply, Treatment, and Storage Projects," for $7.5 billion, which includes $2.7 billion for storage projects. Proposition 1, section 79751 specifies:

> *Projects for which the public benefits are eligible for funding under this chapter consist of only the following:*
>
> *(a) Surface storage projects identified in the CALFED Bay-Delta Program Record of Decision, dated August 28, 2000,*

> *except for projects prohibited by Chapter 1.4 (commencing with Section 5093.50) of Division 5 of the Public Resources Code.*

Section 79751 does not amend or modify the State PRC. Whether the State of California can use Proposition 1 funds in support of any alternative potentially authorized related to enlargement of Shasta Dam and Reservoir is outside of Reclamation's authority and to be determined by the State of California.

Several key terms in the State PRC are used, but not fully defined with respect to protection of the McCloud River. This chapter adopts the definition of free-flowing as defined in the Federal Wild and Scenic Rivers Act. While the State PRC does not specifically define "Wild Trout Fishery", CDFW does identify several key elements that are relevant to and useful in developing a working definition of a wild trout fishery as it relates to this discussion. Fishery is a generally accepted term referring to an activity leading to the harvesting or use of a fishery resource (e.g., fishing, aquaculture) (CDFG 2003). It also includes a more inclusive definition that relates to the ecological conditions that provide fish habitat and self-sustaining populations (e.g., wild trout) (CDFG 2003).

25.3 Affected Environment

This section defines "affected environment" as the wild and scenic characteristics of the lower McCloud River that could be affected by the proposed modifications to Shasta Dam and Shasta Lake. It briefly describes the McCloud River from its headwaters to the McCloud Arm of Shasta Lake. It then describes the wild and scenic values of Segment 4 identified in the USFS evaluation and the values provided protection in the PRC.

Descriptions of the river and its characteristics were derived primarily from the following sources:

- Wild and Scenic Rivers Evaluation, Appendix E to the EIS for the Shasta-Trinity National Forest Land and Resources Management Plan (USFS 1994)
- Lower McCloud River and McCloud Arm Watershed Analyses (USFS 1998a and 1998b)
- McCloud River Wild and Scenic River Report (Jones & Stokes Associates 1988)
- Lower McCloud River Wild Trout Area Fishery Management Plan, 2004 through 2009 (Rode and Dean 2004)
- Lower McCloud River Habitat Typing Report (USFS 2001)

25.3.1 The McCloud River

McCloud River Basin

The McCloud River basin drains an area of approximately 800 square miles (USFS 1998a) in northern Shasta County and southern Siskiyou County, southeast of Mount Shasta. The river originates in an area of the STNF near Colby Meadows at approximately 4,250 feet above msl (Rode and Dean 2004). From its headwaters to Shasta Lake, the river is approximately 59 miles long. McCloud Reservoir, part of PG&E's McCloud-Pit Hydroelectric Project, separates the upper river from the lower river. The lower McCloud River transitions into the McCloud Arm of Shasta Lake upstream from the McCloud River Bridge (Figure 25-3).

Upper McCloud River

The upper McCloud River is an approximately 36-mile reach from the river's origins at Colby Meadows downstream to the transition with McCloud Reservoir. The river basin above the reservoir drains an area of approximately 403 square miles. Mean monthly flows in the upper McCloud River range from 766 cubic feet per second (cfs) in October to over 1,000 cfs in March, April, and May (PG&E 2006).

McCloud Reservoir

The McCloud Reservoir is a major component of PG&E's McCloud-Pit Hydroelectric Project, which was constructed in 1965 and operates under license from the Federal Energy Regulatory Commission (FERC). The McCloud Reservoir is approximately 5 miles long and has a storage capacity of approximately 35,200 acre-feet of water. The McCloud-Pit Hydroelectric Project diverts approximately 75 percent of the upper McCloud River's flow through a pipeline to Iron Canyon Reservoir, then conveys it downslope and discharges it into the Pit River at the Pit 6 powerhouse, upstream from the Pit River Arm of Shasta Lake (PG&E 2006). The remaining 25 percent of flows provide base flow for the lower McCloud River, a considerable reduction from historic flow volumes (Jones & Stokes Associates 1988).

Lower McCloud River

The lower McCloud River flows southwesterly through a deep canyon with steep slopes approximately 22 miles from McCloud Dam downstream to the transition with Shasta Lake. Vegetation along the lower river is predominately mixed-conifer and Douglas-fir forest. This stretch of river receives runoff from a 404-square-mile area of the lower McCloud River basin and the 95-square-mile Squaw Valley Creek basin. It provides exceptional fishing opportunities and includes two long-established fishing clubs, the Bollibokka Club and the McCloud River Club. The Nature Conservancy's McCloud River Preserve also encompasses a portion of the lower McCloud River.

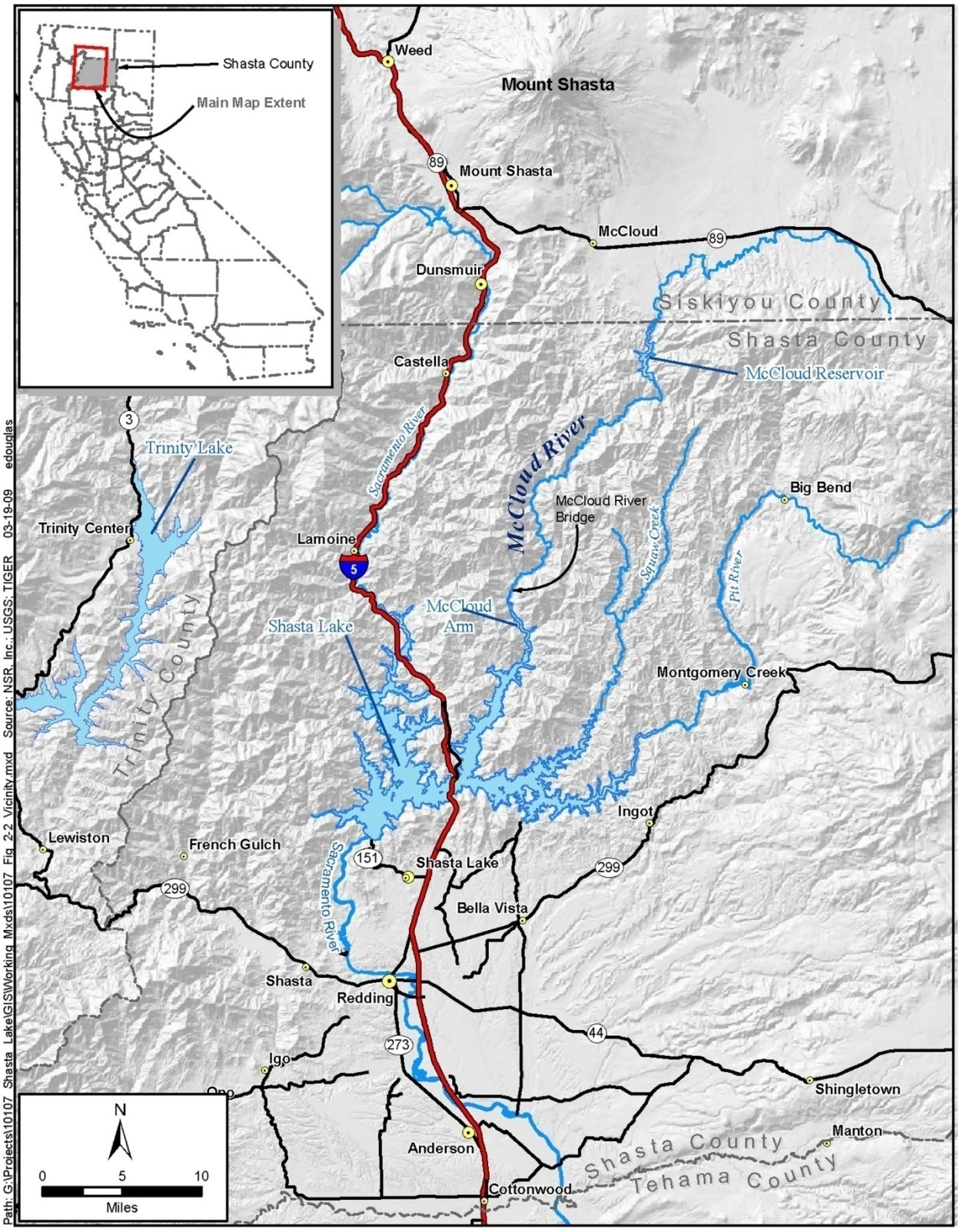

Figure 25-3. Regional Location

Flows in the lower McCloud River have been controlled by releases from McCloud Dam since 1965 (PG&E 2006). Under its current FERC license, PG&E's McCloud-Pit Hydroelectric Project maintains a minimum instream flow of 50 cfs from May through November and 40 cfs from December through April through controlled releases. Accordingly, flows in the lower McCloud River are highly regulated, and annual flows in the river below McCloud Dam do not follow a pattern typical of an unimpaired mountain river in northern California. Before dam construction, flows in the lower river were considerably higher, estimated to be in the range of 924 to 1,245 cfs (mean monthly flows) from June to October (Jones & Stokes Associates 1988, citing U.S. Geological Survey (USGS) for the period of 1967 to 1985).

McCloud Arm of Shasta Lake

The construction of Shasta Dam between 1938 and 1945 converted part of the lower McCloud River into the McCloud Arm of Shasta Lake. The McCloud Arm is more than 16 miles long, with approximately 70 miles of shoreline. It drains an area of approximately 41,000 acres (USFS 1998b). Water levels in the arm fluctuate with the lake's water levels, and during periods of lower water levels, a water line, known as the "bathtub ring," is evident along the banks; this bathtub ring extends about 1 mile upstream from the McCloud River Bridge. During extended periods of lower water levels, vegetation may become established on the exposed banks.

The upper extent of the lake encompasses the transition reach, which varies between about 920 and 1,070 feet msl. Because of the effects of Shasta Lake on the McCloud Arm, the STNF determined that the transition reach did not meet the eligibility requirements of a wild and scenic river (USFS 1994). The USFS defined the upper limit of the McCloud Arm as an elevation of 1,070 feet, or approximately 5,400 feet above the McCloud River Bridge. This elevation corresponds to the lower limit of Segment 4 as defined in the STNF LRMP. A portion of the transition reach – from the McCloud River Bridge to the 1,070-foot elevation – is included in the segments of the river provided protection under the PRC.

The transition reach provides a corridor for fish migrating between Shasta Lake and the lower McCloud River and contributes to the unique fishery of the river. Common fish in the McCloud Arm include native species such as rainbow trout, riffle sculpin, and speckled dace, as well as non-native species (e.g., brown trout, spotted bass) (North State Resources, Inc. 2008).

Water temperatures in the McCloud Arm become warmer as the river transitions to Shasta Lake. The warmer temperatures associated with Shasta Lake support warmwater fish, but the cooler temperatures of the transition reach may prevent some fish from migrating upstream into the lower river. Water temperatures in the transition reach may be suitable for warmwater species.

25.3.2 The McCloud River's Wild and Scenic Values

This section focuses on the wild and scenic river characteristics and ORVs of the lower McCloud River identified by the USFS in the wild and scenic river evaluation performed for the STNF LRMP (USFS 1994) and the wild and scenic river characteristics and extraordinary value protected under the PRC.

The McCloud River's fishery and its free-flowing condition are identified in both the USFS evaluation and the PRC. These characteristics are discussed first, followed by a discussion of the wild and scenic characteristics and values – water quality, geology, cultural/historical resources, and visual quality/scenery – that are identified only in the USFS evaluation.

Throughout the SLWRI planning process, Reclamation has worked closely with private landowners to collect information, perform technical investigations, and incorporate the best available science to support this EIS. Since the DEIS was prepared, information included in Chapters 11, 12, 13, and 25 of this EIS has been updated to include data from recent surveys and investigations performed on both Federal and private lands in the general vicinity of Shasta Lake. Reclamation worked closely with private land owners, including the signatories to the CRMP, to incorporate available information on the McCloud River into this EIS. The following section includes a brief description of the current transition reach (see Figure 25-1) because the reach of the river that would be newly inundated would likely take on the characteristics of the existing transition reach.

Fishery

The fishery of the lower McCloud River is unique; the river is considered a premier trout fishery and is managed according to CDFW's wild trout policy for the reach from Algoma Campground downstream to the lower end of the Nature Conservancy property, despite the ongoing effects of McCloud Dam and Shasta Lake on the river's flows and water quality, and the more recent impacts of the 2012 Bagley Fire on the lower McCloud River watershed. To characterize the fishery, this section includes descriptions of the aquatic habitat in USFS Segment 4, the Resources Agency's Segment 10, and the transition reach as well as the fish species that inhabit the study area.

Aquatic Habitat The lower McCloud River is characterized as a series of alternating riffles, pools, and cascading pocket water occurring along a broad, boulder-studded river channel within a confined, heavily timbered valley. A narrow band of montane riparian vegetation (typically less than 25 feet wide) dominated by willows, white alders, and Oregon ash occurs along the river banks adjacent to steep hill slopes with mixed conifer-Douglas-fir forest (USFS 2001).

In 2001, the USFS prepared a Habitat Typing Report to characterize aquatic habitats in the lower McCloud River from the McCloud River Bridge to McCloud Dam. The report divided the lower river into four reaches: McCloud

Dam to Ladybug Creek, Ladybug Creek to Clairborne Creek, Clairborne Creek to Tuna Creek, and Tuna Creek to McCloud River Bridge. The reach from Tuna Creek to McCloud River Bridge includes all of Segment 4 and nearly all of Segment 10, including the portion of the transition reach that is part of Segment 10. Data are not available for the transition reach below the McCloud River Bridge downstream to Shasta Lake.

The dominant aquatic habitat in the reach of the lower river from Tuna Creek to McCloud River Bridge includes runs (20 percent), mid-channel pools (18 percent), low-gradient riffles (18 percent), lateral scour pools from bedrock (11 percent), and pocket water (10 percent) (USFS 2001). This reach provides most of the corner pool (100 percent), glide (89 percent), and cascade (50 percent) habitats in the lower McCloud River.

The portion of the transition reach upstream from McCloud River Bridge is dominated by low-gradient riffles and mid-channel pools, with some pocket water, glides, runs, and lateral scour pools. Glide habitat is the dominant aquatic habitat between the 1,070-foot and 1,080-foot elevations, and pocket water is the dominant aquatic habitat between the 1,080-foot and 1,090-foot elevations. The habitat within the current transition reach represents a fraction of the total available aquatic habitat within the lower McCloud River and provides a small portion of the habitats within the reach from the McCloud River Bridge to Tuna Creek.

The diversity of riffles, flatwater habitat, and pools is influenced by the presence of boulders and cobble substrate and variations in flow conditions. The lower river is dominated by boulders with pockets of gravel present at pool tailouts and in velocity breaks behind large boulders. The riffles are generally higher gradient channel sections with turbulent surface flow and uniform cobble and boulder substrates. While swift pocket water in the lower McCloud River often appears more like a riffle than a run, the habitable eddies, or pockets, created behind the boulders that characterize this habitat type make it functionally more similar to the other flatwater habitats (USFS 2001). Typically, flatwater and pools are the principal habitats used by the trout in the McCloud River for rearing and feeding (Wales 1939, Rode and Dean 2004, USFS 2001).

The USFS (2001) reported that the aquatic habitat within the transition reach has undergone type conversions caused by aggradation and scour of sediments for about 3,700 feet upstream from the McCloud River Bridge. When Shasta Lake is drawn down, large, wide, low-gradient riffles with channel braiding dominate in this reach. When the lake is at full pool and at intermediate levels of drawdown, the transition reach becomes inundated, but a unidirectional current created by the lower McCloud River's inflow is detectable throughout the inundation zone, slowing as it approaches the flat water of Shasta Lake. To varying degrees, this fluctuating backwater effect converts this reach to a deep,

wide, slow-moving riverine habitat transitioning to lacustrine habitat near the bottom of the transition reach.

Fish Species The current composition and distribution of fish species inhabiting the lower McCloud River and Shasta Lake reflect the historic fishery, the operational effects of Shasta Dam and McCloud Dam, and the introduction of nonnative fish species into the river and Shasta Lake. The completion of Shasta Dam in 1945 eliminated all runs of anadromous fish in the river (Rode and Dean 2004). The historic fishery included Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*O. mykiss irideus*), rainbow trout, and the only known California occurrence of the bull trout. The bull trout is believed to have been extirpated from the lower McCloud River and is possibly extinct in California. Today, the fishery is dominated by rainbow trout and brown trout, an introduced species that migrates between Shasta Lake and the lower McCloud River. Other nonnative species also migrate up the lower McCloud River, including spotted bass (*Micropterus punctulatus*), but bass have not been confirmed upstream from Tuna Falls, a high-gradient rapid at the confluence with Tuna Creek. Despite the change in fish species in this 22-mile reach, the lower McCloud River is still considered one of California's premier trout streams.

Fish observed in the river downstream from the Tuna Creek confluence during a survey conducted in summer 2007 included rainbow trout, spotted bass, speckled dace (*Rhinichthys osculus*), sculpin spp. (*Cottus* spp.), Sacramento sucker (*Catostomus occidentalis*), and Sacramento pikeminnow (*Ptychocheilus grandis*) (North State Resources, Inc. 2008). Other fish that occur in this reach include brown trout, brook trout (*Salvelinus fontinalis*), hardhead (*Mylopharodon conocephalus*), and smallmouth bass (*Micropterus dolomieui*). The status of the riverine fish species of the lower McCloud River is identified in Table 25-1.

Rainbow Trout Fluvial and adfluvial populations of rainbow trout use the habitat available throughout the lower McCloud River. The McCloud River rainbow trout became known as "the rainbow of the fish culturist" because eggs from that population accounted for transplants of rainbow trout in the 1880s to the eastern states and several other countries.

The rainbow trout that inhabit the McCloud River are a vigorous, active fish that primarily inhabit swifter portions of pool and pocket water habitats. Adults migrate into the lower McCloud River from Shasta Lake in the spring and fall months, presumably to spawn. Suitable spawning habitat in the study area is limited, and the trout likely migrate further upstream to spawn (North State Resources, Inc. 2008).

Although the genetic origin of these fish has not been evaluated, the numerous strains of rainbow trout planted in Shasta Lake over the years have likely resulted in some introgression among migratory rainbow trout in the lower McCloud River. The degree to which this migratory population of rainbow trout

contributes to the native trout fishery of the river is not specifically known; however, available data do not indicate that it is substantial.

Table 25-1. Riverine Fish Species of the Lower McCloud River

Species	Current Status	Comments
Sacramento sucker (*Catostomus occidentalis*)	Common	Native, non-game species, observed during 2007 surveys
Riffle sculpin (*Cottus gulosus*)	Common	Native, non-game species, observed during 2007 surveys
Smallmouth bass (*Micropterus dolomieui*)	Uncommon	Introduced sport species in Shasta Lake, moves into lower river from lake, warmwater species
Spotted bass (*Micropterus punctulatus*)	Uncommon	Introduced sport species in Shasta Lake, moves into lower river from lake, observed during 2007 surveys, warmwater species
Hardhead (*Mylopharodon conocephalus*)	Uncommon	Native, non-game species
Rainbow trout (*Oncorhynchus mykiss*)	Abundant	Native trout species, subject to special angling regulations, coldwater species, observed during 2007 surveys
Sacramento squawfish (=pikeminnow) (*Ptychocheilus grandis*)	Common	Native, non-game species, observed during 2007 surveys
Speckled dace (*Rhinichthys osculus*)	Common	Observed during 2007 surveys
Brown trout (*Salmo trutta*)	Common	Introduced sport species found throughout the river, migrates from Shasta Lake to spawn in lower river, subject to special angling regulations, coldwater species
Bull trout (*Salvelinus confluentus*)	CE; Extinct	Native, believed extirpated from entire river by mid-1970s, a few restoration experiments performed in upper river tributaries, coldwater species
Brook trout (*Salvelinus fontinalis*)	Rare	Introduced sport species, stocking in upper river and tributaries discontinued, very rarely observed in lower river, coldwater species

Sources: Wales 1939, Tippets and Moyle 1978, Rode and Dean 2004, Moyle 2002, CDFW, unpublished data, North State Resources, Inc. 2008
Key:
CE = California Endangered
CDFW = California Department of Fish and Wildlife

Rainbow trout typically mature in their second to third year and move upstream to spawn in the lower McCloud River and its tributaries from February to June. The eggs typically hatch in 3 to 4 weeks, depending on water temperature, and fry emerge 2 to 3 weeks later. The fry remain in quiet waters close to shore, among cobbles, or under overhanging vegetation for several weeks. As the fish grow, they move into swifter water habitats.

In the river, this species forms feeding station hierarchies, which they aggressively defend, and prey on aquatic and terrestrial insects drifting in the current. They also eat active bottom invertebrates. It has been reported that

McCloud River rainbow trout tend to be more bottom-oriented when feeding than rainbow trout elsewhere.

In reservoirs, rainbow trout form loose schools and feed on both invertebrates and other fish, although fish dominate their diet as they grow larger. Preferred prey in Shasta Lake is the threadfin shad. Trout growth in Shasta Lake is more rapid than for fluvial trout. The optimum temperature range for growth and for completion of most life stages of rainbow trout is between 50 and 70 degrees Fahrenheit (°F), though they seem to prefer and thrive at temperatures in the lower two-thirds of this range. Rainbow trout in lakes and streams seldom live for more than 6 years.

Brown Trout Like the rainbow trout, fluvial and adfluvial populations of non-native brown trout use habitat throughout the lower McCloud River, but this species migrates more between the lake and river. It is not as abundant as the rainbow trout. CDFW biologists suggest that this species occupies an ecological niche previously occupied by bull trout in the lower McCloud River (Rode and Dean 2004).

Only some of the brown trout migrating from Shasta Lake that passed a lower river counting weir were observed upstream in the CDFW Wild Trout Management Area (Segments 7, 8, 9, and 10), so the actual extent of the spawning grounds of migratory brown trout is not fully known.

Brown trout mature in their second or third year. Some fish may mature in the river while others may migrate to Shasta Lake to feed, returning to spawn on a recurring basis. The stimulus for upstream migration is often a rise in stream flow or changing lake temperatures. Spawning takes place from November through December when water temperatures fall below 50°F. Eggs typically hatch within 7 to 8 weeks, depending on water temperature. Fry emerge from the gravel 3 to 6 weeks later. The habitats used by juvenile brown trout are similar to those used by rainbow trout; however, as brown trout grow, they tend to select habitats with slower water and more cover. In the riverine environment, brown trout prefer slow, deep pools with abundant boulder and bedrock ledge cover. The timing of emigration of juvenile brown trout to Shasta Lake is not known.

Fluvial brown trout have diets similar to those of rainbow trout, but appear to feed more on the stream bottom for benthic prey than rainbows. As brown trout grow, their diet expands to include larger invertebrate prey and fish. Larger brown trout are voracious predators, especially on fish, including young salmonids. In Shasta Lake, adult brown trout prefer threadfin shad as a staple prey.

Brown trout growth in the lower McCloud River appears to increase after age 3, which has been attributed to their migration to Shasta Lake to exploit the forage fish populations. Brown trout growth is best at temperatures ranging from 45 to

69°F, though they seem to prefer and dominate other trout species near the upper half of this range.

Spotted Bass and Smallmouth Bass Black basses and other sunfishes dominate in the littoral zones of Shasta Lake. Spotted bass and smallmouth bass are now the most common species of black bass in Shasta Lake, with spotted bass having become most frequent over the past 20 years. Both spotted and smallmouth bass occupy shallow, low-gradient habitat offered by Shasta Lake and its tributaries. They can be found throughout Shasta Lake and in the lower ends of the main tributary streams, including the lower McCloud River. However, the extent to which black bass have colonized the lower McCloud River is not currently known.

Smallmouth bass and spotted bass share similar life histories, and these similarities may account for their persistence in Shasta Lake compared to that of largemouth bass, which have declined in numbers. Both smallmouth and spotted bass mature in their second or third year and spawn in the late spring. Smallmouth will spawn at cooler temperatures (55 to 61°F) than spotted bass (greater than or equal to 65°F). Both species seek quiet shallow areas over mud, sand, gravel, and rocky, debris-littered bottoms to spawn in both lakes and streams. This type of spawning habitat is available in the transition reach of the lower McCloud River, especially when lake levels are high.

Juvenile bass feed on small invertebrates until they are large enough to prey on small fish and large invertebrates. Temperature preferences and optimal growth for both species of black basses is attained in the range from 68 to 81°F. Because of the year-round cool temperatures (less than or equal to 68°F) of the lower McCloud River, temperatures preferred by bass only occur during the late summer and early fall months upstream from the transition reach. Therefore, the temperature regime of the lower McCloud River may limit intrusions of bass from the lake. However, spotted bass were observed in the lower river below the confluence of Tuna Creek during summer fish surveys (North State Resources, Inc. 2008).

Free-Flowing Condition

The Federal WSRA defines *free flowing* as “existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway” (16 USC Section 1286). The PRC defines free-flowing as “existing or flowing without artificial impoundment, diversion, or other modification of the river.” It states, however, that the “presence of low dams, diversion works, and other minor structures does not automatically bar a river’s inclusion in the system.”

Base flows in the lower McCloud River are partially controlled by releases from McCloud Reservoir in accordance with PG&E’s FERC license and include precipitation and inflow from tributaries. The lower McCloud River experiences seasonal fluctuations and large variations in base flows (USFS 1998a). Releases

from McCloud Reservoir into the lower river are heavily regulated, with a minimum release requirement of 50 cfs from May through November and 40 cfs from December through April; the releases are typically well above these minimum requirements and tend to stay above 100 cfs (USFS 1998a). Tributary contributions are the most noticeable flows during storm events, but are substantially reduced during low-flow conditions. Because of the minimum release requirements from McCloud Reservoir, spring and summer flows are considerably more stable than they would be under unregulated conditions.

PG&E monitors lower McCloud River flows in accordance with its FERC license at a gaging station in Segment 4 upstream from Shasta Lake (0.2 mile downstream from Big Bollibokka Creek); the most recent available water data record covers the water year October 2012–September 2013 (USGS 2013). For this period, measured mean monthly flows ranged from 271 cfs in August to a high of 26,179 cfs in February, with maximum flows as high as 30,100 cfs on December 2, 2012.

Over the course of the year, the transition from lake to river expands and contracts over a distance of about 1.7 miles due to changing water levels in Shasta Lake (Figure 25-2). During April and May of wet years, the transition reach extends about 1 mile (5,400 feet) upstream from the McCloud River Bridge to the full pool elevation of 1,070 feet msl, the downstream boundary of Segment 4. As described in Chapter 6, “Hydrology, Hydraulics, and Water Management” Shasta Lake reaches full-pool elevation about one year in three.

Despite upstream and downstream dams and diversions, the lower McCloud River meets the definition of a free-flowing river under both the Federal WSRA and PRC.

Water Quality

The water quality of the lower McCloud River is influenced by natural processes and land use activities, including PG&E’s McCloud-Pit Hydroelectric Project, timber management activities, and roads. Overall, the water quality of the river is rated as good (USFS 1998). Glacial silt gives the river “a beautiful turquoise color typical of rivers draining glacial valleys in British Columbia and Alaska” (Jones & Stokes Associates 1998).

Turbidity and water temperature are two important factors that influence the water quality of the river and affect aquatic habitat. Turbidity is caused by suspended sediment transported from upstream waters and in surface runoff, particularly from disturbed landscapes, such as areas burned by fire, timber harvest areas or roads. Water temperature is affected by a variety of conditions, such as river flows, solar radiation, and density of vegetation along the river, but is closely tied to the temperature of the flows released from the McCloud Reservoir.

The turbidity of the lower McCloud River is influenced by the water quality and water levels of the McCloud Reservoir and runoff from upland areas throughout the basin. Turbidity levels are generally low during most of the year, ranging from 5–10 nephelometric turbidity units, but can spike to more than 900 units during periods of intense rainfall and flood flows (PG&E 2006).

Sediment becomes trapped at McCloud Dam and is released into the lower river during large storm events, temporarily increasing turbidity levels, especially in the upper segments of the lower river. Testing of the McCloud Dam bypass valve can cause high turbidity for a short period when sediment is discharged from the reservoir into the lower McCloud River. Surface runoff, especially after the first storms of the wet season, can contribute large amounts of turbid runoff from upland areas.

The length of the transition reach depends on the water year type. As the transition reach moves upstream, sediment within the reach is remobilized and turbidity levels respond accordingly. Periodic fluctuations in water levels can result in erosion along the banks and localized increases in turbidity levels in the transition reach and the McCloud Arm.

The year-round cool water temperature regime of the lower McCloud River inhibits the productivity of its fishery, but provides high-quality holding habitat for salmonids, contributing to the river's unique value as a tributary to Shasta Lake. The controlled releases from McCloud Dam appear to have a direct bearing on the water temperatures downstream. Water temperatures tend to be higher in Segment 4 than immediately below McCloud Dam. Data recorded at PG&E's monitoring station on the river just upstream from Shasta Lake (0.2 mile downstream from Big Bollibokka Creek) indicate that water temperature ranges from the high 30s to the upper 60s (°F), with lower temperatures in the winter and higher temperatures in the summer (PG&E 2006).

The infusion of cooler water from the lower McCloud River influences water temperatures in the transition reach throughout the year. The degree of influence depends on the amount of discharge from the river and Shasta Lake levels. The temperatures throughout the lower McCloud River also control to some degree the distribution of the warmwater fishery known to occupy the river below Tuna Falls.

Outstandingly Remarkable Values Identified in USFS Evaluation

Cultural/Historical Resources Cultural resources include archaeological sites, historical structures and sites, and areas of religious or cultural significance to Native Americans. Significant resources that provide important information on the prehistory and history of an area or that are considered sacred to Native Americans can contribute to wild and scenic river values.

The McCloud River basin was part of a major center of occupation by the Wintu people, who occupied the McCloud River area at the time of Euro-

American contact in the 1800s. Although much of the Wintu territory was overrun with miners and other opportunistic Euro-Americans, the lower McCloud River was left largely untouched due in part to a lack of easily mined materials and the ruggedness of the terrain (Yoshiyama and Fisher 2001), but also because of the resistance of the Wintu to incursions into their territory. Because of its generally undisturbed nature, the significance of the lower McCloud River to prehistoric and ethnographic records of this area of California's history is considered to be great (Jones & Stokes Associates 1988).

Within the 0.25-mile corridor deemed eligible by the USFS, three formally recorded sites and other known sites contribute to the lower river's ORVs because they provide important information on the use of the area from before the Late Archaic Period (1300 to 150 before present, calibrated using radiocarbon dating) to the Historic Era (1840 to present). Three Wintu villages, called Tsekerenwaitsogi, Klolwakut, and Boloibaki, are thought to have been located in the general area of the present-day Bollibokka Club headquarters (Guilford-Kardell 1980), which is part of the former Wintu territory. These villages likely represent the typical lifestyle of the Wintu at the time of Euro-American contact, when they lived in permanent villages near rivers and streams and were semi-sedentary, foraging people (DuBois 1935). As part of the Wintu occupation of this area, prehistoric, historic, and modern Traditional Cultural Properties, sacred locations, and important use areas are located throughout the lower McCloud River basin (outside of the 0.25 mile corridor), including features such as mountains, unique landforms, caves, distinctive rock outcrops, waterfalls, pools, springs, and resource gathering areas.

Point McCloud Bridge (known as McCloud River Bridge in this chapter) is a historical resource that was constructed in 1940 and altered in 1986; the bridge would be subject to relocation in conjunction with SLWRI activities. The Bollibokka Club is a historical resource located on the north bank of the river between the confluence of Big Bollibokka Creek on the east and Wittawaket Creek on the west. Buildings associated with the club were built between the 1860s and 1920s by Austin and Rueben Hills, the founders of Hill's Brothers Coffee, and previous owners (Lucas and Stienstra 2007). A log cabin dates from the 1860s, and other structures date from the ownership of the Hills Family, including the clubhouse built in 1924 and a structure built of river cobble in 1915 (Whitney 2004). Although these resources could be eligible for listing on the National Register of Historic Places, they have not been formally evaluated.

The fishery of the lower McCloud River was also very important to prehistoric and historic uses of the area. The Native Americans in the lower McCloud River basin conducted communal fish drives of salmon or steelhead at night, which brought together many communities and provided opportunities for trade and social networking, including the parsing out of the catch among the people and villages involved (DuBois 1935). Fish, including salmon, steelhead, Sacramento sucker, freshwater shellfish, and lamprey, were an important part of the Native American diet in this area. When the northern mines opened in the 1800s,

settlers moved into the area, and the McCloud River and other rivers' fisheries provided important sources of food. In the early years of settlement, fish and game in the area were used for subsistence; however, this changed with the formation of the State of California and increased fishery management and recreational fishing.

Geology The lower McCloud River flows through a number of geologic formations, including the McCloud Limestone formation. This formation contains fossilized remains of invertebrate and vertebrate fauna that provide important scientific information on the history of California, and it has a high potential for research. According to the USFS (1998b), the limestone features exposed at a number of locations around Shasta Lake are unique and contribute to worldwide paleontological knowledge. The McCloud Limestone contains 36 species of corals, some of which may form the basis of a new taxonomic group.

Because of its very diverse fossil faunas, the mountainous terrain between the McCloud and Pit arms of Shasta Lake is perhaps California's single most important area for paleontological research (Munthe and Hirschfield 1978, cited in USFS 1998b). The limestone outcrops on the ridge immediately northwest of McCloud River Bridge (several hundred vertical feet above Shasta Lake) have produced several large Mississippian and Pennsylvanian invertebrate faunas. Because this period is poorly represented on the West Coast, this fossiliferous limestone is important to understanding the late Paleozoic evolution in this part of the country (USFS 1998b). Limestone outcrops adjacent to the McCloud Arm also provide habitat for several special-status species, such as Shasta salamander, Shasta eupatorium, Howell's cliff-maids, and Shasta snow-wreath (Reclamation 2003).

Exposed outcrops of the limestone formation are visible from the lower McCloud River in and upslope of the transition reach and contribute to its scenic values.

Visual Quality/Scenery The visual setting of the lower McCloud River upstream from Shasta Lake includes views of the river, limestone rock outcrops, adjacent coniferous and oak forests, and infrastructure associated with the Bollibokka and McCloud River clubs. A USGS stream gage has also been in place for a number of years. The pristine nature of the lower river provides for high-quality scenic views. However, the scenic views of the lower McCloud River are enjoyed by only a limited number of viewers, consisting primarily of private landowners, club members, and their guests.

Views of the river include "picturesque cascading whitewater, and deep, long, green- or turquoise-colored pools," with Douglas-fir and black and canyon oaks dominating the steep slopes and hillsides along the river (Jones & Stokes Associates 1988). Several buildings are present at the Bollibokka Club headquarters, but these structures blend in with the visual setting. The transition reach exhibits some evidence of fluctuating surface water elevations associated

with changes in water levels of Shasta Lake. Areas that are noticeably affected by the reservoir levels exhibit "a bathtub ring of steep, treeless slopes with occasional deposits of alluvium."

The scenic views make most of the lower McCloud River, including Segment 4, eligible as a scenic river under the Federal WSRA (USFS 1994). To be classified as a scenic river, the river must be free of impoundments, be accessible in places by roads, and have a river basin/shoreline that is largely undeveloped. Segment 4 does not contain any human-made or other impoundments that affect its free-flowing conditions. Roads to the Bollibokka Club provide access to portions of Segment 4 for members of the club and their guests. Currently, public access is limited to pedestrians on USFS lands along the shoreline of Shasta Lake. For these reasons, the USFS has determined that this segment meets the eligibility requirements of a scenic river under the Federal WSRA.

25.4 Environmental Consequences and Mitigation Measures

This section identifies how the characteristics of the lower McCloud River that make it eligible for listing under the PRC and Federal WSRA could be affected by each alternative and whether the alternatives would conflict with the provisions of the STNF LRMP and the CRMP.

25.4.1 Methods and Assumptions

This analysis of environmental consequences focuses on the effects of proposed modifications to Shasta Dam and Shasta Lake on the McCloud River's free-flowing conditions, its water quality, and the ORVs (cultural resources, fisheries, geology, and scenery) that make it eligible for listing as a wild and scenic river under the Federal WSRA. In large part, the environmental effects are based on computer modeling of water levels, known elevations of the existing bathtub ring that is observable in the transition reach, and the anticipated changes in the environment due to fluctuations in water levels and expansion of the transition reach. Physical effects to the free-flowing conditions, water quality, and ORVs are analyzed in terms of their effects on the eligibility of the river for wild and scenic river designation. While aquatic habitat data are used to quantify the relative impact to the fishery values, a qualitative analysis is provided for most resources because of a lack of quantitative data and the subjective nature of the values. Information to support the analysis was generated from available literature and planning documents and technical studies prepared as part of the SLWRI as well as other chapters in this EIS.

CalSim Modeling

The CalSim-II computer model was used to assist in the evaluation of the potential impacts of the project alternatives on water-related resources. The model used historical data on California hydrology to represent the variety of

weather and hydrologic patterns, including wet periods and droughts, under which water storage and conveyance facilities would be operated. Two scenarios (base cases) of demands for, and storage and conveyance of, water were used in model runs: 2005 facilities and demands ("existing conditions") and forecasted 2030 demands and reasonably foreseeable projects and facilities ("future conditions"). A model run was conducted for each of these base cases combined with each alternative so that the effects of the No-Action Alternative and the action alternatives could be evaluated for both existing and future conditions.

The analysis focuses on the environmental effects in the portion of Segment 4 that would periodically be inundated. These effects are discussed in the following section.

Gage Data

PG&E, in coordination with USGS, monitors lower McCloud River flows in accordance with its FERC license for the McCloud-Pit Hydroelectric Project at a gaging station just upstream from the McCloud River Bridge, approximately 0.2 mile downstream from Big Bollibokka Creek (USGS 11368000 McCloud River above Shasta Lake, California). The station measures mean, minimum, and maximum monthly flows in the lower McCloud River. The most recent available water data record covers the water year of October 2012 to September 2013 (USGS 2013). This data was used to describe flow conditions in the lower McCloud River.

Water Quality Monitoring

Current and historical water quality monitoring data for the McCloud River have been collected by Federal and state agencies as well as PG&E and The Nature Conservancy. The California Department of Water Resources maintains water quality information on the McCloud River in the California Data Exchange Center database. The Nature Conservancy monitors water quality at the McCloud River Preserve. Water quality monitoring of the lower McCloud River includes measures of water temperature, dissolved oxygen, pH, specific conductance, and turbidity, as well as correlated data on weather, air temperature, and debris movement. PG&E monitors water quality in compliance with its FERC license. Available information on water quality was used to describe the setting of the lower river and assess changes in water quality that would occur as a result of the Shasta Dam modification alternatives.

Habitat Typing

The USFS stream habitat typing performed in 1999 and 2000 (STNF, December 2001 unpublished data report, as found in USFS 2001) was used to describe aquatic habitat in the lower McCloud River and to assess the changes in aquatic habitat from implementation of the Shasta Dam modification alternatives. The habitat typing data were used in conjunction with the CalSim-II modeling results, digitized orthophotographs, and high-resolution topographic data to provide habitat maps and graphic depictions of the distribution of aquatic

habitat in the lower river below Little Bollibokka Creek. A longitudinal profile, using water surface elevations, was generated to illustrate habitats; it does not provide an accurate representation of channel geometry.

A quantitative evaluation of the aquatic habitats was performed using digital images and the USFS habitat typing data in an integrated geographic information systems environment. Longitudinal habitat delineation was determined from the habitat typing data, with minor adjustments to match photo-interpreted habitat, and incorporated into the geographic information systems in conjunction with water surface elevations generated through the CalSim-II modeling results. Estimates of aquatic habitat areas were generated from digitized wetted stream perimeters. These measurements were based on orthophotographs taken April 25, 2001. While the absolute amount of riverine habitat can vary with flow, the relative proportions of different types of habitat remain relatively constant. Therefore, we used the relative proportions of aquatic habitat types to compare impacts to the transition reach with the entire lower river.

25.4.2 Criteria for Determining Significance of Effects

The following significance criteria were developed based on guidance provided by the State CEQA Guidelines, other Federal and State guidance, and consider the context and intensity of the environmental effects as required under NEPA. (Please see Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences) for an explanation of the distinction between significance under NEPA and significance under CEQA.) Impacts of an alternative on the wild and scenic river values of the lower McCloud River would be significant if project implementation would:

- Affect the eligibility for Federal listing as a wild and scenic river of any portion of the lower McCloud River above the 1,070-foot elevation
- Conflict with the STNF LRMP or with management of the McCloud River under the CRMP
- Impact the wild trout fishery and free-flowing conditions as described in the State PRC

25.4.3 Direct and Indirect Effects

No-Action Alternative

Under the No-Action Alternative, Reclamation would not pursue an action to enlarge Shasta Dam to help increase anadromous fish survival in the upper Sacramento River and address the growing water supply reliability issues in California. Water levels in Shasta Lake and the transition reach would continue to fluctuate similar to current conditions. USFS Segment 4 and the Resources Agency's Segment 10 would not be affected by this alternative.

Impact WASR-1 (No-Action): Effect on McCloud River's Eligibility for Listing as a Federal Wild and Scenic River Under the No-Action Alternative, the current maximum elevation of water levels in the transition reach would not be increased, and Segment 4 would not be affected. Fluctuations in water levels would continue to be similar to current conditions, with water levels reaching the maximum elevation of 1,070 feet msl – the downstream boundary of Segment 4 – in the transition reach for a brief period (typically a few days in May) during wet years.

The average monthly water surface of Shasta Lake would continue to fluctuate based on the water year, with a maximum elevation of 1,053 feet msl in April of an average water year and 1,070 feet msl in April and May of a wet year. These fluctuations would not affect the free-flowing conditions and water quality of Segment 4. The ORVs that make the river eligible for designation as a Federal wild and scenic river would continue to be affected only by ongoing natural processes and land use activities, and all of Segment 4 would remain eligible for listing under the Federal WSRA. Therefore, there would be no impact. Mitigation is not required for the No-Action Alternative.

Impact WASR-2 (No-Action): Conflict with Shasta-Trinity National Forest Land and Resource Management Plan Under the No-Action Alternative, the STNF LRMP would continue to be implemented as it has in the past, with no changes in the management of the McCloud River's free-flowing condition, water quality, and ORVs. Therefore, there would be no impact. Mitigation is not required for the No-Action Alternative.

Impact WASR-3 (No-Action): Effects to McCloud River Wild Trout Fishery, as Identified in the California Public Resources Code, Section 5093.542 Under the No-Action Alternative, the protections afforded the McCloud River by the PRC would not be affected. River conditions would not be modified, and the provisions of the PRC would continue to protect the river. Therefore, there would be no impact. Mitigation is not required for the No-Action Alternative.

Impact WASR-4 (No-Action): Effects to McCloud River Free-Flowing Conditions, as Identified in the California Public Resources Code, Section 5093.542 Under the No-Action Alternative, the protections afforded the McCloud River by the PRC would not be affected. River conditions would not be modified, and the provisions of the PRC would continue to protect the river. Therefore, there would be no impact. Mitigation is not required for the No-Action Alternative.

CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

CP1 would involve a 6.5-foot raise of Shasta Dam, which would increase the lake's gross pool by 8.5 feet and enlarge the total storage space in the lake by 256,000 acre-feet. This increase would equate to an increase of about 1,100

acres of surface area occupied by Shasta Lake when the lake is full. CP1 includes measures to increase water supply reliability while contributing to increased survival of anadromous fish. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 70,000 acre-feet and 35,000 acre-feet, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing municipal and industrial (M&I) deliveries.

Impact WASR-1 (CP1): Effect on McCloud River's Eligibility for Listing as a Federal Wild and Scenic River Under CP1, the increased gross pool of Shasta Lake would expand the current transition reach up to the 1,078-foot elevation, resulting in adverse effects on the characteristics of approximately 1,470 feet of Segment 4. The rest of the McCloud River would remain eligible for designation as a Federal wild and scenic river. This impact would be significant.

Under CP1, approximately 1,470 feet, or 11 percent, of Segment 4 would be periodically inundated. This increase in the transition reach to a maximum elevation of 1,078 feet msl would equate to a 16 percent increase over the current transition reach. The length of time during the year when the transition reach is inundated and the maximum elevation of the inundation area would vary by the type of water year (wet, above normal, below normal, average, dry, or critical).

Within the expanded transition reach, flow conditions and fisheries would periodically be affected, with the timing and duration of the effects similar to those that occur in the current transition reach. Over time, the expansion of the bathtub ring would affect water quality, geology, and visual quality/scenery in the affected portion of Segment 4. Erosion of soils along the river could expose buried cultural resources, and periodic inundation could permanently alter cultural resource values and features in the transition reach important to Native Americans. These effects could reduce the total length of the lower McCloud River that is eligible for wild and scenic river designation by about 1,470 feet (approximately 1.2 percent of the total length of the lower river).

Free-Flowing Conditions Under CP1, the currently free-flowing section of the lower McCloud River would be reduced by about 1,470 feet or about 1.2 percent. The flow characteristics of the affected portion of Segment 4 would periodically be modified, resulting in slower moving waters and a wider river channel. When inundated, the affected portion would retain some current, but flow velocities would decrease with distance downstream. This modification would not meet the definition of a free-flowing river under the Federal WSRA.

Because free-flowing conditions are a fundamental requirement for wild and scenic river eligibility, the 1,470-foot reach of Segment 4 that would be affected by CP1 would become ineligible for listing under the Federal WSRA.

Water Quality As Shasta Lake's water levels rise, vegetation and soils along the banks of the affected portion of Segment 4 would become inundated. Most or all of the vegetation that is inundated would eventually die and be washed or fall into the river, bringing with it sediment and other materials that could affect water quality. Soils in the affected portion of Segment 4 would erode as water levels rise and fall, causing an increase in turbidity. These effects would likely be most noticeable during the initial inundation periods, since the river corridor is likely to eventually stabilize as the soil is eroded to bedrock.

Within the approximately 1,470-foot reach of Segment 4 that would be affected under CP1, water temperatures would fluctuate relative to temperatures immediately upstream. Similar to flow, these changes would vary by water year type. Increased turbidity and warmer water temperatures would be most noticeable along the affected portion of Segment 4 because this area has not been previously exposed to periodic inundations.

Adverse effects on water quality would be associated with the periodic fluctuations in the water levels of Shasta Lake. Because water quality is a fundamental requirement for wild and scenic river eligibility, the 1,470-foot reach of Segment 4 that would be affected by CP1 would become ineligible for listing under the Federal WSRA.

Outstandingly Remarkable Values As described above under Affected Environment, the ORVs that make Segment 4 of the McCloud River eligible for listing as a wild and scenic river are cultural/historical resources, fisheries, geology, and visual quality/scenery.

Cultural/Historical Resources Under CP1, erosion of rock outcrops and expansion of the bathtub ring in an approximately 1,470-foot reach of Segment 4 could expose buried or previously undiscovered prehistoric cultural resources associated with Wintu occupation of the area and historic recreational uses of the area. As this reach becomes inundated, any exposed resources would be susceptible to the effects of water, which could damage or otherwise alter their values, affecting their eligibility for listing on the National Register of Historic Places and reducing their importance for providing information on past use within the corridor. As the water recedes, exposed resources would be susceptible to wind and rain and could be visible, potentially exposing them to theft or vandalism. These adverse effects would be localized along the corridor of the affected portion of Segment 4 and would likely only affect a small portion of the cultural resources that may be associated with the lower McCloud River basin.

The historic structures associated with the Bollibokka Club occur outside of the area that would be affected by the expanded transition reach and would not be affected. However, unrecorded resources associated with the Wintu village locations may occur within the corridor along the river and could be subjected to periodic inundation, deposition, and scour within the upper portions of the

expanded transition reach. Portions of three other recorded sites could also be subject to similar impacts within the expanded transition reach, which could result in damage to resources within the sites. Although these sites may provide information on the area's history or prehistory, none of these sites has been evaluated for listing on the National Register of Historic Places.

Sacred sites important to Native Americans have not been specifically identified, and access to lands adjacent to the reach that would be periodically inundated under CP1 is limited because all of these lands are privately owned.

The cultural resources located along the 1,470-foot reach of Segment 4 that would be affected under CP1 would be subject to the effects of periodic inundation.

Fisheries Aquatic habitat in the 1,470-foot extension of the transition reach would be affected during periodic inundations, resulting in potential adverse effects on the fish that occur in the river. Potential adverse effects on fish could include a reduction in spawning habitat for trout in the expanded transition reach and an increase in the range of warmwater fish in the lower McCloud River. Fishing opportunities would not be affected more than they are now with the periodic fluctuations in river levels.

Under CP1, the transition reach would be extended by about 1,470 feet to the 1,078-foot elevation, resulting in a larger inundation area when Shasta Lake water levels are the highest. Aquatic habitat in the affected portion of Segment 4 consists primarily of flatwater habitat (52 percent glide, 19 percent mid-channel pool, and 13 percent run), with pocket water (11 percent) and a small, low-gradient riffle (5 percent) in the lower portion of the segment. With the periodic inundations, sediment deposition could cause flatwater habitat to convert to riffle habitat, resulting in a reduction in flatwater habitat of less than 3 percent of the total lower McCloud River's flatwater habitat. During the inundation period, riffle and pool habitat (approximately 1.2 percent of the total lower McCloud River) would be converted to flatwater habitat. Also, riparian vegetation along the newly inundated banks of the affected portion of Segment 4 would be expected to die, which could affect water temperatures and reduce cover for fish in this reach. The extent of these effects would depend on the frequency, duration, and surface elevation of the inundation, which would vary depending on the type of water year and water levels of Shasta Lake.

The migration of fish, especially trout, between the lower McCloud River and Shasta Lake is an important attribute of the unique trout fishery. Many of the rainbow and brown trout that occupy the lower McCloud River spend part of their lives rearing in Shasta Lake, feeding on the abundant prey in the lake and attaining large sizes that would not be possible if they reared only in the river. Upon returning to the river to spawn, these lake-reared fish provide the trophy-sized trout, particularly brown trout, for which the lower McCloud River is renowned (Rode and Dean 2004). Based on a survey that extended up to Tuna

Falls (North State Resources, Inc. 2008), the reach of Segment 4 that would periodically be inundated does not contain any barriers or impediments to fish movement or migration, and CP1 would not create any. Consequently, trout migration through the transition reach to upstream spawning areas would not be impaired.

Conversely, warmwater fish movement between the lake and river is not likely to be facilitated by the expanded transition reach. Warmwater fish from Shasta Lake, such as spotted bass, have been observed throughout the lower McCloud River, at least up to the confluence with Tuna Creek (North State Resources, Inc. 2008). Nonnative warmwater species inhabiting Shasta Lake (e.g., smallmouth bass and spotted bass) are known to exploit riverine and transitional habitats and are effective predators of juvenile trout. No barriers have been observed in the transition reach that could prevent warmwater fish from moving upstream, and no barriers would be created by the expansion of the transition reach. Warmwater fish would continue to be able to move between the lake, the transition reach, and lower McCloud River (Segment 4).

Aquatic habitat changes could affect how fluvial resident trout use habitat within the affected portion of Segment 4. General effects may range from temporary displacement of trout to upstream habitats at high water levels to degraded riverine habitat suitability within the transition reach.

Suitable spawning habitat for rainbow and brown trout in the expanded transition reach is limited because of the few pools and riffles available during the spring and fall when these species spawn. Based on the USFS habitat data and more recent reconnaissance surveys, the amount of spawning gravels in the expanded transition reach represents only a small percentage of the suitable spawning habitat in the lower McCloud River. However, any effect on spawning habitat would be considered adverse.

Geology During periods of maximum inundation in the 1,470-foot portion of Segment 4 that would be affected under CP1, some rock outcrops may become inundated and could erode, but the overall geologic value of the McCloud Limestone features would not be adversely affected.

Visual Quality/Scenery The visual quality of the affected portion of Segment 4 would decrease as the vegetation along the banks becomes inundated and eventually dies, the bathtub ring expands, and evidence of flow is reduced. These conditions would be similar to those in the current transition reach. The affected portion of Segment 4 would no longer have the qualities that contributed to its classification by the USFS as “scenic.”

CP1 would result in making approximately 1,470 feet of the lower McCloud River ineligible for listing as wild and scenic. This impact would be significant. Mitigation for this impact is not currently available. If authorized, additional studies will be conducted by Reclamation to determine if feasible mitigation

measures could be developed. Since no mitigation is currently available, this impact would be significant and unavoidable.

Impact WASR-2 (CP1): Conflict with Shasta-Trinity National Forest Land and Resource Management Plan The inundation of approximately 1,470 feet of Segment 4 would not conflict with the provisions in the STNF LRMP to protect the ORVs that make the McCloud River eligible for listing under the Federal WSRA. Although raising Shasta Dam would result in inundation of part of Segment 4, the McCloud River and the adjoining lands in this part of the segment are not National Forest System lands and therefore not subject to the LRMP. Management of the river's ORVs under the STNF LRMP and the CRMP would not be affected. No land use changes would occur along the river, and the USFS and signatories to the CRMP would be able to continue implementing provisions of their plans that apply to the river. Because the LRMP does not apply to the private lands in Segment 4, there would be no impact and no mitigation is required.

Impact WASR-3 (CP1): Effects to McCloud River Wild Trout Fishery, as Identified in the California Public Resources Code, Section 5093.542 The State PRC includes provisions that protect the wild trout fishery of the lower McCloud River. Under CP1, this equates to about 1,470 feet of the river that would be modified and function as an additional portion of the existing transition reach. This reach of the river provides limiting spawning habitat for wild trout (NSR 2009) and during runoff conditions is subject to sedimentation and erosion of the bed and banks similar to upstream reaches. Public access to utilize the fishery offered in this reach is limited to the area below the high-water mark (State Lands) and lands managed by the STNF similar to the other portions of Segment 10 upstream of the McCloud River Bridge. Implementation of proposed modifications to Shasta Dam and Shasta Lake could affect the wild trout fishery (access and ecology) of the lower McCloud River identified in the State PRC. This impact would be potentially significant.

The proposed modifications to Shasta Dam and Shasta Lake would result in periodic fluctuations in water levels within the expanded transition reach, permanently affecting about 1.2 percent of the lower McCloud River and its associated fishery habitat. Under CP1, the transition reach would be extended by about 1,470 feet, a 16 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. The primary impact of the expansion of the transition reach would be conversion of aquatic habitat in a manner similar to that described under Impact WASR-1 and Impact WASR-2 and comparable to the habitat conversion that can be observed in the current transition reach downstream. While the overall impacts to the fishery (populations and habitat) are small in the context of the entire lower McCloud River. This impact would be potentially significant. Mitigation for this impact is proposed in Section 25.4.4.

Impact WASR-4 (CP1): Effects to McCloud River Free-Flowing Conditions, as Identified in the California Public Resources Code, Section 5093.542 The State PRC includes provisions that protect the free-flowing conditions of the McCloud River, including the conditions in the transition reach upstream of the McCloud River Bridge. Implementation of proposed modifications to Shasta Dam and Shasta Lake could affect the free-flowing conditions of the McCloud River, as identified in the State PRC. This impact would be significant.

The proposed modifications to Shasta Dam and Shasta Lake would result in periodic fluctuations in water levels within the expanded transition reach, permanently affecting about 1.2 percent of the lower McCloud River. Under CP1, the transition reach would be extended by about 1,470 feet, a 16 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. The free-flowing conditions of the river would not be adversely affected beyond the upstream extension of the transition reach. The primary impact of the expansion of the transition reach would be modifications to the free-flowing character in a manner similar to that described under Impact WASR-1 and Impact WASR-2. While the overall impacts to the free-flowing conditions that would occur within this transition reach are small in the context of the lower McCloud River (1.2 percent), this impact would be significant and unavoidable. Mitigation for this impact is proposed in Section 25.4.4. If authorized, additional studies will be conducted by Reclamation to refine this mitigation measure. Although mitigation has been identified, this impact would be significant and unavoidable.

CP2 – 12.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply Reliability

CP2 would involve a 12.5-foot raise of Shasta Dam, which would increase the lake's gross pool by 14.5 feet and enlarge the total storage space in the lake by 443,000 acre-feet. This increase would equate to an increase of about 1,850 acres of surface area when the lake is full. CP2 also includes measures to increase water supply reliability while contributing to increased survival of anadromous fish. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 120,000 acre-feet and 60,000 acre-feet, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing M&I deliveries. CP2 would help reduce future water shortages through increasing drought year and average year water supply reliability for agricultural and M&I deliveries. In addition, the increased depth and volume of the cold-water pool in Shasta Reservoir would contribute to improving seasonal water temperatures for anadromous fish in the upper Sacramento River.

Impact WASR-1 (CP2): Effect on McCloud River's Eligibility for Listing as a Federal Wild and Scenic River Impact WASR-1 (CP2) would be similar to Impact WASR-1 but would affect 1,270 feet more of Segment 4 than CP1.

Implementation of CP2 would reduce the total length of the McCloud River that is eligible for wild and scenic river designation by about 2,740 feet (approximately 2.3 percent of the total length of the lower river). The rest of the lower McCloud River would remain eligible for listing.

Under CP2, approximately 2,740 feet, or 21 percent, of Segment 4 would be periodically inundated. The transition reach would increase to a maximum elevation of 1,084 feet msl, which would extend it by about 2,740 feet (a 30 percent increase over the current transition reach), inundating a larger portion of the lower McCloud River within the study area and Segment 4. The inundated area would increase to approximately 51 total acres (an increase of 18 acres over existing conditions and 9 acres more than CP1 conditions), with a maximum width of approximately 530 feet (an increase of 60 feet over existing conditions) and a total length of approximately 11,740 linear feet (2.22 miles). The extension of the transition reach by approximately 2,740 feet would affect approximately 21 percent of Segment 4. Additional impacts under CP2 compared with CP1 would be minimal and would be limited to the additional 440-foot extension of the transition reach and about 15 additional feet on both sides of the river.

During a wet year, the maximum average water surface elevation of Shasta Lake would be 1,080 feet msl, with a peak elevation of 1,084 feet msl during May. This is an increase of 15 feet above the existing maximum average. During an average water year, the maximum average water surface elevation would increase to 1,051 feet msl, an increase of 11 feet above existing conditions. During dry and critical water years, the change would be on the order of 5 to 9 feet in elevation.

The increased gross pool of Shasta Lake would expand the current transition reach up to the 1,084-foot elevation, a 30 percent increase. Flow conditions and fisheries in the 2,740-foot reach of Segment 4 would periodically be affected, with the timing and duration of the effects similar to those in the current transition reach. Over time, the expansion of the bathtub ring would adversely affect water quality, geology, and visual quality/scenery. Erosion of soils along the river could expose buried cultural resources, and periodic inundation could permanently alter cultural resource values and features in the transition reach important to Native Americans.

Free-Flowing Conditions As discussed under Impact WASR-1 (CP1), the flow characteristics of the extended transition reach under CP2 would be periodically modified, resulting in slower moving waters and a wider river channel. This modification would not meet the definition of a free-flowing river under the Federal WSRA. The width of the transition reach would be increased by approximately 30 feet on both sides of the river. Flow conditions and the river's free-flowing nature upstream from the expanded transition reach would remain similar to current conditions.

Because free-flowing conditions are a fundamental requirement for wild and scenic river eligibility, the 2,740-foot reach of Segment 4 that would be affected by CP2 would become ineligible for listing under the Federal WSRA.

Water Quality Under CP2, increased turbidity and warmer water temperatures would be most noticeable along the expanded 2,740 feet of the transition reach and in the 30-foot corridor on either side of the transition reach because these areas have not been previously exposed to periodic inundations. As discussed under Impact WASR-1 (CP1), effects on water quality would be associated with the periodic increases in water levels of Shasta Lake.

Because water quality is a fundamental requirement for wild and scenic river eligibility, the 2,740-foot reach of Segment 4 that would be affected by CP2 would become ineligible for listing under the Federal WSRA.

Outstandingly Remarkable Values As described above under Affected Environment, the ORVs that make Segment 4 of the McCloud River eligible for listing as a wild and scenic river are cultural/historical resources, fisheries, geology, and visual quality/scenery.

Cultural/Historical Resources Impacts would be the same as discussed under Impact WASR-1 (CP1); however, a slightly larger portion of the three recorded sites and possible resources associated with the known Wintu villages would be inundated.

The cultural resources located along the 2,740-foot reach of Segment 4 that would be affected under CP2 would be subject to the effects of periodic inundation.

Fisheries Aquatic habitat in the affected 2,740-foot segment consists of pocket water and a lateral scour pool. The potential conversion of flatwater habitat to riffle habitat in the 2,740-foot segment would be similar to but greater than under WASR-1 (CP1), and overall impacts to aquatic habitat and fish would be similar to those discussed under Impact WASR-1 (CP1).

Geology Impacts would be the same as discussed under Impact WASR-1 (CP1); the geologic values of the lower McCloud River would not be adversely affected.

Visual Quality/Scenery Impacts would be the same as discussed under Impact WASR-1 (CP1). The affected portion of Segment 4 would no longer have the qualities that contributed to its classification by the USFS as “scenic.”

CP2 would result in making approximately 2,740 feet of the lower McCloud River ineligible for listing as wild and scenic. This impact would be significant. Mitigation for this impact is not currently available. If authorized, additional studies will be conducted by Reclamation to determine if feasible mitigation measures could be developed. Since no mitigation is currently available, this impact would be significant and unavoidable.

Impact WASR-2 (CP2): Conflict with Shasta-Trinity National Forest Land and Resource Management Plan The inundation of approximately 2,740 feet of Segment 4 would not conflict with the provisions in the STNF LRMP to protect the ORVs that make the McCloud River eligible for listing under the Federal WSRA. There would be no impact, and no mitigation is required.

Impact WASR-3 (CP2): Effects to McCloud River Wild Trout Fishery, as Identified in the California Public Resources Code, Section 5093.542 The impact would be similar to WASR-3 (CP1) but the magnitude of the impact would be greater under CP2 because of the longer transition reach. Under CP2, the proposed modifications to Shasta Dam and Shasta Lake would result in temporary and periodic fluctuations in water levels within the expanded transition reach, affecting about 2.3 percent of the lower McCloud River. Under CP2, the reach affected by Shasta Lake water levels would be extended by about 2,740 feet, a 30 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. An impact of the expansion of the transition reach would be conversion of aquatic habitat in a manner similar to the habitat conversion that can be observed in the current transition reach downstream. While the overall impacts to the wild trout fishery, including public access and management opportunities in conjunction with fish habitat and populations, are small in the context of the entire lower McCloud River, this impact would be potentially significant. Mitigation for this impact is proposed in Section 25.4.4.

Impact WASR-4 (CP2): Effects to McCloud River Free-Flowing Conditions, as Identified in the California Public Resources Code, Section 5093.542 The impact would be similar to WASR-4 (CP1) but the magnitude of the impact would be greater under CP2 because of the longer transition reach. Under CP2, the proposed modifications to Shasta Dam and Shasta Lake would result in temporary and periodic fluctuations in water levels within the expanded transition reach, affecting about 2.3 percent of the lower McCloud River. Under CP2, the reach affected by Shasta Lake water levels would be extended by about 2,740 feet, a 30 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. The free-flowing conditions of the lower McCloud River would not be adversely affected beyond the upstream extension of the transition reach. While the overall impacts to the free-flowing conditions that would occur within this transition reach are small in the context of the lower McCloud River (2.3 percent), the impacts would be significant. Mitigation for this impact is proposed in Section 25.4.4. If authorized, additional studies will be conducted

by Reclamation to refine this mitigation measure. Although mitigation has been identified, this impact would be significant and unavoidable.

CP3, CP4, CP4A, and CP5 – 18.5-Foot Dam Raise, with Variations

CP3, CP4, CP4A, and CP5 would involve an 18.5-foot raise of Shasta Dam, which would increase the lake's gross pool by 20.5 feet and enlarge the total storage space in the lake by 634,000 acre-feet. This increase would equate to an increase of about 2,500 acres of surface area when the lake is full. CP3 focuses on increasing agricultural water supply reliability and increasing anadromous fish survival CP4, CP4A, and CP5 increase water supply reliability and include enhancements in the upper Sacramento River for anadromous fish survival including gravel augmentation and the restoration of riparian, floodplain, and side channel habitat.

CP3 would increase the ability of Shasta Dam to make cold-water releases and regulate water temperatures for fish in the upper Sacramento River, primarily in dry and critical water years. CP3 would help reduce estimated future water shortages by increasing the reliability of dry and critical year water supplies for agricultural deliveries by at least 63,000 acre-feet per year and average annual deliveries by about 62,000 acre-feet per year. Under CP3, operations for water supply, hydropower, and environmental and other regulatory requirements would be similar to existing operations, with the additional storage retained for water supply reliability and to expand the cold-water pool for downstream anadromous fisheries.

CP4 would be used to improve the ability to meet temperature objectives and habitat requirements for anadromous fish during drought years and increase water supply reliability. Of the increased reservoir storage space under CP4, about 378,000 acre-feet would be dedicated to increasing the supply of cold water for anadromous fish survival purposes. For CP4, operations for the remaining portion of increased storage (approximately 256,000 acre-feet) would be the same as in CP1, with 70,000 acre-feet and 35,000 acre-feet reserved to specifically focus on increasing M&I deliveries during dry and critical years, respectively. CP4 includes augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River.

CP4A reserves a portion of the increased storage in Shasta Lake for maintaining cold-water volume or augmenting flows in the Sacramento River as part of an adaptive management plan for anadromous fish survival. Of the increased reservoir storage space under CP4A, about 191,000 acre-feet would be dedicated to increasing the supply of cold water for anadromous fish survival purposes. For CP4A, operations for the remaining portion of increased storage (approximately 443,000 acre-feet) would be the same as in CP2, with 120,000 acre-feet reserved in dry years and 60,000 acre-feet reserved in critical years for M&I deliveries. CP4A includes augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River. CP5 would help reduce future water shortages through increasing drought year

and average year water supply reliability for agricultural and M&I deliveries. Shasta Dam operational guidelines would continue essentially unchanged, except during dry years and critical years, when 150,000 acre-feet and 75,000 acre-feet, respectively, of the increased storage capacity in Shasta Reservoir would be reserved to specifically focus on increasing M&I deliveries. CP5 also includes constructing additional fish habitat in and along the shoreline of Shasta Lake and along the lower reaches of its tributaries; augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River; and increasing recreation opportunities at Shasta Lake.

Impacts associated with CP3, CP4, CP4A, and CP5 would be very similar to those described for CP1 and CP2, but the increased water levels of Shasta Lake would affect a longer reach of the lower McCloud River. Because of their similarities, and in an effort to reduce redundancy, only the differences between the plans are described below.

Impact WASR-1 (CP3, CP4, CP4A, and CP5): Effect on McCloud River's Eligibility for Listing as a Federal Wild and Scenic River Implementation of CP3, CP4, CP4A, and CP5 would reduce the total length of the McCloud River that is eligible for wild and scenic river designation by about 3,550 feet (less than 3 percent of the total length of the lower river). The rest of the lower McCloud River would remain eligible for listing.

Under CP3, CP4, CP4A, and CP5, the extent of the transition reach would increase to a maximum elevation of 1,090 feet msl, which would extend the current transition reach by about 3,550 feet (a 39 percent increase over the current transition reach), inundating a larger portion of the lower McCloud River within the study area and Segment 4. The inundated area would increase to approximately 60 total acres (an increase of 27 acres over existing conditions, and 9 acres more than CP2 conditions), with a maximum width of approximately 610 feet (an increase of 140 feet over existing conditions) and a total length of approximately 12,550 linear feet (2.38 miles). The extension of the transition reach by approximately 3,550 feet would affect approximately 26 percent of Segment 4. Additional impacts under CP3, CP4, CP4A, and CP5 compared with CP1 and CP2 would be minimal and would be limited to the additional 810-foot extension of the transition reach and about 20 additional feet on either side of the river.

During a wet year, the maximum average water surface elevation of Shasta Lake would be 1,086 feet msl, with a peak elevation of 1,090 feet msl during May. This is an increase of 21 feet above the existing maximum average. During an average water year, the maximum average water surface elevation would increase to 1,054 feet msl, an increase of 14 feet above existing conditions. During dry and critical water years, the change would be on the order of 6 to 13 feet in elevation.

The increased gross pool of Shasta Lake would expand the current transition reach by approximately 3,550 feet (810 feet beyond CP2's effects) up to the 1,090-foot elevation, resulting in a 39 percent increase in the transition reach. Within the expanded transition reach, flow conditions and fisheries would periodically be affected, with the timing and duration of the effects similar to those in the current transition reach. Over time, the expansion of the bathtub ring would affect water quality, geology, and visual quality/scenery. Erosion of soils along the river could expose buried cultural resources, and periodic inundation could permanently alter cultural resource values and features in the transition reach important to Native Americans.

Free-Flowing Conditions As discussed under Impact WASR-1 (CP1), the flow characteristics of the extended transition reach under CP3, CP4, CP4A, and CP5 would be temporarily modified, resulting in slower moving waters and a wider river channel. This modification would not meet the definition of a free-flowing river under the Federal WSRA. The width of the transition reach would be increased by approximately 70 feet on either side of the river. Flow conditions and the river's free-flowing nature upstream from the expanded transition reach would remain similar to current conditions.

Because free-flowing conditions are a fundamental requirement for wild and scenic river eligibility, the 3,550-foot reach of Segment 4 that would be affected by CP3, CP4, CP4A, and CP5 would become ineligible for listing under the Federal WSRA.

Water Quality Under CP3, CP4, CP4A, and CP5, increased turbidity and warmer water temperatures would be most noticeable along the expanded 3,550-foot reach of the transition reach and in the 70-foot corridor on either side of the transition reach because these areas have not been previously exposed to periodic inundations. Under these plans, the wider affected river corridor could result in greater temporary effects on water quality because more vegetation would be temporarily inundated and more soils would be exposed. As discussed under Impact WASR-1 (CP1), effects on water quality would be associated with the periodic increases in water levels of Shasta Lake.

Because water quality is a fundamental requirement for wild and scenic river eligibility, the 3,550-foot reach of Segment 4 that would be affected by CP3, CP4, CP4A, and CP5 would become ineligible for listing under the Federal WSRA.

Outstandingly Remarkable Values As described above under Affected Environment, the ORVs that make Segment 4 of the McCloud River eligible for listing as a wild and scenic river are cultural/historical resources, fisheries, geology, and visual quality/scenery.

Cultural/Historical Resources Impacts would be similar to those discussed under Impact WASR-1 (CP1). Under CP3, CP4, CP4A, and CP5, the

wider affected river corridor could result in greater effects on cultural resources because of the wider inundated area and increased erosion. Larger portions of the three recorded sites and known Wintu villages would become inundated.

The cultural resources located along the 3,550-foot reach of Segment 4 that would be affected under CP3, CP4, CP4A, and CP5 would be subject to the effects of periodic inundation.

Fisheries Aquatic habitat in the additional 810-foot segment under CP3, CP4, CP4A, and CP5 consists of a mid-channel pool and a lateral scour pool. The potential conversion of flatwater habitat to riffle habitat in the 3,550-foot reach of Segment 4 that would be affected under these plans would be similar to but greater than under WASR-1 (CP1), and overall impacts to aquatic habitat and fish would be similar to those discussed under Impact WASR-1 (CP1).

Geology Impacts would be the same as discussed under Impact WASR-1 (CP1), except additional rock outcrops could become inundated because of the wider affected corridor.

Visual Quality/Scenery Impacts would be similar to those discussed under Impact WASR-1 (CP1). Under these plans, the wider affected river corridor could result in greater effects on the visual setting because of the wider inundated area and increased impacts on vegetation. The water line would also be visible at a higher elevation and could be more noticeable. The affected portion of Segment 4 would no longer have the qualities that contributed to its classification by the USFS as “scenic.”

CP3, CP4, CP4A, and CP5 would result in making approximately 3,550 feet of the lower McCloud River ineligible for listing as wild and scenic. This impact would be significant. Mitigation for this impact is not currently available. If authorized, additional studies will be conducted by Reclamation to determine if feasible mitigation measures could be developed. Since no mitigation is currently available, this impact would be significant and unavoidable.

Impact WASR-2 (CP3, CP4, CP4A, and CP5): Conflict with Shasta-Trinity National Forest Land and Resource Management Plan The inundation of approximately 3,550 feet of Segment 4 would not conflict with the provisions in the STNF LRMP to protect the ORVs that make the McCloud River eligible for listing under the Federal WSRA. There would be no impact, and no mitigation is required.

Impact WASR-3 (CP3, CP4, CP4A, and CP5): Effects to McCloud River Wild Trout Fishery, as Identified in the California Public Resources Code, Section 5093.542 The impact would be similar to WASR-3 (CP1), but the magnitude of the impact would be greater under CP3, CP4, CP4A, and CP5 because of the longer transition reach. Under CP3, CP4, CP4A, and CP5, the proposed modifications to Shasta Dam and Shasta Lake would result in

temporary and periodic fluctuations in water levels within the expanded transition reach, affecting about 3 percent of the lower McCloud River. Under CP3, CP4, CP4A, and CP5, the reach affected by Shasta Lake water levels would be extended by about 3,550 feet, a 39 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. The primary impact of the expansion of the transition reach would be conversion of aquatic habitat in a manner similar to the habitat conversion that can be observed in the current transition reach downstream. While the overall impacts to the wild trout fishery including public access and management opportunities in conjunction with fish habitat and populations are small in the context of the entire lower McCloud River, this impact would be potentially significant. Mitigation for this impact is proposed in Section 25.4.4.

Impact WASR-4 (CP3, CP4, CP4A, and CP5): Effects to McCloud River Free-Flowing Conditions, as Identified in the California Public Resources Code, Section 5093.542 The impact would be similar to WASR-4 (CP1), but the magnitude of the impact would be greater under CP3, CP4, CP4A, and CP5 because of the longer transition reach. Under CP3, CP4, CP4A, and CP5, the proposed modifications to Shasta Dam and Shasta Lake would result in temporary and periodic fluctuations in water levels within the expanded transition reach, affecting about 3 percent of the lower McCloud River. Under CP3, CP4, CP4A, and CP5, the reach affected by Shasta Lake water levels would be extended by about 3,550 feet, a 39 percent increase over the current transition reach; this entire area would be inundated only during peak water levels in the spring of wet years. The free-flowing conditions of the river would not be adversely affected beyond the upstream extension of the transition reach. The primary impact of the expansion of the transition reach would be conversion of aquatic habitat in a manner similar to the habitat conversion that can be observed in the current transition reach downstream. While the overall impacts to the free flowing conditions that would occur within this transition reach are small in the context of the lower McCloud River (3 percent), the impacts would conflict with the State PRC. This impact would be significant. Mitigation for this impact is proposed in Section 25.4.4. If authorized, additional studies will be conducted by Reclamation to refine this mitigation measure. Although mitigation has been identified, this impact would be significant and unavoidable.

25.4.4 Mitigation Measures

Table 25-2 presents a summary of mitigation measures for wild and scenic rivers.

The mitigation measures described in the following section were developed partly in response to comments on the DEIS. While these measures are considered to be potentially feasible and effective in their ability to reduce impacts, this EIS acknowledges that there is uncertainty with respect to reducing impacts to less-than-significant levels.

Table 25-2. Summary of Mitigation Measures for Wild and Scenic Rivers

Impact		No-Action Alternative	CP1	CP2	CP3	CP4/ CP4A	CP5
Impact WASR-1: McCloud River's Eligibility for Listing as a Federal Wild and Scenic River	LOS before Mitigation	NI	S	S	S	S	S
	Mitigation Measure	None required.	No feasible mitigation available to reduce impact at this point in the planning process.				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU
Impact WASR-2: Conflict with Shasta-Trinity National Forest, Land and Resource Management Plan	LOS before Mitigation	NI	NI	NI	NI	NI	NI
	Mitigation Measure	None required.	None required.				
	LOS after Mitigation	NI	NI	NI	NI	NI	NI
Impact WASR-3: Effects to McCloud River Wild Trout Fishery, as Identified in the California Public Resources Code, Section 5093.542	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	WASR-3 (CP1-CP5): Develop and Implement a Comprehensive Multi-scale Fishery Protection, Restoration and Improvement Program for the Lower McCloud River Watershed.				
	LOS after Mitigation	NI	PS	PS	PS	PS	PS
Impact WASR-4: Effects to McCloud River Free-Flowing Conditions, as Identified in the California Public Resources Code, Section 5093.542	LOS before Mitigation	NI	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure WASR-4 (CP1-CP5): Implement Protection, Restoration, and Improvement Measures to Benefit Hydrologic Functions Within the Lower McCloud River Watershed				
	LOS after Mitigation	NI	SU	SU	SU	SU	SU

Key:
CP = Comprehensive Plan
LOS = level of significance
NI = no impact
PS = potentially significant
S = significant
SU = significant and unavoidable

No-Action Alternative

Under the No-Action Alternative, no action would be taken, including implementation of mitigation measures; rather, existing conditions would continue to change in response to natural processes and human activities. No mitigation measures are required for the No-Action Alternative.

Mitigation Measure WASR-3 (CP1-CP5): Develop and Implement a Comprehensive Multi-scale Wild Trout Fishery Protection, Restoration and Improvement Program Within the Lower McCloud River Watershed

The inundation of a portion of the lower McCloud River will affect the habitat available to wild trout and other aquatic organisms. The impacts are similar to, but more specific to the lower McCloud River watershed than those described under Impact Geo-2 in Chapter 4, "Geology, Geomorphology, Minerals and Soils"; Impact WQ-1 in Chapter 7, "Water Quality"; and Impacts Aqua-4 and Aqua-7 in Chapter 11, "Fisheries and Aquatic Ecosystems." This mitigation measure incorporates Mitigation Measures Geo-2, WQ-1, and Aqua-4.

This mitigation measure also includes the commitment to identify suitable sections of the lower McCloud River protected under the State PRC that may be available for acquisition from willing sellers for purposes of protecting, restoring and improving the wild trout fishery. This element of the mitigation measures is intended to be consistent with CDFW's wild trout policy as defined in the Strategic Plan for Trout Management, Appendix E, Section C (CDFG 2003), emphasizing designation and management of the wild trout fishery available to the public.

Watershed analysis and assessments prepared for the lower McCloud River watershed document that roads and modified fire regimes have increased sediment contributions to receiving waters, particularly in those watersheds that have been subjected to mining, forest management, and other types of large-scale developments and disturbances (CVWRCB 2011). Reclamation will apply this element of this mitigation measure to protect, restore, and improve the wild trout fishery in the lower McCloud River watershed.

The STNF, through the efforts of the interagency mitigation working group described in Chapter 2, "Action Alternatives," identified that acquisition of lands along the lower McCloud River is a priority and is consistent with the LRMP to meet a number of resource goals and objectives (e.g., cultural resources, recreation, biological resources). Under Impacts WASR-3 and WASR-4, the wild trout fishery and free-flowing conditions in the main stem lower McCloud River that would be affected in the protected reach would be at most 3,550 feet. This element of Mitigation Measure WASR-3 would include acquisition of private lands along the river corridor commensurate with the selected action alternative, if authorized, and available from a willing seller.

This mitigation measure requires that Reclamation work with the watershed stakeholders (e.g., CRMP members) to develop a basin plan that identifies deficient areas where riparian and watershed improvements can be made and work with landowners to improve those areas. Reclamation will commit to funding the planning effort, which will be completed within 10 years after construction has been initiated. This plan is intended to reduce the impacts of inundation on the wild trout fishery in the McCloud River and its tributaries. This program would be performed in conjunction with the efforts of the interagency work group described in Mitigation Measure Geo-2.

Although implementation of this mitigation measure will reduce the impacts associated with WASR-3, Reclamation acknowledges that the impact would remain potentially significant.

Mitigation Measure WASR-4 (CP1-CP5): Implement Protection, Restoration, and Improvement Measures to Benefit Hydrologic Functions Within the Lower McCloud River Watershed The inundation of a portion of the lower McCloud River will impede the free-flowing nature of as much as 3,550 feet of the river, thereby affecting the hydrologic and hydraulic

characteristics of the affected reach. These impacts are similar to other inundated tributaries, but more specific to the lower McCloud River. These impacts are described in Chapter 4, "Geology, Geomorphology, Minerals and Soils" (Impact Geo-2); Chapter 7, "Water Quality" (Impact WQ-1); and Chapter 11, "Fisheries and Aquatic Ecosystems" (Impacts Aqua-4 and Aqua-7). This mitigation measure incorporates Mitigation Measures Geo-2, WQ-1, and Aqua-4, specifically in the context of increasing the overall hydrologic function of the lower McCloud River watershed in a variety of ways. Examples of the measures that may be implemented include the following:

- Silviculture treatments that improve fuel conditions, reduce runoff from high intensity fires and enhance the functions and values of wetlands and riparian areas

- Road decommissioning and drainage improvement projects that reduce concentrated road-related runoff and reestablish flows to tributaries to the lower McCloud River

- Restoration/improvement of in-channel habitat to enhance potential for sustained flows from tributaries

This measure also includes the mitigation measures described in Chapter 12, "Botanical Resources and Wetlands," intended to support land acquisition and wetland mitigation. Five mitigation measures would be applicable to WASR-4: Bot-2, Bot-3, Bot-4, Bot-5 and Bot-7. Land acquisition and wetland mitigation measures are intended to offer a certain level of protection from future development (e.g., diversions) as well as opportunities to improve the hydrologic function at multiple scales that could provide an overall benefit to the free-flowing conditions of the lower McCloud River.

Although implementation of this mitigation measure will reduce the impacts associated with WASR-4, Reclamation acknowledges that the impact would remain significant and unavoidable.

25.4.5 Topics Eliminated from Further Consideration

No topics related to the eligibility of the McCloud River for listing under the Federal WSRA, the compatibility of the alternatives with the STNF LRMP or the CRMP, or their compatibility with the PRC providing protection to the McCloud River were eliminated from further consideration.

25.4.6 Cumulative Effects

Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," gives an overview of the cumulative effects analysis, including significance criteria, and discusses the relationship of this analysis to the CALFED Programmatic Cumulative Impacts Analysis. Table 3-1, "Present and Reasonably Foreseeable Future Actions Included in the Analysis of Cumulative Impacts, by Resource Area," in Chapter 3, lists the

projects considered quantitatively and qualitatively within the cumulative impacts analysis. This cumulative impacts analysis accounts for potential project impacts combined with the impacts of existing facilities, conditions, land uses, and reasonably foreseeable actions expected to occur in the study area on a qualitative and quantitative level. None of the projects listed in Table 3-1 under Quantitative Analysis would have impacts on the McCloud River in the primary study area and the SLWRI would not have adverse impacts in the extended study area; therefore, the following analysis is based on programs and projects listed in Table 3-1 under Qualitative Analysis that would have potential effects in the primary study area as explained below.

Significant effects were identified related to the compatibility of the project with the PRC, Section 5093.542. The potential effects would be of greater magnitude and duration with the larger dam raises (i.e., CP3 through CP5 would have greater potential effects than CP1 and CP2). These impacts may also be associated with two reasonably foreseeable future actions that could affect the McCloud River: the relicensing of PG&E's McCloud-Pit Project and the pilot project to reintroduce anadromous salmonid populations upstream from Shasta Dam. FERC has issued the Final EIS for the relicensing of the McCloud-Pit Project. However, the relicensing process for the McCloud-Pit Project is ongoing, and the conditions that may be required under a new FERC license are uncertain. The potential effects of the relicensing on the lower McCloud River are therefore unknown.

In 2012, the Bagley Fire and subsequent winter flood events resulted in significant changes to vegetation conditions, erosional processes, and water quality in the lower McCloud River watershed. The impacts of this combination of natural disturbances are ongoing and there is considerable uncertainty on how they are affecting the physical processes and biological resources of the lower McCloud River watershed. Subsequent management activities (e.g., road reconstruction, silviculture) are ongoing throughout the Bagley Fire area.

The 2009 NMFS Biological Opinion described in Chapter 3 requires Reclamation to implement a pilot project that would provide passage for anadromous salmonids upstream from Shasta Dam. This project is listed in Table 3-1 as the Fish Passage Program at Shasta. This project could reintroduce anadromous salmonids to the lower McCloud River. At this point in the planning process, the details of this project are ill-defined and the potential for success is uncertain. Therefore, the potential effects of this future action on the lower McCloud River are unknown. Given the information available on these future actions, the potential for project-related impacts to be cumulatively considerable would be less than significant and could, in fact, result in benefits to some of the values and resources of the lower McCloud River.

Chapter 26
Other Required Disclosures

26.1 Significant Adverse Effects that Cannot be Avoided If a Project is Implemented

Section 21100(b)(2)(A) of CEQA requires an EIR to include a detailed statement setting forth "any significant effect on the environment that cannot be avoided if the project is implemented." Chapters 4 through 25 of this EIS analyze in detail all of the project's potentially significant environmental impacts, including cumulative impacts; list feasible mitigation measures that could avoid, minimize, rectify, reduce or eliminate, or compensate for the project's significant impacts; and specify whether these mitigation measures would reduce the impacts to a less-than-significant level. If no feasible mitigation measure is available to reduce a significant impact to a less-than-significant level, then the impact would be a significant and unavoidable impact.

After consideration of actions, operations, and features to avoid, mitigate, and/or compensate for adverse effects, the action alternatives would likely result in the following significant and unavoidable direct and indirect impacts:

- **Geology, Geomorphology, Minerals, and Soils** – Loss or diminished availability of known mineral resources that would be of future value to the region; lost or diminished soil biomass productivity; and substantial soil erosion or loss of topsoil due to shoreline processes (all action alternatives).

- **Air Quality and Climate** – Short-term emissions of criteria air pollutants and precursors at Shasta Lake and vicinity during project construction (all action alternatives).

- **Agriculture and Important Farmland** – Direct and indirect conversion of forest land to nonforest uses in the vicinity of Shasta Lake (all action alternatives).

- **Botanical Resources and Wetlands** – Loss of Multi-Species Conservation Strategy (MSCS) covered species; loss of USFS sensitive, U.S. Department of the Interior, Bureau of Land Management (BLM) sensitive, or California Rare Plant Rank (CRPR) species; loss of jurisdictional waters; and loss of general vegetation habitats (all action alternatives).

- **Wildlife Resources** – Take and loss of habitats for the Shasta salamander, bald eagle, northern spotted owl, and Pacific fisher; impact on the foothill yellow-legged frog, tailed frog, northwestern pond turtle, purple martin, special-status bats, American marten, ringtail, terrestrial mollusks, and their habitat; impact on willow flycatcher, Vaux's swift, yellow warbler, yellow-breasted chat, long-eared owl, northern goshawk, Cooper's hawk, great blue heron, and osprey, and their foraging and nesting habitat; permanent loss of general wildlife habitat; take and loss of foraging and nesting habitat for other birds of prey and migratory bird species; and loss of critical deer winter and fawning range (all action alternatives).

- **Cultural Resources** – Inundation of Traditional Cultural Properties (all action alternatives).

- **Land Use and Planning** – Conflict with existing land use goals and policies of affected jurisdictions (Shasta Lake and vicinity and upper Sacramento River), and disruption of existing land uses (Shasta Lake and vicinity and upper Sacramento River) (all action alternatives).

- **Aesthetics and Visual Resources** – Inconsistency with guidelines for visual resources in the STNF LRMP, degradation and/or obstruction of a scenic view from key observation points, and generation of increased daytime glare and/or nighttime lighting (all action alternatives).

- **Wild and Scenic River Considerations for McCloud River** – Effect on McCloud River's eligibility for listing as a Federal Wild and Scenic River and effects to McCloud River resources identified in the California Public Resources Code, Section 5093.542 (all action alternatives).

The action alternatives could also result in the following significant and unavoidable cumulative impacts (i.e., an impact would make a considerable contribution to a significant cumulative effect):

- **Geology, Geomorphology, Minerals, and Soils** – Cumulative effects from use of soil and mineral resources, leading to diminished regional availability of cement, concrete sand, and aggregate and loss of soil productivity (all action alternatives).

- **Air Quality and Climate** – Cumulative effects from emissions of nitrogen oxide during project construction (all action alternatives).

- **Hydrology, Hydraulics, and Water Management** – Cumulative effects on south Delta water levels, X2 position, and Delta outflow (all action alternatives).

- **Botanical Resources and Wetlands** – Cumulative effects from inundation at Shasta Lake, leading to take and loss of habitat for special-status species at Shasta Lake and vicinity; cumulative effects from increased water delivery in the service areas and growth-related loss of sensitive plant communities and special-status plant species (all action alternatives).

- **Wildlife Resources** – Cumulative effects from inundation at Shasta Lake, leading to take and loss of habitat for numerous special-status species at Shasta Lake and vicinity (all action alternatives).

- **Cultural Resources** – Inundation of Traditional Cultural Properties (all action alternatives).

- **Aesthetics and Visual Resources** – Changes to aesthetic values and resources at Shasta Lake (all action alternatives).

- **Power and Energy Resources** – Changes to SWP and CVP power production and consumption (CP1).

- **Environmental Justice** – Cumulative effects from disproportionate placement of environmental impacts on Native American populations, leading to disturbance or loss of resources associated with locations considered by the Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance in the vicinity of Shasta Lake (all action alternatives).

Feasible mitigation will be implemented to reduce these impacts but would not be sufficient to reduce these impacts to a less-than-significant level.

26.2 Relationship of Short-Term Uses and Long-Term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 Code of Federal Regulations (CFR) Section 1502.16 [40 CFR Section 1502.16]). This involves using all practicable means and measures, including financial and technical assistance, in a manner calculated to: foster and promote the general welfare; to create and maintain conditions under which man and nature can exist in productive harmony; and fulfill the social, economic, and other requirements of present and future generations of Americans.

All action alternatives analyzed in this EIS would involve new construction, such as raising Shasta Dam, replacing bridges, and relocating/reconstructing recreational facilities and access roads adversely affected by higher reservoir

levels. Specific activities would modify the Pit River Bridge, modify/replace six other bridges, relocate various recreation facilities, utilities and related infrastructure, and inundate numerous small segments of existing paved and unpaved roads. All of the action alternatives would result in indirect and induced employment, which may support hiring in businesses that would provide materials to the construction effort; in service-related industries that would provide food, beverages, and other goods to construction workers; or in more technical industries, such as consulting firms and other businesses (see Chapter 16, "Socioeconomics, Population, and Housing"). Sales and profits for businesses that support the construction industry in the primary study area would increase over the 4.5- to 5-year construction period.

Potential habitat- and recreation-related losses caused by enlarging the dam and reservoir would irreversibly affect habitats and developments near the dam inundation area. Impacts on habitat areas within the dam inundation area would be mitigated by preservation of similar habitats elsewhere. Construction activities would include short-term uses of capital, labor, fuels, and construction materials; habitats; and recreation areas. General commitments of construction materials are largely irreversible because most construction materials are unsalvageable.

Potential benefits of the action alternatives include an increase in water supply reliability and a reduction in the probability of experiencing a potential flood-related loss of resources, property, and human life. Environmental uses and habitat for a variety of aquatic and terrestrial species along the Sacramento River and waterways within the primary and extended study areas would be maintained and potentially enhanced with the proposed mitigation. No adverse effects would pose a long-term risk to health and safety.

26.3 Irreversible and Irretrievable Commitments of Resources

The State CEQA Guidelines require a discussion of the significant irreversible environmental changes that would be caused by implementation of the proposed project. In addition, an EIS prepared under NEPA must analyze irreversible and irretrievable commitments of resources, such as soils, wetlands, waterfowl habitat, and cultural resources (40 CFR1502.16).

The irreversible and irretrievable commitment of resources is the permanent loss of resources for future or alternative purposes. Irreversible and irretrievable resources are those that cannot be recovered or recycled, or those that are consumed or reduced to unrecoverable forms. The action alternatives would result in the irreversible and irretrievable commitment of the following energy and material resources during project construction and maintenance:

- Construction materials, including resources such as soil and rocks

- Land area committed to new/expanded project facilities and water inundation areas

- Energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for project construction, operations, and maintenance

Nonrenewable resources are expected to account for a minimal portion of the region's resources; the project's use of nonrenewable resources would not affect the availability of these resources for other needs within the region. Construction activities would not result in inefficient use of energy or natural resources. The selected construction contractors would use best available engineering techniques, construction and design practices, and equipment-operating procedures. Furthermore, mitigation would be provided to offset any loss of habitat areas and other land uses within the proposed dam inundation areas. Long-term project operation would not result in substantial long-term consumption of energy and natural resources, and increased energy production would result from the additional storage capacity at Shasta Lake.

26.4 Growth-Inducing Impacts

CEQA requires that an EIR discuss how a project may induce growth. NEPA requires that an EIS consider indirect effects of a project, which are often the result of growth inducement. A project is considered potentially growth inducing if it is reasonably foreseeable that the project may foster economic or population growth or may result in the construction of additional housing (California Code of Regulations Section 15126.2(d)[CCR 15126.2(d)]). The increase in water supply reliability that would result from the construction of any of the proposed action alternatives would be potentially growth inducing because it would foster economic growth and potentially remove an obstacle to development.

The purpose of this section is to disclose how the action alternatives that are analyzed in this EIS could be growth inducing and to describe how the potential resulting environmental effects would be addressed. In *Napa Citizens for Honest Government v. Napa County Board of Supervisors* (2001) 91 Cal.App.4th 342, 367–371 [110 Cal.Rptr.2d 579], the California Court of Appeal, Fourth District, provided clear direction on the standards for disclosure of growth-inducing effects in an EIR that also is relevant to an EIS. The lead agency also may consider mitigation measures for the anticipated effects. Growth-inducing impacts are evaluated for the project alternatives in accordance with the California Court of Appeal finding in *Napa Citizens for Honest Government v. Napa County Board of Supervisors* (2001):

> *Neither CEQA itself, nor the cases that have interpreted it, require an EIR to anticipate and mitigate the effects of a*

> *particular project on growth on other areas. In circumstances such as these, it is sufficient that the final EIR (FEIR) warns interested persons and governing bodies of the probability that additional housing will be needed so that they can take steps to prepare for or address that probability. The FEIR need not forecast the impact that the housing will have on as yet unidentified areas and propose measures to mitigate that impact. That process is best reserved until such time as a particular housing project is proposed.*

The increase in water supply reliability resulting from the action alternatives would make additional water resources available for municipal, industrial, and agricultural uses in the CVP and SWP service areas. The additional water resources could be used for actions that sustain and support growth.

Growth-inducing effects resulting from the increase in water supply reliability that were caused by the action alternatives would be indirect. However, Reclamation's ability to forecast the extent and location of these effects throughout its extensive service area is extremely limited. More than likely, the effects would be spread throughout the CVP and SWP service areas, would change annually, and would depend on how the additional water supply stored in Shasta Lake is ultimately used. Because the potential indirect, growth-inducing effects are speculative, amorphous, and not site specific, no feasible mitigation measures are available or proposed. No mitigation measure could be feasibly applied across the entire CVP and SWP service areas. Direct impacts on traffic and air quality and changes to the jobs/housing balance would be evaluated and mitigated by the local land use agency during general plan updates and project-specific application review. The following potential effects of an increase in water supply reliability are discussed:

- Existing fallow agricultural land and rangeland may be converted to irrigated row crops or irrigated orchard. This land use change could increase effects of local economic growth on farmers and could result in more local employment opportunities.

- If water supply is an obstacle to expansion of industrial facilities, this obstacle may be removed. Increased industrial capacity could result in economic growth and provide more local employment opportunities.

- If water supply is an obstacle to residential development, this obstacle may be removed, and local land use authorities may be encouraged to approve residential development projects on currently zoned agricultural land:

  - Residential development would result in the construction of houses.

- Residential development may cause economic growth through the collection of development fees.

The project analysis covers the primary study area and an extended study area. The primary study area encompasses Shasta Dam and Shasta Lake; inflowing rivers and streams including the Sacramento River, McCloud River, Pit River, and Squaw Creek; and the Sacramento River downstream to about the Red Bluff Pumping Plant. Because of the potential influence of Shasta Dam modification on natural resources along the Sacramento River as well as on other programs and projects in the Central Valley, the project also evaluates an extended study area that includes the Sacramento River basin downstream from the Red Bluff Pumping Plant, the American River basin, the Delta, the San Joaquin River basin, and the CVP and SWP service areas.

The extended study area includes CVP and SWP reservoirs and the portions of tributaries that are downstream from these reservoirs and affect the Sacramento River, San Joaquin River, Trinity River, and Delta flows. These reservoirs and tributaries include Lake Oroville, Folsom Lake, Millerton Lake, San Luis Reservoir, New Melones Reservoir, and Trinity Lake, and portions of the Trinity, Feather, American, and Stanislaus rivers. The CVP and SWP service areas include much of the Sacramento and San Joaquin valleys, and substantial portions of the Bay Area and Southern California.

The following sections describe mechanisms that could be growth inducing and analyze potential growth-inducing effects of the action alternatives.

26.4.1 Increased Construction Work

The action alternatives would create new construction jobs in the primary study area, but this temporary effect would not be growth inducing. Concrete workers, workers with large-scale construction experience, general laborers, and others would be drawn from the local construction industry. These jobs would represent a relatively small increase (i.e., less than 0.5 percent) in the total labor force in the two counties of the primary study area (Shasta and Tehama counties), but also would represent a substantial increase in employment for many of the cities surrounding the project, where employment has consistently been below the state average (EDD 2010, 2011). Therefore, jobs created by the action alternatives would be serviced by the local workforce and would not be growth inducing (see Chapter 16, “Socioeconomics, Population, and Housing”).

26.4.2 Increased Flood Risk Reduction

The action alternatives also are anticipated to provide some flood risk reduction benefits, but these benefits would not be growth inducing. The added reservoir capacity at Shasta Lake would give Reclamation greater flexibility in using the reservoir for flood management purposes, thereby increasing the threshold at which seasonal heavy-rain events produce flood conditions downstream from Shasta Dam. The benefits of this increase in reservoir capacity and related flood management options would be most evident along the upper Sacramento River

in the primary study area, and would decrease downstream where other major tributaries, such as the Feather and American Rivers, join the Sacramento River. Structures in and inhabitants of this floodplain experience the most direct effects from storage releases during flood events. The action alternatives would reduce the frequency, magnitude, and duration of some potential future flood events, like those that have affected structures and residents in this part of the primary study area in the past.

As a result of the added reservoir capacity, the overall risk of flooding and its related consequences below Shasta Dam is expected to be reduced. Although heavy-rain events would continue to occur in the region, and potentially increase as a result of global climate change, enlarging the dam is intended to provide greater flexibility in flood management in the lower Sacramento River and Delta area because of the increased capacity of the reservoir. As a result, less damage to existing structures in or near the lower Sacramento River and Delta floodplains would be expected over time although the probability of certain flood events of a substantial size would not be decreased from the increased reservoir capacity at Shasta Lake. Most importantly, the flood risk reduction benefits of the dam enlargement would not change the existing floodplain or Federal Emergency Management Agency flood zone designations, so the action alternatives would not remove an obstacle to development or even reduce any obstacles to development. Flood risk reduction benefits from any of the action alternatives, therefore, are not growth inducing.

26.4.3 Increased Water Supply Reliability

Implementing any of the action alternatives would improve water supply reliability in the primary and extended study areas. This improved water supply reliability would better accommodate existing water contracts by increasing the available water supply in some years. The environmental consequences of these contracts have been (and in the future will be) evaluated in separate environmental review processes. The improvement in water supply reliability would not change long-term contract amounts or deliveries within their existing historical ranges.

A variety of factors indirectly influence business, residential, and population growth in the region. Among these are city and county general plans and policies, and the availability of utility services, public schools, and transportation services. Water is one of the primary public services needed to support urban development, including businesses, industry (including agriculture), and housing; a deficiency in water service capacity could constrain future development.

Implementing any of the action alternatives also would increase water supplies for CVP/SWP deliveries, which would have the potential to be growth inducing. The expected increase in water deliveries relative to the CVP and SWP service areas would be small (i.e., less than 1 percent), and increased deliveries likely would be provided to a number of geographic areas within the CVP and SWP

service areas. Also, a substantial portion of this water would substitute for groundwater pumping, would allow for changes in agricultural irrigation practices, or would return idle cropland to production. For this reason, implementing any of the action alternatives would result in beneficial effects on agricultural resources, which would intrinsically benefit the economies in the affected localities. An increase in the reliability of water provided to agricultural areas would not necessarily lead to a direct increase in population because the water primarily would service existing agricultural lands and would not be expected to foster expansion into undeveloped natural communities. Substantial acreages of existing agricultural lands are idle because of reduced water reliability, and some of these existing acreages would receive water and be put back into agricultural production. However, the cumulative effect of a more reliable water source would be to increase agricultural effectiveness, a key economic sector in the region, which could indirectly result in growth-inducing impacts by bringing more money into the local economies.

The proposed action alternatives would increase water supply reliability for agricultural and/or municipal and industrial (M&I) uses. Agriculture is the most important segment of the economy below Shasta Dam and throughout California's Central Valley. Anticipated increases in agricultural water supply reliability are based on simulated CVP and SWP irrigation deliveries. The average annual increase in CVP and SWP irrigation deliveries under action alternatives would be up to 62,200 acre-feet per year. Anticipated increases in M&I water supply reliability are estimated based on simulated increases in CVP and SWP M&I deliveries. The average annual increase in CVP and SWP M&I deliveries under action alternatives would be up to 25,000 acre-feet per year.

Anticipated increases in total water supply reliability are based on the sum of simulated increases in agricultural and M&I water supply reliability. Average annual increases in total water supply reliability under action alternatives would be up to 75,900 acre-feet per year. Therefore, the action alternatives would result in increases in agricultural and/or M&I water supply reliability, which potentially would be a growth-inducing effect.

If residential development is constrained by water supply, then increased water supply reliability may remove an obstacle to residential development. Therefore, any of the action alternatives potentially would be growth inducing. Local land use authorities are required to demonstrate sufficient water supply reliability, pursuant to Senate Bill 610 (Chapter 643, Statutes of 2001), in addition to completion of a water supply evaluation required by CEQA. Water supply reliability may be demonstrated with surface water, water contracts, groundwater, and combinations thereof. Impacts on the physical environment would be evaluated and mitigated at a project level. The locations of potential residential development on existing agricultural or rangeland cannot be predicted, and because of the speculative and amorphous nature of potential growth-inducing impacts, no feasible mitigation for impacts of the action alternatives is available at this time.

Increased reliability of the water supply could reduce a limitation on growth throughout the primary and extended study areas; however, any project that could affect natural resources or otherwise accommodate growth in the study areas would have to comply with existing planning documents and would be subject to project-specific public environmental analysis and review. The effects of subsequent growth would be analyzed in general plan EIRs and in project-level CEQA compliance documents for the local jurisdictions in which the growth would occur. Mitigation of these potential effects would be the responsibility of these local jurisdictions, not Reclamation.

In summary, the expected increase in water deliveries relative to the entire CVP service area would be extremely small and could be provided to any number of geographic areas within the CVP service area (and in part would substitute for ongoing groundwater pumping). Water provided to agriculture would be used primarily if not exclusively to return idle cropland to production. Furthermore, it would be speculative to identify specific areas where growth could occur or the indirect effects on specific community service facilities in a particular service area. For these and other reasons specified above, the growth-inducing effects from the action alternatives are limited, minimal, and can be effectively mitigated through local jurisdictions as needed.

26.5 Environmentally Preferable Alternative/Environmentally Superior Alternative

CEQ Regulations require identification of an environmentally preferable alternative and the CEQA Guidelines require identification of an environmentally superior alternative. However, the CEQ Guidelines and CEQA Guidelines do not require adoption of the environmentally preferable/superior alternative as the preferred alternative for implementation. This Final EIS identifies a preferred alternative (see Chapter 32, “Final EIS,” Section, 32.4.1 “Preferred Alternative.” The selection of the preferred alternative is independent of the identification of the environmentally preferable/superior alternative, although the identification of both will be based on the information presented in this EIS.

Section 1505.2(b) of the CEQ Regulations requires the NEPA lead agency to identify the environmentally preferable alternative in a Record of Decision. The CEQ Regulations define the environmentally preferable alternative as “…the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.” Similar to the environmentally preferable alternative under NEPA, the CEQA Guidelines, Sections 15120 and 15126.6(e)(2), require identification of an environmentally superior alternative. If the environmentally superior alternative is the “no project” alternative, the CEQA Guidelines, Section

15126.6(e)(2), require identification of an environmentally superior alternative among the action alternatives.

Each action alternative generally has similar characteristics as all alternatives vary based on combinations of dam raise height, water management, and environmental restoration, and gravel augmentation. The primary distinguishing factors between action alternatives are related to dam raise height, water supply reliability, anadromous fish survival, and other project objectives. CP1, CP2, and CP3 primarily address water supply reliability and anadromous fish survival; however, each of these plans also would contribute to other project objectives. Furthermore, the likelihood that each of these three plans would meet its intended objectives is very high because the plans generally would not rely on any other actions. However, CP4 or CP4A would emphasize anadromous fish survival through an increase in the Shasta Lake storage dedicated to cold-water supply each year, Sacramento River environmental restoration, and gravel augmentation, and CP5 specifically addresses reservoir area environmental restoration and gravel augmentation. For Sacramento River and reservoir area environmental restoration, success would depend on the continued effectiveness of the environmental restoration facilities/features proposed as part of the SLWRI – enhanced lake area habitat, increased native vegetation, and new riparian rehabilitation areas – well past completion of construction.

Construction-related impacts would be similar for all of the action alternatives, and the significance determinations for each of the action alternatives generally are the same. Varying magnitudes of impacts generally would be related to the height of the dam raise because additional construction resources would be required for the larger raise and more land would be affected within the larger inundation area. All of the action alternatives would provide additional opportunities for flood risk reduction and increased anadromous fish survival; they also would provide greater water supply reliability during extremely dry years, which would benefit all water users. CP1 and CP2 would have less of an impact on land uses within the reservoir area than the other action alternatives because they would raise the dam by 6.5 feet and 12.5 feet, respectively, compared to the 18.5-foot increase proposed under CP3, CP4, CP4A, and CP5. However, water supply reliability and anadromous fish survival would be maximized with the larger raise.

Impacts associated with each alternative are summarized at the end of each resource chapter and in Table S-1 in the Summary.

This EIS provides a substantive portion of the environmental information necessary for Reclamation to determine the Environmentally Preferable Alternative. Accordingly, and consistent with NEPA requirements, the environmentally preferable alternative will be identified in the Record of Decision.

26.6 Least Environmentally Damaging Practicable Alternative

The SLWRI would require discharge of dredged or fill material into waters of the United States. Section 404 of the Federal Clean Water Act (CWA) authorizes USACE to issue permits for the discharge of dredged or fill material into waters of the United States, including wetlands (33 United States Code [USC] 1344). Guidelines promulgated by the U.S. Environmental Protection Agency and commonly known as the Section 404(b)(1) Guidelines (40 CFR 230 et seq.), regulatory guidelines of USACE (33 CFR 320 et seq.), and NEPA guidelines (40 CFR 1500 et seq.) are substantive environmental criteria used to evaluate permit applications submitted to USACE. An analysis of practicable alternatives is the primary screening mechanism used by USACE to determine the appropriateness of permitting a discharge. A key element of this approval is the requirement that USACE approve only the Least Environmentally Damaging Practicable Alternative (LEDPA), in accordance with guidance provided by Section 404(b)(1) of the CWA.

An alternative is considered practicable if it is available and capable of being implemented after considering cost, existing technology, and logistics in light of overall project purposes (40 CFR 230.3[q]). Practicable alternatives may include placing a project in an area not owned by the applicant that could be reasonably obtained by the project applicant to achieve the overall purpose of the project (40 CFR 230.10[a][2]).

The LEDPA would be determined on the basis of the entire environmental review and identified in the Record of Decision, consistent with Section 404(b)(1) of the Federal CWA, which requires that only the LEDPA may be approved and implemented by a Federal agency. This EIS provides a substantive portion of the environmental information necessary for USACE to determine the LEDPA consistent with Section 404(b)(1) guidelines.

26.7 Compliance with Applicable Laws, Policies, and Plans

For more detailed descriptions of the laws, policies, and plans listed below, see Section 3.4, “Regulatory Framework.”

26.7.1 Federal Requirements

National Environmental Policy Act

NEPA requires that an appropriate document be prepared to ensure that Federal agencies accomplish the Act’s purposes. The Council on Environmental Quality has adopted regulations and other guidance that provide detailed procedures for Federal agencies to follow in implementing NEPA. Once finalized, Reclamation would use the Final EIS to comply with Council on Environmental Quality regulations and document NEPA compliance.

Clean Water Act

Section 404 A Section 404(b)(1) alternatives information package will be prepared for the action alternatives and submitted to USACE and the U.S. Environmental Protection Agency. In addition, Reclamation will obtain a Section 404 permit before filling any waters of the United States. USACE will issue a Record of Decision that addresses pertinent consideration and implementation requirements. Section 404 also requires that the LEDPA be identified and implemented by an authorized Federal agency.

Section 401 Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States. The Federal government delegates water pollution control authority under Section 401 of the CWA to the states. Refer to the Porter-Cologne Water Quality Control Act discussion below.

Rivers and Harbors Act

In USACE's Sacramento District, navigable waters of the United States in the project area that are subject to the requirements of the Rivers and Harbors Act include the Sacramento River and all waterways in the Sacramento-San Joaquin drainage basin affected by tidal action. Sections of the River and Harbors Act applicable to the action alternatives are described below.

Section 9 All of the action alternatives include construction of dikes. A Section 9 approval would be required before construction of any dikes. Reclamation would obtain approval from the Chief of Engineers and the Secretary of the Army before construction of any dikes in navigable waters of the United States.

Section 10 A Section 10 permit would be required before any activity that would alter waters of the United States. To comply with the Rivers and Harbors Act, Reclamation would apply for a permit from USACE's Sacramento District before construction, and that application would be processed simultaneously with the CWA Section 404 permit application. This EIS evaluates the environmental effects that the action alternatives would have on waters of the United States, including navigable waters.

Section 13 The Central Valley Regional Water Quality Control Board has jurisdiction within the primary study area. The Federal government delegates water pollution control authority to states under Section 402 of the CWA. Refer to the Porter-Cologne Water Quality Control Act discussion below.

Federal Endangered Species Act

Reclamation has coordinated with USFWS and NMFS regarding potential project effects on Federally listed species. The potential effects of the SLWRI on endangered and threatened species are described in Chapter 11, "Fisheries and Aquatic Ecosystems"; Chapter 12, "Botanical Resources and Wetlands";

and Chapter 13, "Wildlife Resources." Reclamation will prepare the appropriate biological assessments to address potential impacts on Federally listed species and will consult with USFWS and NMFS regarding impacts of the proposed action.

Magnuson-Stevens Fishery Conservation and Management Act

Chapter 11, "Fisheries and Aquatic Ecosystems," discusses impacts on fisheries and fisheries habitat. Reclamation will coordinate with NMFS to ensure that recommended measures be put into the Preferred Plan that would minimize adverse modifications to Essential Fish Habitat. The specific implementation plan will analyze the significance of modifications to Essential Fish Habitat and will support the habitat assessments included for restoration-specific actions during Endangered Species Act, Section 7 consultations.

Fish and Wildlife Coordination Act

Compliance with the Fish and Wildlife Coordination Act (FWCA) involves assessing the impacts of the proposed action on preservation, conservation, and enhancement of fish and wildlife habitat and preparation of a FWCA Report. Reclamation will be required to include recommendations for preserving affected habitats, mitigating their loss, and enhancing such habitats, in its documentation of compliance. Documentation of compliance with the FWCA is a separate analysis of habitats of concern to USFWS, NMFS, and CDFW, and does not replace the analysis required by Section 7 of the Federal Endangered Species Act.

Migratory Bird Treaty Act

Chapter 13, "Wildlife Resources," evaluates potential impacts on migratory bird species and identifies mitigation measures to reduce impacts on birds, nests, and eggs. In addition, Reclamation will implement all feasible measures included in the FWCA Report discussed above. Reclamation will comply with the Migratory Bird Treaty Act by implementing mitigation measures described in the EIS and in the FWCA Report, before and during implementation of the proposed action.

Bald and Golden Eagle Protection Act

USFWS has proposed new permit regulations to authorize the take of bald and golden eagles under the Bald and Golden Eagle Protection Act, generally when the take to be authorized is associated with otherwise lawful activities (72 Federal Register 31141–31155, June 5, 2007). With delisting of the bald eagle in 2007, the Bald and Golden Eagle Protection Act is the primary law that protects bald eagles as well as golden eagles. As discussed in Chapter 13, "Wildlife Resources," suitable habitat is not present for golden eagle in the primary study area; however, each of the action alternatives would have a significant and unavoidable impact on the bald eagle. Therefore, Reclamation will consult with USFWS to implement the reasonable and prudent alternative and conservation measures to reduce impacts on the bald eagle.

Safe Drinking Water Act

Water used for domestic purposes must be treated in accordance with Federal and State standards by the local or regional water supply. Reclamation will be in compliance with the Safe Drinking Water Act because the action alternatives would not change existing license requirements or impede enforcement of primary drinking water standards.

Farmland Protection Policy Act

As a Federal agency preparing environmental compliance documents, Reclamation has included in its analysis a farmland assessment designed to minimize adverse impacts on Prime and Unique Farmlands and provide for mitigation as appropriate. Chapter 10, "Agriculture and Important Farmland," evaluates potential effects of the action alternatives on Important Farmland.

National Forest Management Act

As discussed in Chapter 1, "Introduction," USFS is a cooperating agency in this EIS. Under the National Forest Management Act, any decision emanating from a NEPA process must comply with the Land and Resource Management Plan (LRMP) to authorize an action on lands managed by Shasta-Trinity National Forest (STNF). Significant impacts on lands and resources managed by STNF are discussed in Chapter 4, "Geology, Geomorphology, Minerals, and Soils;" Chapter 12, "Botanical Resources and Wetlands;" Chapter 13, "Wildlife Resources;" Chapter 17, "Land Use and Planning;" Chapter 18, "Recreation and Public Access;" and Chapter 19, "Aesthetics and Visual Resources." These impacts may require nonsignificant, project-specific amendments to the LRMP.

The National Forest Management Act also requires that USFS maintain viable populations of existing native and desired nonnative species in the planning area. Reclamation will meet this requirement by preparing a biological evaluation and associated management indicator species assessment. Those documents will be used by USFS to make a finding that the actions disclosed in the record of decision, issued by Reclamation, will be consistent with the LRMP.

Federal Land Policy and Management Act

As described in Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences," the Federal Land Policy Management Act directs USFS and BLM to manage public lands under the principles of multiple use and sustained yield. Under the Federal Land Policy and Management Act, the use and occupancy of public lands requires authorization by a land management agency, typically under the auspices of a special-use permit. As the principal land management agency for the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area, USFS and, to a lesser degree, BLM, will need to use the Final EIS to support issuance of authorizations to various parties, pursuant to the Federal Land Policy and Management Act.

Wild and Scenic Rivers Act

Section 7 of the Federal Wild and Scenic Rivers Act requires STNF to manage the outstandingly remarkable values of the McCloud River, consistent with the objectives, standards, and guidelines of its LRMP. The evaluation in the LRMP concluded that the lower McCloud River, from McCloud Dam downstream about 22 miles to the river's transition to Shasta Lake at about 1,070 feet mean sea level, provides outstanding cultural, fisheries, and geologic values, and its corridor has been classified as a highly sensitive visual area by USFS (USFS 1995). Based on the outstandingly remarkable values, STNF determined that the lower McCloud River meets the eligibility requirements for designation under the Federal Wild and Scenic Rivers Act. Chapter 25, "Wild and Scenic River Considerations for McCloud River," evaluates potential effects of the SLWRI on the McCloud River.

Federal Water Project Recreation Act

Compliance with the Federal Water Project Recreation Act is achieved by documenting the consideration of recreation opportunities in USACE reports and NEPA documents. Within this EIS, Reclamation has taken into consideration and addressed outdoor recreation and fish and wildlife enhancement in the primary and extended study areas.

National Historic Preservation Act

Under Section 106 of the National Historic Preservation Act, Federal agencies must consider effects to eligible resources ("historic properties") from the proposed undertaking, in consultation with the California State Historic Preservation Officer (SHPO) and other parties. This includes affording the Advisory Council a reasonable opportunity to comment on such undertakings. For this project, consultation between Reclamation, USFS, any other applicable Federal agencies, SHPO, and other consulting parties would include consideration of possible options for avoiding, minimizing, or mitigating adverse effects. If SHPO, Reclamation, USFS, other applicable Federal agencies, and the Council (if participating) agree to measures to resolve adverse effects to historic properties, these are formalized in a Memorandum of Agreement (MOA). Other consulting parties may be invited to sign the MOA. The Section 106 process (36 CFR Part 800.14) is completed once the terms of the MOA have been met. Alternatively, the Federal agencies may elect to enter into a programmatic agreement that would be developed as an alternative procedure to implement the Section 106 process (36 CFR Part 800.14). In rare cases, if consultation fails to result in agreement on resolving adverse effects, consultation may be terminated pursuant to the process detailed in 36 CFR Part 800.7.

Indian Trust Assets

When adverse impacts on Indian Trust Assets (ITA) cannot be avoided, appropriate mitigation or compensation will be provided. ITAs consist of lands that have been deeded to tribes or on which tribes have a historical legal claim. However, no such lands are within the primary study area. Thus, the SLWRI

would have no impact on ITAs. Because ITAs have been evaluated and the SLWRI would have no impact on these resources, the SLWRI would comply with ITAs.

Executive Order 11988 (Flood Hazard Policy)

As discussed in Chapter 6, "Hydrology, Hydraulics, and Water Management," all of the action alternatives would have an effect on floodplains in the primary study area. However, none of the action alternatives would increase flood flows, and feasible mitigation would be implemented to compensate for the impact of altered flow on riparian and wetland communities.

Executive Order 11990 (Protection of Wetlands)

As discussed in Chapter 12, "Botanical Resources and Wetlands," a wetland delineation will be prepared for the Preferred Plan and a USACE Section 404 permit will be obtained before construction. Reclamation will identify the location of sensitive habitats by conducting a wetland delineation, avoid and minimize impacts to the extent feasible, and compensate for any losses. However, implementation of any of the action alternatives would result in significant and unavoidable impacts on wetlands.

Executive Order 12898 (Environmental Justice Policy)

As discussed in Chapter 24, "Environmental Justice," the disturbance or loss of resources associated with locations considered by Winnemem Wintu and Pit River Madesi Band members to have religious and cultural significance would result in a disproportionately high and adverse effect on Native American populations in the vicinity of Shasta Lake. Therefore, the project would contribute to disproportionate placement of environmental impacts on Native American populations and would result in a cumulatively considerable incremental contribution to a significant and unavoidable cumulative impact. No feasible mitigation is available to reduce this high and adverse effect. Compliance with Executive Order 12898 occurs through the identification of this effect and acknowledgement of the lack of feasible mitigation measures available to reduce it.

Americans with Disabilities Act

The Americans with Disabilities Act of 1990 is a comprehensive law prohibiting discrimination against people with disabilities in employment practices, use of public transportation, use of telecommunication facilities, and use of public accommodations. Title II of the ADA applies to government facilities and requires that reasonable modifications must be made to services and programs so that they are readily accessible to and usable by people with disabilities. If any alternative proposed under the SLWRI is approved and authorized, Reclamation would make every reasonable effort to make any new construction or improvement fully compliant with ADA requirements. If it is found to be infeasible to make a new construction or improvement element fully ADA compliant, Reclamation would obtain any required waivers or modifications to the ADA standards.

Executive Order 13007 (Indian Sacred Sites) and Memorandum of April 29, 1994

EO 13007 defines a sacred site as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site."

Potential impacts of the action alternatives on Native American sacred sites are addressed in Chapter 14, "Cultural Resources." Reclamation will continue to coordinate with federally recognized tribes to address potential impacts on sacred sites.

Executive Order 13112 (National Invasive Species Management Plan)

A weed management plan is within the scope of the action alternatives and would include methods for managing the spread of invasive plant species. Because the details of the weed management plan have not been finalized at the time of this writing, this EIS identifies preparation and implementation of a weed management plan as a mitigation measure. Developing and implementing the weed management plan as a mitigation measure demonstrates compliance with Executive Order 13112. Reclamation will demonstrate continued compliance with this executive order by implementing the methods described in the weed management plan.

Federal Clean Air Act

As discussed in Chapter 5, "Air Quality and Climate," the SLWRI would not result in long-term effects on air quality. Because the effects of the action alternatives on air quality have been evaluated and mitigated to the extent possible, any of the action alternatives would comply with the Federal Clean Air Act.

Federal Transit Administration

This EIS evaluates potential groundborne-vibration impacts on sensitive receptors, including the maximum sensitivity of 65 vibration decibels for hospitals, high-technology manufacturing, and laboratory facilities. Some construction activities associated with the action alternatives could result in groundborne vibrations exceeding 65 vibration decibels. However, sensitive receptors would need to be within 250 feet of the activities to be affected, and no sensitive receptors would be within this distance. Reclamation has demonstrated consistency with this policy by evaluating the construction activities that would generate the maximum possible groundborne vibration at the highest sensitive uses.

Federal Energy Regulatory Commission

Changes to hydroelectric facilities on the Pit River, including instream flow releases or modifications to downstream structures, may necessitate a license amendment from the Federal Energy Regulatory Commission. Reclamation will support Pacific Gas and Electric Company in any application to the Federal Energy Regulatory Commission for necessary license amendments before implementing any action alternatives that would affect Pit River flows.

U.S. Coast Guard

The SLWRI has the potential to affect several bridges over inflows to Shasta Lake. Reclamation will coordinate with the U.S. Coast Guard in respect to these potential impacts.

26.7.2 State Requirements

The section below describes potential State or local agency requirements under CEQA if the preferred alternative or action alternatives is authorized and approved. It is possible that some state or local agencies will be unable to process and issue permits and approvals identified below.

California Environmental Quality Act

This document has been prepared in consideration of CEQA requirements. This EIS may not be sufficient to serve as a DEIR for CEQA purposes and would require scrutiny by any State or local CEQA Lead Agency before release to the public as a DEIR. Section 15221 of the CEQA Guidelines states that when a NEPA document is ready before the CEQA document, the State Lead agency shall evaluate the NEPA document for CEQA compliance and augment the CEQA document with CEQA specific analysis, as necessary. The State Lead Agency, assuming one is identified in the future, would evaluate the legal sufficiency of all aspects of the document including range of alternatives, impact assessments, mitigation measures, and effects to State protected resources including state-listed endangered and threatened species.

California Endangered Species Act

Evaluations have been conducted for State-listed endangered and threatened species, and have determined that the proposed action would affect several State-listed species. Effects on those species are discussed in Chapter 11, “Fisheries and Aquatic Ecosystems;” Chapter 12, “Botanical Resources and Wetlands;” and Chapter 13, “Wildlife Resources.” Reclamation will prepare appropriate biological assessments to address potential impacts on Federally listed species. The CEQA lead agency will consult with CDFW regarding impacts of the proposed action on State-listed species.

California Fish and Game Code—Fully Protected Species

This EIS identifies potential actions that could result in take of fully protected species, and the CEQA lead agency will work closely with CDFW to evaluate methods to avoid impacts on fully protected species.

California Fish and Game Code Section 1602—Streambed Alteration

A CDFW streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake. This EIS identifies potential actions within the proposed action that would require the alteration of stream features, subject to Section 1602 of the California Fish and Game Code. The CEQA lead agency will secure an approved streambed alteration agreement before performing any actions subject to Section 1602.

California Fish and Game Code Sections 5900–5904, 5930–5948, 7261, and 7370—Fish Passage

This EIS identifies actions that could affect fish passage, and Reclamation or the CEQA lead agency will work closely with CDFW to evaluate methods to avoid impacts on sturgeon, fish passage, and designated "Heritage Trout Waters." Potential impacts on fisheries are described in Chapter 11, "Fisheries and Aquatic Ecosystems."

California Native Plant Protection Act

All action alternatives are evaluated in this EIS for consistency with this Act. Mitigation measures are provided, as necessary, to minimize potential take of listed and special-status plants under the California Native Plant Protection Act.

California Native Plant Society California Rare Plant Ranking System

This EIS identifies plants of concern in the California Rare Plant Ranking System (formerly known as the California Native Plant Society species lists) that may be affected by the action alternatives, using the California Rare Plant Ranking System as a method of identifying species of concern. Mitigation and minimization measures will be implemented, as necessary, to reduce the significance of potential impacts on these species of concern.

Central Valley Flood Control Act of 2008

The action alternatives have been developed in a manner that is consistent with the Central Valley Flood Control Act, and the action alternatives would not inhibit development and implementation of the *Central Valley Flood Protection Plan*.

Central Valley Flood Protection Board Encroachment Permit

Certain action alternatives would require work along the Sacramento River in areas that may be subject to Title 23; the river is managed for flood control, and thus it contains features subject to Central Valley Flood Protection Board jurisdiction. The CEQA lead agency will secure encroachment permits, as needed, to satisfy Title 23 before performing any work along relevant reaches of the Sacramento River that contain flood control features subject to Central Valley Flood Protection Board jurisdiction.

Water Rights

The action alternatives do not include any actions that would require acquisition, use, or modification of water rights. Therefore, the action

alternatives would comply with all existing water rights in the primary and extended study areas.

California Public Resources Code

The Legislature has declared that the McCloud River, which is within the primary study area, possesses "extraordinary resources" in the context of Section 5093.542 of the California Public Resources Code, established through enactment of the Wild and Scenic Rivers Act, as amended (Sections 5093.50 through 5093.70). However, the Legislature's action stopped short of formally designating the river as wild and scenic. Chapter 25, "Wild and Scenic River Considerations for McCloud River," evaluates potential effects of the action alternatives on the McCloud River. New legislation may be required for State support and/or participation in any of the action alternatives.

The California Public Resources Code also contains several other sections relevant to the project. Compliance with provisions of the California Public Resources Code is achieved in this EIS by analyzing the impact of the action alternatives on recreation opportunities. Chapter 18, "Recreation and Public Access," discusses effects on Shasta Lake and the surrounding recreation areas under the action alternatives.

California Harbors and Navigation Code

Significant modifications to facilities on Shasta Lake may necessitate coordination with the California Department of Boating and Waterways and/or the U.S. Coast Guard. The CEQA lead agency and/or Reclamation will coordinate with them as necessary.

Porter-Cologne Water Quality Control Act

Action alternatives that have the potential to adversely affect water quality are identified in this EIS. Measures necessary for compliance with the Porter-Cologne Water Quality Control Act would need to achieve consistency with implementation programs under the water quality control plan for the Sacramento River basin, and with the Central Valley Regional Water Quality Control Board's waste discharge requirements. Other necessary actions likely would include application for and finalization of National Pollutant Discharge Elimination System permits and Section 401 water quality certifications.

California Land Conservation Act of 1965 (Williamson Act)

Approximately 51 percent of Shasta County's farmland is under Williamson Act contracts (Shasta County 2004). Williamson Act lands affected by the action alternatives are discussed in Chapter 10, "Agriculture and Important Farmland."

California Clean Air Act

This EIS evaluates the contribution of the action alternatives to any violation of air quality standards and identifies mitigation measures to help achieve

consistency with the State implementation plan's attainment goal before implementation of any of the alternative actions.

California Scenic Highway Program

On the south side of Shasta Lake, portions of State Route 151 are an officially designated State Scenic Highway. County Road A18 is an officially designated County Scenic Highway, and it also is located on the southern side of Shasta Lake. Portions of Interstate 5, as it approaches Shasta Lake and crosses the Pit River Bridge, are considered eligible for designation as a State Scenic Highway. Impacts on scenic highways are discussed in Chapter 19, "Aesthetics and Visual Resources."

State Lands Commission Land Use Lease

In the primary study area, the lands under the jurisdiction of the California State Lands Commission include areas along the Sacramento River, north of Red Bluff. Work on the Sacramento River would require a lease from the California State Lands Commission. The CEQA lead agency will coordinate with the California State Lands Commission and obtain a State Lands Commission Land Use Lease before starting work in areas under the Commission's jurisdiction.

California Surface Mining and Reclamation Act

In general, the California Surface Mining and Reclamation Act of 1975 (SMARA) requires that the lead agency approve a permit and a reclamation plan, and that an approved financial assurance be posted for the reclamation of the mined land. If borrow is required from borrow site(s), not previously permitted under SMARA, the CEQA lead agency will either obtain a SMARA permit or an exemption from SMARA for all borrow sites before beginning borrow activities.

State of California General Plan Guidelines

Chapter 8, "Noise and Vibration," evaluates long-term effects on noise levels in the primary and extended study areas. Long-term changes in noise levels associated with any of the alternative actions would be less than significant. All alternative actions would comply with the appropriate noise guidelines based on Reclamation's evaluation of long-term compatibility of the actions with noise levels.

California Department of Transportation

Highway improvements or modifications that may be necessary as part of this project may require an encroachment permit, issued through the California Department of Transportation (Caltrans). The project may involve modifications to roadways that Caltrans considers "complex," and Reclamation or the CEQA lead agency may need extensive communication with the Caltrans Department of Engineering Services and/or structure-specific encroachment permits. The requirements are detailed in the *Caltrans Encroachment Permits Manual*, which is available at the Caltrans Web site.

26.7.3 Local Plans and Policies

Shasta County Air Quality Management District's Authority to Construct and Permit to Operate

The CEQA lead agency would obtain an Authority to Construct permit before building or installing any new emissions unit or modifying any existing emissions unit that requires a permit, if necessary. The CEQA lead agency also would obtain a Permit to Operate after all construction is completed and the emission unit is ready for operation, if needed.

Other Local Permits and Requirements

Several other local permits and requirements may apply to the action alternatives. Shasta and Tehama counties and their public works departments will require compliance with local plans and ordinances, such as the county general plan, zoning ordinances, grading plan, and various use permits. Utility easements and various encroachments also may be required.

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Chapter 27
Public Involvement, Consultation, and Coordination

This chapter summarizes completed, ongoing, and anticipated public outreach and agency involvement efforts related to development of the SLWRI, including activities that satisfy NEPA requirements for public scoping and agency consultation and coordination. Efforts to engage the public, stakeholders, Federally recognized Native American Tribes, Native American groups, and public agencies are an important role in the SLWRI. These efforts are guided by the *Strategic Agency and Public Involvement Plan* (Reclamation 2003a), and include a broad range of activities designed to accomplish official and supplementary outreach goals. Chapter 28, "DEIS Distribution List," lists the entities receiving a copy of the DEIS. Reclamation encourages review of this DEIS and will continue to solicit public and agency input on the proposed action. For updated information on the Final EIS, please see Chapter 32, "Final EIS."

The *Strategic Agency and Public Involvement Plan* features four main objectives:

- **Stakeholder Identification** – Identifying and involving individuals, groups, and other entities that have an expressed or implied interest in the SLWRI.

- **Project Transparency** – Informing stakeholders and the public of study results in a timely, unbiased fashion through a variety of methods, including stakeholder and/or public meetings, Web postings, and mailings.

- **Issues and Concerns Resolution** – Gaining awareness of the issues and concerns of stakeholders and the public early in the process, and responding to these issues in an effective and timely manner.

- **Project Implementation** – Assisting policy-makers in understanding project purposes and benefits, and demonstrating that the project has met all necessary requirements to be implemented.

27.1 Public Involvement Through Project Scoping

Public scoping activities are conducted as part of compliance with both NEPA and CEQA, but are more formalized under NEPA. Scoping allows agencies, stakeholders, organizations, and other interested parties to identify resources to be evaluated, issues that may require environmental review, reasonable alternatives to consider, and potential mitigation if significant adverse effects are identified. The scoping process helps with early identification of problems to be studied, and also helps to eliminate from detailed study issues that are not critical to the decision at hand. Scoping also provides decision makers with insight on the issues and concerns that the public believes should be considered as part of the feasibility study. Public scoping activities performed for the SLWRI environmental documentation process are described below.

27.1.1 Notice of Intent to Propose an Environmental Impact Statement

Reclamation initiated the scoping process by publishing a notice of intent to prepare an EIS and a notice of public scoping meetings pursuant to NEPA on October 7, 2005, in the *Federal Register* (Volume 70, pages 58744–58746). The opportunity for submitting written comments on the notice of intent extended through December 6, 2005.

On the same day that the notice of intent and notice of meetings were published in the *Federal Register*, Reclamation announced the scoping meetings to be held in a news release posted on the project Web site and distributed via e-mail to media in the extended study area. The release was also distributed to agencies, stakeholders, organizations, and other interested parties. A second news release on October 20, 2005, announced an additional scoping meeting to be held in Red Bluff, and was published in display advertisements that Reclamation purchased in newspapers within the immediate study area in Redding, Red Bluff, and Dunsmuir.

27.1.2 Public Scoping Meetings

In 2005, seven public scoping meetings were conducted in an “open house” format throughout California to update the public on the status of the proposed action and to solicit and receive input on alternatives, project related concerns, and issues to be addressed in the environmental review process. Project team members from Reclamation and its consultants staffed informational workstations and interacted with meeting participants to provide information and answer questions. Attendance ranged from very light for meetings held in Concord, Fresno, and Los Angeles at 2, 2 and 4 people, respectively. Attendance was comparatively stronger in Dunsmuir, Redding, Red Bluff and Sacramento at 11, 39, 20 and 10 people, respectively. The proximity to the projects, and advertisements in three local newspapers, likely contributed to a stronger attendance in the northern cities.

The meetings were attended by private citizens, Federal and State agency personnel, local government representatives, political representatives, members

of the media, Native American Tribes, Native American groups, and business owners, and representatives of private industry, utilities, environmental interest groups, and nongovernmental organizations.

Displays of information were presented at each meeting on large-scale panels at a series of four workstations. Information included on these panels is summarized as follows.

Background

This workstation described Shasta Dam and Shasta Lake, authorization of the Federal feasibility study and other pertinent guidance, the CALFED Bay-Delta Program (CALFED) Programmatic Record of Decision (ROD) relating to enlarging Shasta Dam and Shasta Lake, and the primary and extended study areas.

Environmental Overview

This workstation summarized the major resource areas to be evaluated, defined the biological, socioeconomic, physical, and cultural environments, and identified potential impacts on those environments. The workstation also included information on the Federal environmental review process and Federal and State regulatory requirements and processes.

Study Process

This workstation presented information on water resources problems and needs being addressed in the SLWRI environmental documents. The primary and secondary study objectives were identified along with the overall study mission. The workstation also included information about the Federal plan formulation process, including the development of the SLWRI initial alternatives and the formulation of comprehensive alternatives.

Initial Alternatives

This workstation described the initial alternatives formulated, potential major features associated with potential enlargement of Shasta Dam and Shasta Lake that are likely to be considered in future studies, and potential environmental restoration features to be included in the alternatives.

The *Environmental Scoping Report* (Reclamation 2006) describes the scoping process, comments received during scoping, and how these comments would be addressed as part of the SLWRI and in support documentation (e.g., Feasibility Report and EIS).

27.2 PDEIS Outreach

Before releasing the DEIS, Reclamation released the Preliminary Draft Environmental Impact Statement and the Draft Feasibility Report. This February 2012 release was followed by an October 2012 Reclamation news

release requesting additional public comment on the Draft Feasibility Report for input on potential cost, benefits and impacts of enlarging Shasta Dam and Reservoir. In December 2012, Reclamation extended the comment period for review of the document from December 28, to January 28, 2013, to allow time for additional public comments on the Draft Feasibility Report.

27.3 Other Public Outreach

In addition to scoping activities, other public outreach activities have included the following:

- Release of major previous Reclamation studies and reports investigating potential enlargement of Shasta Dam and Reservoir included: *Enlarged Shasta Lake Investigation Preliminary Findings Report* (1983), *Shasta Dam and Reservoir Enlargement, Appraisal Assessment of the Potential for Enlarging Shasta Dam and Reservoir* (1999), *SLWRI Strategic Agency and Public Involvement Plan* (2003b), *SLWRI Mission Statement Milestone Report* (2003a), *SLWRI Initial Alternatives Information Report* (2004a), *SLWRI Environmental Scoping Report* (2006), and *SLWRI Plan Formulation Report* (2007). As described above, Reclamation also completed the Preliminary DEIS (2011a), Draft Feasibility Report (2011b), and supporting technical appendices for the SLWRI in November 2011. These documents were released to the public in February 2012, to share study findings and provide additional opportunities for public and stakeholder input.

- Release of two project information papers associated with milestone reports- the *Mission Statement Milestone Report* (Reclamation 2003b) and the *Initial Alternatives Information Report* (Reclamation 2004a) – in support of public outreach.

- Right-of-entry request letters to more than 450 property owners in support of field surveys and investigations including geological, archeological, biological and topographical surveys.

- Stakeholder workshops during development of the SLWRI (multiple years)

- Project briefings to Federal, state and local elected officials, water and hydropower interest groups, and environmental interest groups have been on-going since 2003.

- Project update meetings with property owners and/or business interests in the Shasta Lake area (multiple years)

- Presentations to the California Water Commission, Bay-Delta Public Advisory Committee, and related agency presentations (multiple years)
- Briefings to resource management groups and stakeholders (multiple years)
- Project Web site for the SLWRI (www.usbr.gov/mp/slwri/index.html)

Future meetings will focus primarily on public outreach related to the release of this DEIS.

27.4 Consultation and Coordination

Reclamation has consulted various public agencies and organizations during the public outreach process and throughout development of the SLWRI DEIS to obtain feedback on the investigation. Consultations have assisted Reclamation in determining the scope of the DEIS, developing project components and objectives, identifying the range of alternatives, and defining potential environmental impacts, impact significance, and mitigation measures.

27.4.1 Consultation and Coordination with Agencies

Reclamation conducts ongoing consultation and coordination efforts with agencies. The SLWRI study management structure includes the active participation of numerous cooperating agencies and other stakeholders on a Project Coordination Team (PCT) and Study Management Team and in Technical Working Groups. Cooperating agencies for the SLWRI, pursuant to NEPA, include USFS, Colusa Indian Community Council of the Cachil Dehe Band of Wintun Indians, USACE, and U.S. Department of the Interior, Bureau of Indian Affairs. Other participants in the PCT include USFWS; NMFS; U.S. Department of the Interior, Bureau of Land Management; and other Federal and State agencies. These groups were active contributors to the ongoing development and/or review of the alternative plans that are addressed herein and in supporting documentation.

The PCT is among the most effective means of communication between agencies, continuing to provide for regular participation by numerous cooperating agencies. Regularly scheduled bimonthly meetings have been held and continue to be held, for the purpose of project coordination and decision making, with invitations extended to all cooperating agencies and other CALFED Bay-Delta Program agencies and the Central Valley Regional Water Quality Control Board.

Key elements of these coordination activities are the *Planning Aid Memorandum* and *Coordination Act Report*, documents issued by USFWS. A draft *Planning Aid Memorandum* outlining areas of potential concern was circulated among the resource agencies in the first quarter of 2007.

Development of the *Coordination Act Report* began in summer 2007, with circulation of a draft in 2008. An updated draft of the *Coordination Act Report* was provided in October 2014.

27.4.2 Coordination with Native American Tribal Governments

Native American tribal governments are American Indian or Alaska Native tribal entities registered with the U.S. Department of the Interior, Bureau of Indian Affairs (BIA) as having a formal government-to-government relationship – inclusive of the responsibilities, powers, limitations, and obligations attached to that designation – with the United States. This Federal registration further recognizes the tribal governments' possession of certain inherent rights of self-government (i.e., tribal sovereignty) and carries with it entitlements to certain Federal benefits, services, and protections because of their special relationship with the United States.

Consistent with a memorandum from the President on April 29, 1994, Reclamation and the cooperating agencies will continue to actively engage Federally recognized tribal governments in planning and developing the investigation, and will consult with each tribe on a government-to-government basis before taking actions that could affect such tribal governments. Under Federal Trust responsibility, Reclamation will provide full disclosure (benefits and negative impacts) of the project, allow time for tribal review/consultation, and receive comments and/or suggestions for alternatives.

The PCT held several coordination meetings with Federally recognized tribes during 2007 and 2008. Tribes were invited to an informal meeting held on April 4, 2007, in Redding, California, to provide general information about the SLWRI and determine tribal participation interests. Additionally, from August 2007 to November 2008, members of the PCT held six separate meetings with four Federally recognized tribes whose traditional territories overlap with the SLWRI project area. The purposes of the meetings were to solicit, clarify, and document major concerns and issues regarding the SLWRI, and to establish a preferred method or approach for maintaining effective communication with each tribe during the remainder of the feasibility study and in future endeavors.

27.4.3 Coordination with Native American Groups

A Native American group is comprised of individuals who self-identify as Native American, but have not been conferred formal tribal sovereignty by the United States. Native American groups are consulted with as interested parties under NHPA Section 106. Under 36 CFR §800.4(3), agencies seek information from these parties, who are identified as likely having knowledge of, or concerns with, historic properties in the area, and may identify issues related to potential effects.

In accordance with Executive Order 12898, Native American groups and Federally-recognized tribes – are considered minority populations, and are encouraged as stakeholder groups to participate in the ongoing investigation.

Several Native American groups, such as the Winnemem Wintu and Shasta Nation, have expressed significant interest in the SLWRI. In response, the PCT conducted – in addition to the six Tribal Government Coordination meetings – four meetings with Native American groups in 2007 and 2008. This engagement began with an informal meeting with Native American groups on April 4, 2007, to distribute general information about the SLWRI and to identify their interests for project participation. As with Federally recognized tribes, meetings were held with Native American groups to solicit, clarify, and document major concerns and issues regarding the SLWRI, and to establish each group's preferred method or approach for receiving communications about the SLWRI during the remainder of the study.

27.5 Major Topics of Interest

The focus of interest varied among the outreach activities, but a common theme centered on potential impacts on the Shasta Lake area that could result from enlargement of the reservoir.

The public, stakeholders, and other Federal agencies, and State and local agencies identified several areas of concern during SLWRI meetings and workshops. Key topics included potential adverse effects on cultural resources in the Shasta Lake area; recreation and recreation providers in the Whiskeytown-Shasta-Trinity National Recreation Area; terrestrial special-status species around Shasta Lake, including State-designated fully protected species, aquatic special-status species in the Sacramento River and Delta (including delta smelt); the lower McCloud River and its special designation under California Public Resources Code 5093.542(c); Delta water quality; south Delta water levels; Central Valley hydrology below CVP and SWP facilities and resulting effects on water supplies for water contractors and other water users; and consistency with the CALFED Programmatic ROD. These topics are described in more detail in Chapter 1, "Introduction," Section 1.6, "Areas of Controversy."

27.6 DEIS Outreach

This DEIS was released on July 1, 2013, for public and agency review and comment for a 90 day period that ended September 30, 2013. The document's Notice of Availability (NOA) was posted by the U.S. Environmental Protection Agency in the July 1, 2013, *Federal Register*. During this public comment period, Reclamation held a public workshops in Los Banos, Redding and Sacramento to solicit, receive and respond to public input on the DEIS. Consistent with NEPA requirements, three public hearings were held before the close of the public comment period and held in the same communities. Before the conduct of each workshop and the public hearings, Reclamation issued a news release to its statewide media list and posted advertisements in

newspapers of record for each community, which were the Los Banos Enterprise, Redding Record-Searchlight and The Sacramento Bee.

The workshops were held July 16, 17, and 18, 2013, in Redding, Sacramento and Los Banos, respectively. The total number of people that signed in for the meetings was 150, 20 and 15 people, respectively. The public hearings were held September 11, 12 and 13, 2013, in Sacramento, Los Banos and Redding, respectively. The total number of people that signed in for the meetings was 9, 5 and 138, respectively. These meetings were formatted similar to public scoping with an open house preceding a formal public session. The open house portion of the July and September meetings included five project information stations staffed by project team members available to respond to attendee's questions. These workstations included Process, Schedule and Next Steps; Alternatives; Implementation Considerations; Biological Resources; and Cultural Resources.

Following each open house for the July public workshops, Reclamation staff led a brief presentation and responded to questions from attendees. Following each open house for the September public hearings, Reclamation staff provided a brief presentation before opening the formal public hearing consistent with NEPA. The public hearing was led by a hearing officer, with comments recorded verbatim by a stenographer.

Comments provided during the public hearing have been incorporated, as identified, to the Final EIS. Written comments from the public, reviewing agencies, and stakeholders received during the public comment period were also incorporated, as identified, to the Final EIS. Next steps in the environmental review process are described in Chapter 32, "Final EIS," Section 32.7, "Next Steps."

Chapter 28
DEIS Distribution List

This chapter provides locations where the DEIS was available for review and provides an overview the governmental entities, organizations, and interested parties that received copies of the DEIS. This list includes agencies and organizations that were involved in the scoping process for the proposed action, requested a copy of the DEIS, or that may use the DEIS for discretionary or informational purposes. For updated information on the Final EIS, please see Chapter 32, "Final EIS."

28.1 Document Availability

The public distribution of the DEIS emphasized the use of electronic media to ensure cost-effective, broad availability to the public and interested parties. This DEIS is available on the Internet at Reclamation's Web site, http://www.usbr.gov/mp/slwri/documents.html. The hard copies of the DEIS were made available for review at the following locations:

U.S. Department of the Interior, Bureau of Reclamation Library
2800 Cottage Way
Sacramento, California 95825

Bureau of Reclamation, Northern California Area Office
16349 Shasta Dam Boulevard
Shasta Lake, California 96019

U.S. Department of the Interior, Natural Resources Library
1849 C Street NW, Main Interior Building
Washington, D.C., 20240

Dunsmuir Branch Library
5714 Dunsmuir Avenue
Dunsmuir, California 96025

Shasta County Public Library,
Redding Library
1100 Parkview Avenue
Redding, California 96001

Kern County Library,
Holloway-Gonzales Branch
506 East Brundage Lane
Bakersfield, California 93307

Concord Library
2900 Salvio Street
Concord, California 94519

Los Banos Public Library
1312 South 7th Street
Los Banos, California 93635

Napa City-County Library
580 Coombs Street
Napa, California 94559

28.2 Agencies and Organizations Receiving Copies of the DEIS

All persons, agencies, and organizations listed in this chapter were informed of the availability of and locations to obtain the DEIS. Parties listed below have received an electronic or hard copy of the main body of the DEIS or the entire DEIS, including appendices.

28.2.1 Federal Agencies

- U.S. Army Corps of Engineers
- U.S. Department of Interior, Fish and Wildlife Service
- U.S. Department of Interior, Bureau of Indian Affairs
- U.S. Department of Interior, Bureau of Land Management
- U.S. Department of Agriculture, Forest Service
- U.S. Department of Commerce, National Marine Fisheries Service
- U.S. Environmental Protection Agency

28.2.2 State Agencies

- California Water Commission
- California Department of Boating and Waterways
- California Department of Conservation
- California Department of Education

- California Department of Fish and Wildlife
- California Department of Public Health
- California Department of Parks and Recreation
- California Department of Toxic Substances Control
- California Department of Transportation
- California Department of Water Resources
- California Department of Food and Agriculture
- California Department of Forestry and Fire Protection
- California Environmental Protection Agency
- California Highway Patrol
- California Air Resources Board
- California Central Valley Flood Protection Board
- Central Valley Regional Water Quality Control Board
- California Governor's Office of Planning and Research
- State Water Resources Control Board
- California Energy Commission
- Delta Protection Commission
- Delta Stewardship Council
- Native American Heritage Commission
- State Lands Commission
- Office of Historic Preservation

28.2.3 Regional and Local Entities

- Shasta County
- Tehama County
- Siskiyou County

- Trinity County
- Shasta County Air Quality Management District
- Tehama County Air Quality Management District
- City of Anderson
- City of Corning
- City of Dunsmuir
- City of Mount Shasta
- City of Redding
- City of Red Bluff
- City of Shasta Lake

28.2.4 Federally Recognized Tribes

- Grindstone Indian Rancheria
- Paskenta Band of Nomlaki Indians
- Pit River Environmental Council
- Pit River Tribe of California
- Redding Rancheria

28.2.5 Other Interested Parties

- More than 250 non-governmental organizations representing environmental, agricultural, business, tribal, and related interests
- More than 50 water districts, irrigation districts, other water purveyors, and related utilities
- More than 50 media outlets
- More than 180 private business interests
- More than 1,000 individuals, including reservoir area property owners

Chapter 29
List of EIS Preparers

Following is a list of persons who contributed to preparation of this EIS.

This list is consistent with the requirements set forth in NEPA and CEQA (40 CFR 1502.17 and Section 15129 of the State CEQA Guidelines).

29.1 Federal

Reclamation (NEPA Lead Agency)	
Katrina Chow	Project Manager
Ron Ganzfried	Senior Reviewer
Michael Tansey	Climate Change
Anastasia Leigh	Cultural Resources
Laureen Perry	Cultural Resources
Craig Stroh	Economics
Janice Pinero	Endangered Species Act
Bob Gee	Engineering
Tom Hepler	Engineering
Adam Toothman	Engineering
Carolyn Bragg	Environmental Resources
Michael Inthavong	Environmental Resources
Elizabeth Vasquez	Environmental Resources
John Hannon	Fisheries Biologist
Greg Mangano	Geology
Jared Vauk	Geology
David Hansen	GIS
Patricia Rivera	Indian Trust Assets
Kristin White	Modeling
Ann Stine	Natural Resources
Louis Moore	Public Affairs
Julie Bowen	Real Estate

Reclamation (NEPA Lead Agency) (contd.)	
Heidi Schuchbauer	Real Estate
Chuck Johnson	Recreation
Tom Fitzhugh	Water Operations
Russ Yaworsky	Water Operations
Scott Springer	Wild and Scenic River and Recreation

29.2 Non-Federal

29.2.1 Consultants

MWH		
Name	**Qualifications**	**Participation**
Mary Paasch, P.E., PMP	B.S., Agricultural Engineering; M.S., Agricultural Engineering; 18 years of experience.	Project Manager
Danelle Bertrand, P.E.	B.S., Civil Engineering; M.S., Civil Engineering; 7 years of experience.	Deputy Project Manager/Project Planning
Jeff Payne, P.E.	B.S., Civil Engineering; M.S., Water Resources Engineering; 15 years of experience.	Climate Change
Don Crone, P.E.	B.S., Civil Engineering; 39 years of experience.	Cost Estimating
James Loucks, P.E.	B.S., Construction Engineering; 33 years of experience.	Cost Estimating
Puja Mohandas	B.A., Architecture; M.A., Architecture; M.S., Civil Engineering; 10 years of experience.	Cost Estimating
Paul Smith	B.S., Civil Engineering; 47 years of experience.	Cost Estimating
Vincent Barbara	B.S., Agriculture Business; M.A., Economics; 6 years of experience.	Economics
Matthew Carpenter, P.E.	B.S., Civil Engineering; 15 years of experience.	Engineering
Robert Filgas, P.E.	B.S., Civil Engineering; 28 years of experience.	Engineering
Andrew Nishihara, P.E.	B.S., Bioengineering; 5 years of experience.	Engineering
Philip Salzman, P.E.	B.S. Civil Engineering; B.A. Biological Sciences; 18 years of experience.	Engineering

MWH (contd.)		
Name	**Qualifications**	**Participation**
Shankar Parvathinathan, P.E.	B.E., Chemical Engineering; M.S., Environmental Engineering; Ph.D., Environmental Engineering; 13 years of experience.	Engineering and Hydraulics
James Herbert, C.E.G, P.G.	B.S. Geological Sciences; 33 year of experience.	Engineering Geology and Geology
Ian Buck, P.E.	B.S., Civil Engineering; 4 years of experience.	Engineering, Recreation, Real Estate and Cost Estimating
Evan Perez, P.E.	B.S., Civil Engineering; M.S., Civil Engineering; 2 years of experience.	Engineering, Recreation, Real Estate and Cost Estimating
Eric Clyde, P.E.	B.S., Civil Engineering; M.S., Civil Engineering; 36 years of experience.	Engineering; Hydrology, Hydraulics, and Water Management.
Jill Chomycia, P.H.	B.S., Geological Sciences; M.S., Soil Sciences; M.S., Hydrology; 10 years of experience.	Environmental Planning
Stephanie Theis	B.S., Fisheries Ecology; Graduate Studies, Applied Ecology and Conservation Biology; 24 years of experience.	Fisheries and Aquatic Ecosystems
Craig Altare, P.G.	B.S., Geology; M.S., Hydrology; 10 years of experience.	Geology and Water Quality
Erica Bishop	B.S., Physical Geography; M.A., Water Resources; 10 years of experience.	Geology, Geomorphology, Minerals and Soils
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MWH (contd.)		
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Meredith Parkin, PMP	B.S, Human Nutrition and Food Science; J.D., Law; 14 years of experience.	NEPA/CEQA Specialist
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Rina Binder-Macleod	B.Eng., Environmental Engineering; M.Eng., Civil Engineering; 2 years of experience.	Planning and Document Coordination
Rajaa Hassan, P.E.	B.S., Civil Engineering; M.S., Civil and Environmental Engineering; 13 years of experience.	Power and Energy
Helen Iosfin, P.Eng.	M.Sc, Electrical Engineering; 32 years of experience.	Power and Energy
Kristin Goree	B.S., Government; 9 years of experience.	Public Involvement
Craig Moyle, PMP	B.A., Journalism; 21 years of experience.	Public Involvement
Dina Hunt, P.E.	B.S., Civil and Environmental Engineering; M.S., Civil and Environmental Engineering; 10 years of experience.	Seismic Hazards
William Smith, P.E.	B.S., Forest Engineering; 37 years of experience.	Water Quality, Water Management and Power and Energy
Andy Draper, P.E.	B.S., General Engineering; M.S., Irrigation Engineering; Ph.D., Water Resources; 35 years of experience.	Water Quality; Hydrology, Hydraulics, and Water Management
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North State Resources (NSR)		
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Paul Uncapher	B.A., Geology; 34 years of experience.	Project Manager, Wild and Scenic Rivers, Land Use
Constance Carpenter	B.A., History; B.S., Range Resources with emphasis in Fire Ecology; M.S., Forest Resources; 23 years of experience.	Aesthetics and Visual Resources
Andrew Minks	B.S., Natural Resources Planning and Interpretation; M.S., Environmental Science and Management; 24 years of experience	Aesthetics, Land Use and Planning, Public Services, Utilities and Service Systems, Hazards and Hazardous Materials
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Heather Kelly	B.S., Biology; 17 years of experience.	Botanical Resources and Wetlands, Wildlife Resources
Len Lindstrand III	B.S., Wildlife Management; Minors in Fisheries Management and Forestry; 21 years of experience.	Botanical Resources and Wetlands, Wildlife Resources
Sara Tona	B.S., Genetics and Plant Biology; 5 years of experience.	Botanical Resources and Wetlands, Wildlife Resources
Mike Gorman	B.S., Fisheries; 10 years of experience.	Fisheries and Aquatic Ecosystems
Keith Marine	B.S., Wildlife and Fisheries Biology; M.S., Ecology; 29 years of experience.	Fisheries and Aquatic Ecosystems
Mariah McPherson	B.S., Civil and Environmental Engineering; M.S., Civil and Environmental Engineering; 9 years of experience.	Geology, Geomorphology, Minerals, and Soils
Tim Reilly	B.S., Soil Science; 37 years of experience.	Geology, Geomorphology, Minerals, and Soils
Duncan Drummond	B.S., Geology; 9 years of experience.	Geology, Geomorphology, Minerals, and Soils; Water Quality

North State Resources (NSR) (contd.)		
Name	**Qualifications**	**Participation**
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Anne Ferguson	B.S., Natural Resource Recreation and Tourism; M.S., Environmental Sustainability; 11 years of experience.	Recreation and Public Access
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Leo Edson	B.S., Biological Sciences; 24 years of experience.	Wildlife Resources
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	JRP Historical Consulting (Under subcontract to MWH)	
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	MGE Engineers (Under subcontract to MWH)	
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Name	**Qualifications**	**Participation**
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Chapter 30
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NMFS. *See* National Marine Fisheries Service.

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Chapter 3, "Considerations for Describing the Affected Environment and Environmental Consequences"

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None.

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Chapter 32
Final EIS

On June 28, 2013, the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), acting as the National Environmental Policy Act (NEPA) Lead Agency, released the Shasta Lake Water Resources Investigation (SLWRI) Draft Environmental Impact Statement (DEIS) for public review and comment. In compliance with NEPA, a Notice of Availability (NOA) was published by Reclamation in the Federal Register (Federal Register Vol. 78, No. 126, 39315) on Monday, July 1, 2013, and an associated NOA was published by the U.S. Environmental Protection Agency (EPA) in the Federal Register (Federal Register Vol. 78, No. 129, 40474) on Friday, July 5, 2013.

Reclamation conducted public involvement activities on the Environmental Impact Statement (EIS) during scoping and upon release of the DEIS. The scoping comment period and scoping meetings were held in October and November of 2005. Additionally, Reclamation held three public workshops and three public hearings during the comment period on the DEIS at the following locations in California:

- **Public Workshops** were held to provide an overview of the project and allow public comment and discussion:
  - Holiday Inn, Redding, California, July 16, 2013
  - Cal Expo Quality Inn Hotel & Suites, Sacramento, California, July 17, 2013
  - Merced County Fairgrounds, Los Banos, California, July 18, 2013
- **Public Hearings** were held to receive oral or written comments on the DEIS:
  - Holiday Inn, Redding, California, September 10, 2013
  - Cal Expo Quality Inn Hotel & Suites, Sacramento, California, September 11, 2013
  - Merced County Fairgrounds, Los Banos, California, September 12, 2013

Written and verbal comments were accepted at meetings and written comments were accepted throughout the comment period. The comment period on the DEIS began on July 1, 2013, and closed on September 30, 2013.

The public comments have been reviewed and, in accordance with NEPA Council on Environmental Quality (CEQ) Regulations, responses have been developed for all substantive comments, and revision of the DEIS has been made to clarify and enhance the text to produce this SLWRI Final EIS. This Final EIS consists of revised chapters 1 through 31, a new Chapter 32, "Final EIS," a new Chapter 33, "Public Comments and Responses," and revised and new appendices.

During the process of addressing public comments on the DEIS, some notable content changes were made in the Final EIS, including:

- Refinement of the project purpose statement
- Clarification of the relationship of this EIS and tiering to the CALFED Bay-Delta Program Programmatic Environmental Impact Statement/Environmental Impact Report
- Refinement of the operational scenarios focused on anadromous fish survival, and development, evaluation, and incorporation of Comprehensive Plan 4A (CP4A)
- Refinement of facility plans for recreation relocations, Shasta Dam modifications, Pit 7 Dam and Powerhouse modifications, and other reservoir area relocations (e.g., power transmission lines)
- Incorporation of updated resource information related to physical and biological resources in the primary study area
- Based on facility and construction footprints, refinement of "maximum" affected areas and refinement of "most likely" affected areas for biological resources
- In conjunction with an interagency, interdisciplinary team, refined and enhanced the mitigation measures, including development of a framework to quantify impacts (where appropriate) and establish mitigation ratios that were applicable to a number of impacts related to biological resources

32.1 Contents of the SLWRI Final EIS

The SLWRI Final EIS consists of:

- **Volume I**
  - Chapters 1 through 31
- **Volume II EIS**
  - Glossary Appendix
  - Plan Formulation Appendix
  - Engineering Summary Appendix
  - Modeling Appendix
  - Real Estate Appendix
  - Climate Change Modeling Appendix
  - Physical Resources Appendix
  - Biological Resources Appendix
  - Socioeconomics Appendix
  - Fish and Wildlife Coordination Act Recommendations for the Shasta Lake Water Resources Investigation Appendix
- **Volume III – Responses to Comments on DEIS**
  - Chapter 32 – Final EIS
  - Chapter 33 – Public Comments and Responses
  - Preliminary Environmental Commitments and Mitigation Plan Appendix
  - Duplicate DEIS Public Comments Appendix
  - Traffic Noise Modeling Appendix

32.2 Public Involvement for the SLWRI EIS

A variety of public involvement activities were conducted for the SLWRI EIS and are described below.

32.2.1 Scoping

Reclamation initiated the scoping process by publishing a Notice of Intent (NOI) to prepare an EIS and a notice of public scoping meetings pursuant to NEPA on Friday, October 7, 2005, in the Federal Register (Federal Register, Vol. 70, No. 194, 58744). The opportunity for submitting written comments on the NOI extended through December 6, 2005.

On the same day that the NOI and notice of meetings were published in the Federal Register, Reclamation announced the scoping meetings to be held in a news release posted on the project Web site and distributed via e-mail to media in the extended study area. The release was also distributed to agencies, stakeholders, organizations, and other interested parties. A second news release on October 20, 2005, announced an additional scoping meeting to be held in Red Bluff, and was published in display advertisements that Reclamation purchased in newspapers within the immediate study area in Redding, Red Bluff, and Dunsmuir, California.

In October and November of 2005, seven public scoping meetings were conducted in an "open house" format throughout California to update the public on the status of the proposed action and to solicit and receive input on alternatives, project related concerns, and issues to be addressed in the environmental review process. The scoping meetings were held in the following locations: Concord, Dunsmuir, Fresno, Los Angeles, Red Bluff, Redding, and Sacramento.

32.2.2 Release of the DEIS

The DEIS was released to the public for review and comment on Friday, June 28, 2013. As noted above, a NOA was published by Reclamation in the Federal Register (Federal Register, Vol. 78, No. 126, 39315) on Monday, July 1, 2013, and an associated NOA was published by EPA in the Federal Register (Federal Register Vol. 78, No. 129, 40474) on Friday, July 5, 2013.

Newspaper advertisements providing the dates and locations of the public hearings for the DEIS were published in the following newspapers on September 4, 2013:

- Los Banos Enterprise Record, Los Banos, California.
- Redding Record Searchlight, Redding, California.
- Sacramento Bee, Sacramento, California.

- Siskiyou Daily News, Yreka, California.

Reclamation also issued two news releases to its statewide media database notifying the public of the availability of the DEIS and the intent to hold public workshops. The news releases were distributed on June 28, 2013, and August 30, 2013.

During the comment period on the DEIS, Reclamation held three public workshops and three public hearings. (Dates and locations are presented at the beginning of this chapter.) Written and verbal comments were accepted at meetings and written comments were accepted throughout the comment period.

More than 5,000 comments were received, including written comments submitted during the comment period and verbal and written comments submitted at the meetings. Comments were received from elected officials; federal, state, and tribal governments; regional and local governments and agencies; special interest groups, and individuals. These comments were considered during development of the Final EIS.

32.2.3 Release of the Final EIS

A NOA of the Final EIS was placed in the Federal Register according to NEPA requirements and a press release was issued.

32.3 Executive Summary

The Executive Summary of the DEIS has been revised. The revised Executive Summary provides an overview of the SLWRI EIS, including the purpose and need/project objectives, project description, regulatory requirements, environmental consequences/environmental impacts, and the proposed environmental commitments/mitigation measures. The revised Executive Summary is presented at the beginning of this Final EIS.

32.4 Preferred Alternative and Rationale for Selection

NEPA guidelines (Title 40, Code of Federal Regulations (CFR) Section 1502.14(e) (40 CFR 1502.14(e))) require that the DEIS “identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.” The preferred alternative is the alternative which is believed to fulfill Reclamation’s statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors (CEQ 1981).

A plan recommending Federal action should be the plan that best addresses the targeted water resources problems considering public benefits relative to costs.

It is recognized that most of the activities pursued by the Federal Government will require assessing trade-offs by decision makers and that in many cases, the final decision will require judgment regarding the appropriate extent of monetized and nonmonetized effects.

NEPA CEQ Regulations require the identification of the alternative or alternatives that are environmentally preferable in the Record of Decision (ROD) (40 CFR 1505.2(b)). The environmentally preferable alternative generally refers to the alternative that would result in the fewest adverse effects to the biological and physical environment. It is also the alternative that would best protect, preserve, and enhance historic, cultural, and natural resources. Although this environmentally preferable alternative must be identified in the ROD, it need not be selected for implementation. For the purposes of NEPA, an environmentally preferable alternative will be identified in the ROD associated with this EIS.

The preferred alternative has been identified in this Final EIS in consideration of public, stakeholder, and agency comments on the DEIS. The alternative recommended for implementation may or may not be identified as the "Environmentally Preferable Alternative" consistent with NEPA, the "Least Environmentally Damaging Practicable Alternative" consistent with the CWA, and the "Environmentally Superior Alternative" consistent with CEQA.

Consistent with the above CEQ Regulations and NEPA guidelines, the preferred alternative for implementation has been identified in this Final EIS, as described in the following section.

32.4.1 Preferred Alternative

Each of the action alternatives – CP1, CP2, CP3, CP4, CP4A, and CP5 – includes enlarging Shasta Dam and Reservoir and a variety of management measures to address, in varying degrees, all of the project objectives. The major benefits of the action alternatives are summarized in Table 2-25, and the impacts and mitigation measures are summarized in Table S-3. The cost estimates are presented in the Engineering Summary Appendix, Attachment 1, "Cost Estimates for Comprehensive Plans."

In the action alternatives, dam raises of three different heights were evaluated – 6.5 feet, 12.5 feet, and 18.5 feet. While all action alternatives provide primary and secondary project benefits (to varying degrees), the overall benefits of an 18.5-foot raise (CP3, CP4, CP4A, or CP5) were found to be greater than those of either a 6.5-foot raise (CP1) or 12.5-foot raise (CP2). Therefore, only the 18.5-foot raise action alternatives were retained as possibilities for the preferred alternative. For example, the additional reservoir storage would increase from 256,000 acre-feet with the 6.5-foot raise to 634,000 acre-feet with the 18.5-foot raise – nearly 2.5 times the additional reservoir storage of the 6.5-foot raise for between 15-25 percent greater construction costs. This additional reservoir

storage space would support both water supply reliability and fisheries objectives.

Reservoir operations and the resulting benefits were the differentiators amongst the 18.5-foot raise action alternatives (CP3, CP4, CP4A, or CP5). For example, CP3 would maximize agricultural water supply reliability, but would be the least beneficial to fisheries of the 18.5-foot raises. CP4 would provide the best opportunity to address anadromous fish survival in the upper Sacramento River; however, CP4 would provide the lowest benefits to water supply reliability.

Below is a summary of each action alternative weighed by Reclamation during the selection of a preferred alternative.

- CP1, formulated to address both anadromous fish survival and water supply reliability, would result in the lowest benefits of all of the action alternatives. Greater project benefits should be realized with higher dam raises for relatively low increases in costs. Therefore, CP1 was not selected as the preferred alternative.

- CP2, formulated to address both anadromous fish survival and water supply reliability, would have relatively low benefits when compared to the other action alternatives. Greater project benefits should be realized with higher dam raises for relatively low increases in costs. Therefore, CP2 was not selected as the preferred alternative.

- CP3, formulated to address both agricultural water supply reliability and anadromous fish survival, would greatly increase agricultural water supply reliability. However, CP3 would have no M&I water supply benefits and very low anadromous fish survival benefits when compared to the other 18.5-foot raises. Therefore, CP3 was not selected as the preferred alternative.

- CP5, formulated as a combination plan focusing on all objectives, would greatly increase water supply reliability. However, CP5 would have relatively low increased anadromous fish survival benefits in comparison with all other 18.5-foot raises. Therefore, CP5 was not selected as the preferred alternative.

- CP4, formulated to focus on anadromous fish survival while increasing water supply reliability, would have the highest increase in anadromous fish survival of all of the alternatives, and the lowest increase in water supply reliability (equal to CP1) compared to all of the considered alternatives (equal to CP1). CP4 would not best meet both of the primary objectives; water supply reliability would be compromised for increased anadromous fish survival. Therefore, CP4 was not selected as the preferred alternative. However, the evaluation of CP4 did indicate that refinements of operations could be made to optimize the amount of

water supply targeted for anadromous fish survival and water supply reliability such that both primary objectives could be substantially achieved with an 18.5-foot raise. This evaluation provided the impetus for Reclamation to develop CP4A, which performs better at simultaneously meeting both the anadromous fish survival and water reliability primary objectives.

CP4A would best balance and meet both of the primary objectives. CP4A, formulated to address both anadromous fish survival and water supply reliability, would provide relatively high increases in water supply reliability (equal to CP2) and the second highest increase in anadromous fish survival of all of the alternatives. CP4A would have the ability to meet the secondary project objectives, which were considered to the extent possible through pursuit of the primary project objectives. Secondary objectives include ecosystem enhancement, flood damage reduction, improved Delta water quality, increased hydropower generation and increased recreation. As an 18.5-foot raise, CP4A would best maximize benefits relative to costs. For these reasons, CP4A is the preferred alternative.

32.5 Consultation and Coordination

Chapter 27 of the EIS provides a description of all consultation and coordination that occurred during development of the SLWRI EIS.

32.6 Document Availability and Distribution

This section describes where the Final EIS is available for viewing by the public, and a list of agencies and individuals who received a copy of the Final EIS or a notice of its availability.

32.6.1 Document Availability

Hard copies of this document are available to view at the libraries and Federal and State Agency offices listed below. An electronic version of the document can be viewed on Reclamation's SLWRI Web site: http://www.usbr.gov/mp/slwri.

To request an electronic copy on compact disk of the Final EIS, please contact the Lead Agency representative:

Katrina Chow, Project Manager
Bureau of Reclamation, Planning Division
2800 Cottage Way
Sacramento, California 95825-1893
Email: BOR-MPR-SLWRI@usbr.gov
Fax: 916-978-5094

Libraries and Federal and State Agencies

Hard copies of the Final EIS are available for public viewing at the libraries and Federal and State agencies at the following locations:

U.S. Department of the Interior, Bureau of Reclamation Library
2800 Cottage Way
Sacramento, California 95825

Bureau of Reclamation, Northern California Area Office
16349 Shasta Dam Boulevard
Shasta Lake, CA 96019

U.S. Department of the Interior, Natural Resources Library
1849 C Street NW, Main Interior Building
Washington, D.C., 20240

Dunsmuir Branch Library
5714 Dunsmuir Avenue
Dunsmuir, California 96025

Shasta County Public Library,
Redding Library
1100 Parkview Avenue
Redding, California 96001

Kern County Library,
Holloway-Gonzales Branch
506 East Brundage Lane
Bakersfield, California 93307

Concord Library
2900 Salvio Street
Concord, California 94519

Los Banos Public Library
1312 South 7th Street
Los Banos, California 93635

Napa City-County Library
580 Coombs Stree
Napa, California 94559

Web Site

An electronic version of this Final EIS is available on Reclamation's Web site: http://www.usbr.gov/mp/slwri.

32.6.2 Distribution List

Elected officials and representatives, government agencies, private organizations, businesses, and individual members of the public have received a copy of this Final EIS or a notification of document availability. This section presents the distribution list of the Final EIS.

Federal Agencies

- U.S. Army Corps of Engineers
- U.S. Department of Interior, Fish and Wildlife Service
- U.S. Department of Interior, Bureau of Indian Affairs
- U.S. Department of Interior, Bureau of Land Management
- U.S. Department of Agriculture, Forest Service
- U.S. Department of Commerce, National Marine Fisheries Service
- U.S. Environmental Protection Agency

State Agencies

- California Water Commission
- California Department of Boating and Waterways
- California Department of Conservation
- California Department of Education
- California Department of Fish and Wildlife
- California Department of Public Health
- California Department of Parks and Recreation
- California Department of Toxic Substances Control
- California Department of Transportation
- California Department of Water Resources
- California Department of Food and Agriculture
- California Department of Forestry and Fire Protection
- California Environmental Protection Agency

- California Highway Patrol
- California Air Resources Board
- California Central Valley Flood Protection Board
- Central Valley Regional Water Quality Control Board
- California Governor's Office of Planning and Research
- State Water Resources Control Board
- California Energy Commission
- Delta Protection Commission
- Delta Stewardship Council
- Native American Heritage Commission
- State Lands Commission
- Office of Historic Preservation

Regional and Local Entities

- Shasta County
- Tehama County
- Siskiyou County
- Trinity County
- Shasta County Air Quality Management District
- Tehama County Air Quality Management District
- City of Anderson
- City of Corning
- City of Dunsmuir
- City of Mount Shasta
- City of Redding
- City of Red Bluff

- City of Shasta Lake

Federally Recognized Tribes

- Grindstone Indian Rancheria
- Paskenta Band of Nomlaki Indians
- Pit River Environmental Council
- Pit River Tribe of California
- Redding Rancheria

Other Interested Parties

- More than 250 non-governmental organizations representing environmental, agricultural, business, tribal, and related interests
- More than 50 water districts, irrigation districts, other water purveyors, and related utilities
- More than 50 media outlets
- More than 180 private business interests
- More than 1,000 individuals, including reservoir area property owners

32.7 Next Steps

Reclamation posted the Final EIS at http://www.usbr.gov/mp/slwri for public review and issued a notice in the Federal Register and press release describing the public release of the Final EIS. Also, elected officials and representatives, government agencies, private organizations, businesses, and individual members of the public on the mailing list have received a copy of this document or a notification of document availability.

The Final EIS and Final Feasibility Report will be used together to support the Federal decision. Typically a ROD is the final step in the NEPA process and would document any decision on which actions, if any, to take to address the primary objectives.

The Final EIS, Final Feasibility Report, and supporting documents will be submitted by the Commissioner of Reclamation to the Secretary of the Interior. After review by the Office of Management and Budget, in accordance with Executive Order 12322, the Secretary will transmit a Final EIS and Final Feasibility Report to the U.S. Congress to determine the type and extent of Federal interest in enlarging Shasta Dam and Reservoir if a plan is recommended for implementation. The proposed project would be considered

for authorization by Congress and, if authorized, a separate appropriation authorization would be required. The project would be considered for inclusion in the President's budget based on (1) national priorities, (2) magnitude of the Federal commitment, (3) level of local support, (4) willingness of the non-Federal sponsor to fund its share of the project costs, and (5) budgetary constraints that may exist at the time of construction.

32.8 References

Council on Environmental Quality. 2009 (December). Draft Proposed National Objectives, Principles, and Standards for Water and Related Resources Implementation Studies. Executive Office of the President. Washington, D.C.

Council on Environmental Quality. 1981 (March). NEPA's Forty Most Asked Questions. Available: < http://ceq.hss.doe.gov/nepa/regs/40/40p3.htm>. Accessed March 15, 2014.

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Chapter 33
Public Comments and Responses

This chapter contains the comments received on the Draft Environmental Impact Statement (DEIS), and responses to those comments. More than 660 letters and 5,000 comments were received. Section 33.1 describes the format of the responses to comments. Section 33.2 presents a summary of the comments. Section 33.3 comprises of the Master Comment Responses (MCR). Section 33.4 contains a complete list of all agencies, organizations, and individuals who commented on the DEIS. Sections 33.5 through 33.13 present the written comment letters and e-mails received on the DEIS, as well as the responses, as follows:

- Section 33.5, Comments from Elected Officials and Responses
- Section 33.6, Comments from Federal Agencies and Responses
- Section 33.7, Comments from Tribes and Responses
- Section 33.8, Comments from State Agencies and Responses
- Section 33.9, Comments from Regional and Local Governments and Agencies and Responses
- Section 33.10, Comments from Special Interest Groups and Responses
- Section 33.11, Comments from Individuals and Responses
- Section 33.12, Comments from Public Hearings and Responses
- Section 33.13, Comments submitted after deadline

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33.1 Format of Comments and Responses

The order of the comments and responses is as listed above. Each comment in the comment letters was assigned a number, in sequential order (note that some letters may have more than one comment). The numbers were then combined with an abbreviation for each commenting entity. Responses to the comments follow the comment letter, and are also numbered, corresponding to the numbers assigned to comments in the letter.

Written responses are to describe the disposition of any significant environmental issues raised (e.g., revisions to the proposed project to mitigate anticipated impacts or objections) and provide a good faith, reasoned analysis in response. The range of responses includes clarifying the analysis in the DEIS, making factual corrections, pointing to sections of the Environmental Impact Statement (EIS) where the comment is addressed, explaining why certain comments do not warrant further response, or acknowledging the comment for consideration by the decision-making bodies. Comments that present opinions about the program unrelated to environmental issues or that raise issues unrelated either to the substance of the DEIS, or to environmental issues, are generally noted without a response. The National Environmental Policy Act (NEPA) lead agency is directed to "assess and consider comments, both individually and collectively" (Title 40, Code of Federal Regulations (CFR) Section 1503.4 (a) (40 CFR 1503.4(a))) and prepare a response to these concerns expressed during the comment period.

No comments were received on the DEIS that resulted in any new impacts, required new mitigation, required consideration of new alternatives, or resulted in any other substantial changes to the DEIS. Changes made to the DEIS in response to comments were limited to minor corrections of errors and omissions. This Final EIS meets NEPA requirements for responding to comments.

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33.2 Summary of Comments

U.S. Department of the Interior, Bureau of Reclamation (Reclamation) received more than 660 letters commenting on the DEIS from elected officials, Federal agencies, tribes, State of California (State) agencies, regional and local governments, special interest groups, and individuals. The comment letters contain more than 5,000 individual comments. Additionally, several duplicate form letters and duplicate comment letters were received. Those letters can be viewed in the Duplicate DEIS Public Comments Appendix to Final EIS.

In all cases, the comments and responses have not resulted in new environmental impacts or a substantial increase in the severity of an environmental impact, or create a feasible project alternative or mitigation measure that would clearly lessen environmental impacts. The comments and responses also have not changed the analysis or conclusions of the DEIS.

Key issue areas in comments include the following, each of which is addressed in MCRs:

- NEPA Compliance
- Air Quality
- Noise and Vibration
- Flood Management
- Road and Bridge Relocations
- Relationship to Bay Delta Conservation Plan (BDCP)
- Water Supply Reliability
- U.S. Department of Agriculture, Forest Service (USFS) Cabins
- Downstream Fisheries
- Environmental Impacts
- Technical Analysis
- Climate Change
- California Environmental Quality Act (CEQA) Compliance
- Costs versus Benefits
- Cost Estimates
- Fracking
- Comprehensive Mitigation
- Reservoir Area Hydrology
- Recreation
- Land Use
- Endangered Species Act
- Environmental Justice
- Transportation
- Central Valley Project Improvement Act (CVPIA)
- Alternatives Development
- Engineering and Design
- Cultural Recourses
- Water Rights
- Wild and Scenic Rivers
- Reservoir Evaporation
- Private Land Acquisition
- Utility Relocations
- Fish Passage
- Regional Economic Impacts
- Water Quality

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33.3 Master Comment Responses

Reclamation as the Federal lead agency under NEPA received more than 660 letters commenting on the DEIS for the Shasta Lake Water Resources Investigation (SLWRI), containing more than 5,000 individual comments. When there is significant public comment, NEPA allows lead agencies to summarize or consolidate responses to similar comments, as long as all substantive issues are represented.

Some comments on the DEIS were made frequently, demonstrating common concerns among those submitting written comments and those speaking at the public hearings. The array of similar comments about particular topics revealed different aspects of common issues. To present responses that address all aspects of these related comments, MCR were prepared for recurrent topics and themes that were raised in a number of comments on the DEIS. The MCRs provide a means of providing a broader context to the response than may be possible when making individual responses. In some cases, an individual comment may be answered by one or more of the MCRs. Note that there are some comment categories below where the numbering sequencing is not continuous. This represents a consolidation of topics during the response development process.

Table 33.3-1. Master Comment Responses by Category

National Environmental Policy Act (NEPA)	
Acronym	**Title**
NEPA-1	Sufficiency of EIS
NEPA-2	Cumulative Impacts
California Environmental Quality Act (CEQA)	
Acronym	**Title**
CEQA-1	CEQA Compliance
CEQA-2	CEQA Mitigation
Purpose and Need	
Acronym	**Title**
P&N-1	Purpose and Need and Objectives
Range of Alternatives	
Acronym	**Title**
ALTR-1	Range of Alternatives – General
Alternatives Development	
Acronym	**Title**
ALTD-1	Alternative Development – Water Supply Reliability
ALTD-2	Alternative Development – Anadromous Fish Survival

Table 33.3-1. Master Comment Responses by Category (contd.)

Alternative Selection	
Acronym	**Title**
ALTS-1	Alternative Selection
Air Quality and Climate Change	
Acronym	**Title**
AQ-1	Offsetting Greenhouse Gas Emissions with Increased Hydropower
AQ-2	Loss of Carbon Sequestration and Carbon Sequestration Potential
AQ-3	Potential for Greenhouse Gas Emissions Generated by the Decomposition of Soil and Vegetative Material in the Expanded Reservoir
AQ-4	Greenhouse Gas Emissions Associated with Cement Production
Costs vs. Benefits	
Acronym	**Title**
COST/BEN-1	Intent of EIS and Process to Determine Federal Interest
COST/BEN-2	Comments Related to the SLWRI Feasibility Report
COST/BEN-3	Increased Water Supply Reliability under Action Alternatives
COST/BEN-4	Non-monetary Benefits of Action Alternatives
COST/BEN-5	Potential Project Financing
Engineering and Design	
Acronym	**Title**
ENG-2	Borrow Materials
General	
Acronym	**Title**
GEN-1	Comment Included as Part of the Record
GEN-2	Unsubstantiated Information
GEN-4	Best Available Information
GEN-5	Some People Support Dam Raise and Others Oppose Dam Raise
GEN-7	Rules and Regulations for Water Operations under Action Alternatives
GEN-8	Public Outreach and Involvement
COMMENTPERIOD-1	Comment Period
MAILINGLIST-1	Addition to the Mailing List
Noise and Vibration	
Acronym	**Title**
NOISE-1	Traffic Noise Analysis
NOISE-2	Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors
Cost Estimates	
Acronym	**Title**
COSTEST-1	Development of Cost Estimates
COSTEST-3	Costs for Marina Relocations
COSTEST-4	Procurement and Construction Contract Requirements

Table 33.3-1. Master Comment Responses by Category (contd.)

Cultural Resources	
Acronym	**Title**
CR-1	Potential Effects to Cultural Resources
CR-2	Federal Recognition
CR-3	Current Effects to Cultural Resources
CR-5	Environmental Justice
CR-6	United Nations Declaration on "The Rights of Indigenous Peoples"
CR-8	Native American Connection to Salmon
CR-11	Cultural Resources and NEPA
CR-12	Cultural Resources and CEQA
CR-13	Native American Graves Protection and Repatriation Act Process
CR-15	National Historic Preservation Act Section 106 Consultations
Flood Management	
Acronym	**Title**
FM-6	Effects to Downstream Flooding
Fracking	
Acronym	**Title**
FRACK-1	Water Supply Used for Fracking
Road and Bridge Relocations	
Acronym	**Title**
RBR-1	Access Across Shasta Dam
RBR-2	Reduced Public Access Around Shasta Lake
Water Rights	
Acronym	**Title**
WR-1	Water Rights
Comprehensive Mitigation	
Acronym	**Title**
CMS-1	EIS Mitigation Plan
McCloud River Public Resource Code/Fed W&S Eligibility	
Acronym	**Title**
WASR-1	Eligibility of the McCloud River as a Federal Wild and Scenic River
WASR-3	The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River
WASR-4	CRMP's Responsibilities to Maintain the Outstandingly Remarkable Values of the McCloud River
WASR-6	Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542
WASR-8	Effects to the eligibility of rivers for inclusion in the Federal Wild and Scenic River System
Relationship to BDCP	
Acronym	**Title**
BDCP-1	Relationship of the SLWRI to the Bay Delta Conservation Plan

Table 33.3-1. Master Comment Responses by Category (contd.)

Reservoir Area Hydrology	
Acronym	**Title**
RAH-1	Available Water to Fill an Enlarged Reservoir
RAH-2	Reservoir Surface Area with Reservoir Enlargement
RAH-3	Dry Year Effects to Reservoir Storage
RAH-4	Historic Operations vs. Simulated Operations Used for Alternatives Evaluations
Reservoir Evaporation	
Acronym	**Title**
RE-1	Reservoir Evaporation
Water Supply Reliability Benefits & Beneficiaries	
Acronym	**Title**
WSR-1	Water Supply Demands, Supplies, and Project Benefits
WSR-8	Action Alternatives Don't Meet All Water Demands
WSR-12	Increasing Water Supply Reliability under Action Alternatives
Recreation	
Acronym	**Title**
REC-1	Effects to Recreation at Shasta Lake
REC-2	Ground Surveys for Recreation Facilities
REC-3	Effects to Tourism at Shasta Lake
REC-4	Relocation of Recreation Facilities
REC-5	Relocation of Private Recreation Facilities onto Federal Lands
REC-9	Relationship Between Recreation and Shasta Lake Water Levels
Private Land Acquisition/Relocation	
Acronym	**Title**
PLAR-1	Effects to Private Residences and Businesses
PLAR-9	Maps and Additional Surveys of Private Parcels/Structures
PLAR-11	Inundation Zone/Reservoir Buffer
United States Forest Service (USFS) Cabins	
Acronym	**Title**
FSCABINS-1	USFS Recreational Residence Tract Cabins in Preliminary Draft EIS and Draft EIS
FSCABINS-2	USFS's Authority over Privately Owned Cabins on USFS Lands
FSCABINS-3	Relocation of Privately Owned Cabins on USFS Lands
FSCABINS-5	Comment and Objection Process for Draft USFS Decisions
FSCABINS-8	Inundation Zone/Reservoir Buffer
FSCABINS-9	Structure Surveys for USFS Cabins
Land Use	
Acronym	**Title**
LANDUSE-1	Relocation of Septic Systems and Leach Fields
	Utility Relocations
Acronym	**Title**
UR-1	Effects to Water and Wastewater Infrastructure around Shasta Lake

Table 33.3-1. Master Comment Responses by Category (contd.)

	Downstream Fisheries
Acronym	**Title**
DSFISH-1	SALMOD Model for Sacramento River Chinook Salmon
DSFISH-2	Fisheries Models and Tools
DSFISH-3	Fish Habitat Restoration
DSFISH-4	Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements
DSFISH-5	Fish and Wildlife Coordination Act Report
DSFISH-6	Historic Dam Effects on Fisheries
DSFISH-8	National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions
DSFISH-9	Flow-Related Effects on Fish Species of Concern
DSFISH-10	Methodology for Evaluating Fisheries Effects
Endangered Species Act	
Acronym	**Title**
ESA-1	Compliance with the Endangered Species Act
Fish Passage	
Acronym	**Title**
FISHPASS-1	Fish Passage Above Shasta Dam
Environmental Impacts	
Acronym	**Title**
EI-1	Intent of NEPA Process is to Provide Fair and Full Discussion of Significant Environmental Impacts
EI-2	Potential Impacts to Bank Swallow and Bank Swallow Habitat
EI-3	Botanical Resources Effects Related to Flow Regimes
EI-4	Socioeconomic and Associated Indirect Environmental Effects
EI-7	Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS
Environmental Justice	
Acronym	**Title**
EJ-1	Potential Effects to Disadvantaged Communities
Regional Economic Impacts	
Acronym	**Title**
SOCIOECON-1	Socioeconomic Effects to Shasta Lake Vicinity
SOCIOECON-2	Effects on Short-term and Long-term Employment
Technical Analysis	
Acronym	**Title**
TA-1	Interrelationship Between Shasta Dam Operations, San Joaquin River Flows, and Delta Exports
Transportation	
Acronym	**Title**
TRANS-1	Potential Construction-Related Effects to Roadways and Traffic Congestion

Table 33.3-1. Master Comment Responses by Category (contd.)

Water Quality	
Acronym	**Title**
WQ-1	Remediation of Abandoned Mines in the Shasta Lake Area
Climate Change	
Acronym	**Title**
CC-1	Climate Change Uncertainty and Related Evaluations
CC-2	Climate Change Projections
CVPIA	
Acronym	**Title**
CVPIA-1	Central Valley Project Improvement Act Firm Level 2 and Incremental Level 4 Refuge Water Supplies

33.3.1 Master Comment Responses for NEPA

NEPA-1 – Sufficiency of EIS

Some commenters stated that the SLWRI DEIS is incomplete, deficient, or has substantial flaws and that Reclamation must prepare and recirculate a legally adequate EIS/Environmental Impact Report (EIR). Many of these comments were summary statements at the end of a comment letter or comment topic. If the comments, before the summary statement, contained specific information (e.g., relating to the range of alternatives), these comment are addressed either as an individual response and/or other by other Master Comment Responses. However, as to the general statement that the DEIS is incomplete, deficient, or has substantial flaws and that Reclamation must prepare and recirculate a legally adequate feasibility study and EIS/EIR, the response to these general comments is provided below. For information regarding CEQA sufficiency, please see Master Comment Response CEQA-1, "CEQA Compliance."

A draft EIS must satisfy to the fullest extent possible the requirements for a final EIS established in NEPA Section 102(2)(C). NEPA Section 102(2)(C) states "…all agencies of the Federal Government shall include in every recommendation or report on proposal for legislation and other major Federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on i) the environment impact of the proposed action, ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, iii) alternatives to the proposed action, iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." In addition, 40 CFR 1502.1, the NEPA regulations state that "[An EIS] shall provide a full and fair discussion of significant environmental impacts and shall inform decision makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." In 40 CFR 1508.8(a,b), "Effects" are defined as "Direct effects, which are caused by the action and occur at the same time and place. Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."

The SLWRI Final EIS satisfies NEPA, to the fullest extent possible, by providing a meaningful analysis of all issues relevant to the human

environment. This includes a full and fair discussion of significant environmental impacts, including reasonably foreseeable direct and indirect effects, (DEIS Chapters 4 through 25), those impacts which cannot be avoided (Chapter 26, "Other Required Disclosures"), a reasonable range of alternatives (Chapter 2, "Alternatives"), the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity and irreversible and irretrievable commitments of resources which would be involved in the proposed action (Chapter 26, "Other Required Disclosures"). See also Master Comment Response EI-1, "Intent of NEPA Process is to Provide Fair and Full Discussion of Significant Environmental Impacts."

In 40 CFR 1503.4(a), the NEPA regulations state "An agency preparing a final environmental impact statement shall assess and consider comments both individually and collectively, and shall respond by one or more of the means listed below, stating its response in the final statement. Possible responses are to: 1) modify alternatives including the proposed action, 2) develop and evaluate alternatives not previously given serious consideration by the agency, 3) supplement, improve, or modify its analyses, 4) make factual corrections, 5) explain why the comments do not warrant further agency response, citing the sources, authorities, or reasons which support the agency's position and, if appropriate, indicate those circumstances which would trigger agency reappraisal or further response."

The Final EIS responded to each comment submitted to Reclamation during the public comment period on the DEIS. These responses describe how a reasonable range of alternatives were developed for SLWRI (alternative development (water supply reliability and anadromous fish survival) (ALTD-1 and ALTD-2), purpose and need and objectives (P&N-1), range of alternatives (ALTR-1), and alternative selection (ALTS-1)). Factual corrections and clarifying language has been added to the Final EIS in response to comments, but no significant changes in effects or in the proposed action have been made, nor has significant new information or changes in circumstances been brought to light by commenters.

Reclamation has clarified that it is tiering to the CALFED Bay-Delta Program (CALFED) Programmatic Environmental Impact Statement/Environmental Impact Report (PEIS/R). Reclamation, a CALFED agency, is conducting the SLWRI in furtherance of and consistent with the 2000 CALFED Programmatic Record of Decision (ROD), and considered the CALFED PEIS/R process and effects analysis in developing the SLWRI DEIS (and now the Final EIS). In the DEIS, the alternatives screening criteria reflected decisions documented in the CALFED Programmatic ROD, implicitly relying on those priorities to set the bounds of the SLWRI analysis. The Final EIS now

explicitly clarifies that the CALFED Final PEIS/R formed some of the basis for developing the set of alternatives that were analyzed in the DEIS.

Although conditions have changed since the CALFED Programmatic ROD was issued in July 2000, the Bay-Delta problems for which the alternatives were formulated persist today. The purpose of CALFED was to develop and implement a long-term comprehensive plan that would restore ecological health and improve water management for beneficial uses of the Bay-Delta system. The goal of CALFED was to concurrently and comprehensively address problems of the Bay-Delta system within four critical resource categories: ecosystem quality, water quality, water supply reliability, and levee system integrity. Although conditions have changed in the system since 2000 and progress has been made towards the CALFED goals, the fundamental needs for which the CALFED alternatives were formulated to address are still relevant today. For example, unreliable water supply, declining fish and wildlife habitat, continuing water quality issues, and the levee system are still key concerns for the Bay-Delta system. Accordingly, there is no new information or substantially changed circumstances that require Reclamation to revisit the CALFED alternatives as the alternatives, analyses, and recommended actions remain relevant today.

For that reason, tiering to the CALFED PEIS/R does not alter the effects of the alternatives considered in this analysis nor does it change any information needed by a decision-maker to make a decision, it simply more clearly shows the connection between the CALFED Programmatic ROD and the current SLWRI analysis. Although the California State Court of Appeals questioned the validity of the CALFED PEIS/R and, thus, the CALFED agencies' ability to rely on it, the California Supreme Court ultimately upheld the validity of the CALFED PEIS/R and Programmatic ROD. *See In re Bay-Delta Programmatic Envtl. Impact Report Coordinated Proceedings*, 184 P.3d 709 (Cal. 2008). All challenges to the validity of the CALFED PEIS/R and Programmatic ROD in Federal court were dismissed. Consequently, there are no legal impediments to Reclamation relying on and tiering to the CALFED PEIS/R.

Section 1502.9 of the Council on Environmental Quality (CEQ) regulations states that an EIS must be supplemented if "(i) The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or (ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." The clarification that Reclamation is tiering to the CALFED PEIS/R is not a substantial change to the proposed action, and it does not affect the environmental consequences or concerns raised by the proposed action.

As discussed in Chapter 2, "Alternatives," Section 2.1.6 "Development and Refinement of Comprehensive Plans," a refined operation scenario, CP4A, was developed for the Final EIS based on comment on the DEIS for the anadromous fish focused plan.

The CEQ's "Forty Questions," explains that an alternative which is a minor variation on one of the alternatives discussed in the DEIS should be developed and evaluated, if it is reasonable, in the EIS. The CEQ's "Forty Questions," goes on to state "If it [the new alternative] is qualitatively within the spectrum of alternatives that were discussed in the draft, a supplemental draft will not be needed." And, "[t]he agency will fulfill its obligation by addressing that alternative in the final EIS."

The evaluation of CP4 indicated that refinements of operations could be made to optimize the amount of water supply targeted for anadromous fish survival and water supply reliability such that both primary objectives could be substantially achieved with a 18.5-foot raise. This evaluation provided the impetus for Reclamation to develop CP4A which performs better at simultaneously meeting both the anadromous fish survival and water reliability primary objectives.

As with CP1, CP2, CP3, CP4 and CP5, the affected environment and potential environmental consequences (short- and long-term impacts, direct and indirect impacts, mitigation measures, and cumulative impacts) that could result from implementing CP4A were discussed and evaluated in the Final EIS.

Based on the results of this evaluation, CP4A was determined to be qualitatively within the spectrum of alternatives that were discussed in the DEIS and, since CP4A it is a refined operational scenario for CP4, it is considered a minor variation. Therefore, Reclamation has fulfilled its obligation by addressing CP4A in the Final EIS.

In summary, neither of those changes nor any of the other changes to the Final EIS meet the thresholds set forth in CEQ Regulation 1502.9 for a supplemental statement.

NEPA-2 – Cumulative Impacts

Comments were received relating to the nature and adequacy of the SLWRI cumulative impacts analysis.

This MCR discusses the nature and design of the quantitative and qualitative cumulative impacts analysis conducted to assess impacts of the proposed project in combination with other past, present, and reasonably foreseeable actions occurring in the primary and extended study area. This MCR explains why the cumulative effect analysis in the Final EIS generally is compliant with NEPA.

CEQ regulation defines a cumulative impact as, "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" 40 CFR 1508.7. During the preparation of the SLWRI DEIS, Reclamation carefully considered how to treat various potential future actions and programs consistent with CEQ NEPA Regulation 40 CFR 1508.7. The SLWRI cumulative impacts analysis is intended to account for potential project impacts combined with the impacts of existing facilities, conditions, land uses, and reasonably foreseeable actions expected to occur in the study area on a qualitative or quantitative level.

Actions which are included in the SLWRI cumulative effects analysis quantitatively are those with current authorization, secured funding for design and construction, or environmental permitting and compliance activities that are substantially complete (Chapter 2, "Alternatives," Section 2, "No Action"). Other projects which do not meet those criteria, but may have past, present, or reasonably foreseeable cumulative impacts in combination with the proposed project are included in the cumulative impacts analysis qualitatively. Table 3-1 in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," of the Final EIS lists the projects considered within the impacts analysis quantitatively and qualitatively.

The discussion of cumulative impacts within each resource area (Chapters 4 through 25) focuses on significant and potentially significant cumulative impacts, and mitigation is identified where warranted for cumulative impacts. Quantitative cumulative effects for the No-Action are described in Chapter 2, "Alternatives," Section 2.2, "No-Action Alternative," and in the future with-project conditions for each action alternative. Essentially, the No-Action Alternative includes, in the future condition, those reasonably foreseeable actions that are included in the list of actions for the cumulative impact analysis, as does each of the action alternatives. Therefore, the "Direct and Indirect Effects" impacts assessments for future with-project conditions compared to the No-Action Alternative in each resource area chapter also serves as a quantitative cumulative impact assessment for each impact described, describing the incremental affect associated with the action alternatives. Clarifying text has been added to Chapters 3 through 25 to reflect this correlation.

Additionally, for the Final EIS, the No-Action/No-Project Alternative is based on Central Valley Project (CVP) and State Water Project (SWP) operational conditions described in the Reclamation 2008 Biological

Assessment on the Continued Long-Term Operations of the CVP and SWP (2008 Long-Term Operation BA), and the Biological Opinions (BO) issued by U.S. Department of the Interior, Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) in 2008 and 2009, respectively. The No-Action Alternative also includes key projects assumed to be in place and operating in the future, including the Freeport Regional Water Project, Delta Water Supply Project, South Bay Aqueduct Improvement and Enlargement Project, a functional equivalent of the Vernalis Adaptive Management Plan, full Restoration Flows under the San Joaquin River Restoration Program, and full implementation of the Grassland Bypass Project. Table 2-1 of the Modeling Appendix describes the existing condition, and shows which actions were assumed to be part of the future condition (or No-Action /No-Project Alternative) in the SLWRI 2012 Version CalSim-II model.

Cumulative impacts are also addressed qualitatively in the "Cumulative Effects" section of each resource area chapter to assess if potentially significant effects to a particular resource could exist due to a broader range of past, present, and reasonably foreseeable actions. The qualitative cumulative effects analysis in each resource area chapter considers the actions listed as qualitative in Table 3-1 in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences."

Finally, and in compliance with Section 1502.20 of the CEQ regulations that implement NEPA, the analysis of cumulative effects tiers to the CALFED Final PEIS/R and the Programmatic ROD issued August 28, 2000. The analysis and assumptions in the CALFED Final PEIS/R and Programmatic ROD are applicable to SLWRI cumulative analysis. First, the analysis of cumulative impacts in the CALFED Final PEIS/R considered the long-term environmental impacts of the CALFED Preferred Program Alternative and alternatives, including those that would be less than significant, together with similar impacts of other projects. The CALFED Final PEIS/R and Programmatic ROD evaluated, at a programmatic level, five surface water storage projects to be pursued with project specific studies. These studies included Shasta Lake Enlargement, Los Vaqueros Reservoir Enlargement, Sites Reservoir, In-Delta Storage, and development of storage in the upper San Joaquin River Basin. The CALFED PEIS/R analysis of cumulative effects describes the effects of these storage projects with past, present, and reasonably foreseeable projects in the Delta region, Bay region, Sacramento River region, San Joaquin River region, and other SWP and CVP service areas. To that point, storage projects (e.g., Los Vaqueros Reservoir Enlargement) have proceeded as described in the CALFED Final PEIS/R while no other large storage projects have been implemented that were not described in the CALFED analysis. Second,

because CALFED actions affected a large geographic area over a 30-year time frame, this analysis of cumulative impacts, growth inducement, and area-wide impacts assessment builds upon the CALFED PEIS/R analysis of cumulative effects to include an updated analysis of reasonably foreseeable projects, recent and relevant BOs, and more specific information about the potential for the action alternatives to cause wide-ranging effects.

33.3.2 Master Comment Responses for CEQA

CEQA-1 – CEQA Compliance

Both NEPA's implementing regulations (40 CFR 1506.2) and CEQA Guidelines (Sections 15220 to 15229) encourage the development of joint NEPA/CEQA documents to the extent possible to reduce duplication, provide for better coordination and reduce resource needs. In California, many water resources development project sponsors prepare joint NEPA/CEQA documents with either Reclamation or U.S. Army Corps of Engineers (USACE) being the lead federal agency and the California Department of Water Resources (DWR) or local water agencies being the CEQA Lead Agency. During the preparation of the DEIS it was assumed that a State CEQA Lead Agency would be identified.

DEIS Chapter 1, "Introduction," states that "This document has also been prepared in accordance with the California Environmental Quality Act (CEQA) and could be used by State of California (State) permitting agencies that would be involved in reviewing and approving the project" (Page 1-1). However, at the time of publishing of the DEIS, a CEQA Lead Agency had not been identified. The CEQA Guidelines outline the process to determine the appropriate State Lead Agency in Section 15050-15053. In addition, CEQA Section 21067 defines the Lead Agency as the "public agency which has the principal responsibly for carrying out or approving a project which may have a significant effect upon the environment." Reclamation will be carrying out the "project" and at this time, it is not certain if there will be State or local agency approvals or funding involved in implementation.

As pointed out by several commenters, the DEIS, and possibly the Final EIS, may not be sufficient to serve as a Draft EIR (DEIR) for CEQA purposes and would require scrutiny by any State CEQA Lead Agency before release to the public as a DEIR. Section 15221 of the CEQA Guidelines states that when a NEPA document is ready before the CEQA document, the State Lead agency shall evaluate the NEPA document for CEQA compliance and augment the CEQA document with CEQA specific analysis, as necessary. The State Lead Agency, assuming one is identified in the future, would evaluate the legal sufficiency of all aspects of the document including range of

alternatives, impact assessments, mitigation measures, identification of an environmentally superior alternative, and effects to State protected resources including state-listed endangered and threatened species. For example, the EIS identifies impacts related to the California Public Resource Code Section 5093.542 which states that the wild trout fishery of the lower McCloud River should be protected and its free-flowing conditions should be maintained as described in Chapter 25, "Wild and Scenic River Considerations for McCloud River." Implementation of action alternatives described in the EIS would affect the wild trout fishery and free-flowing condition of up to an additional 3,550 feet of the lower McCloud River by inundating a portion of the lower McCloud River as identified in the California Public Resources Code, Section 5093.542. As more fully described in Master Comment Response WASR-6, "Protections of the Lower McCloud River as identified in the California Public Resources Code, Section 5093.542," NEPA obligates the Federal agency to disclose the consequences of the Federal action, which can include consideration of alternatives that may be inconsistent with existing State or Federal law.

Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," also addresses the participation of state agencies with regards to the feasibility of enlargement of Shasta Dam.

Any CEQA process related to the SLWRI would require a Notice of Preparation and scoping process, consultation with State and local Responsible Agencies, identification of an Environmentally Superior Alternative, and public circulation of a DEIR in accordance with CEQA. Reclamation, as a federal agency evaluating a major Federal action, is not subject to CEQA and has no standing under California law to be the State CEQA Lead Agency. It is assumed that any CEQA Lead Agency would consider the scope of its reliance on the Final EIS for CEQA purposes. Reclamation is not making any judgment on the legal adequacy of the DEIS for CEQA compliance. Nor is Reclamation speculating on whether a State Lead Agency under CEQA will be identified, or what State or local agency might become the State Lead Agency.

Text has been revised in the Final EIS to further clarify that the document is not being published as a fully CEQA-compliant document.

CEQA-2 – CEQA Mitigation

Several commenters stated that some of the mitigation measures are vague, do not include performance measures or other standards that allow the reader to gauge the adequacy of mitigation, and defer any detail to future documents. In addition, there are comments that state that the failure to identify mitigation measures violates CEQA.

Under CEQA, mitigation includes avoiding, minimizing, rectifying, reducing over time, or compensating for an impact (Title 14, California Code of Regulations (CCR) Section 15370 (14 CCR 15370)). An EIR must describe feasible mitigation measures for significant adverse impacts (14 CCR 15126.4(a)(1)), and the agency must adopt mitigation measures or alternatives to substantially lessen the significant effect, if feasible, before approving the project (California Public Resource Code Sections 21002 and 21002.1).

NEPA defines mitigation in a similar way as CEQA (40 CFR 1508.20). If an agency does not adopt feasible mitigation measures in an EIS, it must justify its decision. If it does adopt mitigation measures, then it must put in place a mitigation monitoring and enforcement program and, where applicable, that program should be summarized in the ROD (40 CFR 1505.2(c)). The DEIS provided a discussion of reasonable and appropriate mitigation for identified impacts as required by NEPA and consistent with CEQA.

As stated in Master Comment Response CEQA-1, "CEQA Compliance," the State Lead Agency, assuming one is identified in the future, would evaluate the legal sufficiency of all aspects of the document for CEQA compliance, including the adequacy of mitigation measures. For additional information on the comprehensive mitigation strategy, see Master Comment Response CMS-1, "EIS Mitigation Plan."

33.3.3 Master Comment Response for Purpose and Need

P&N-1 – Purpose and Need and Objectives

Comments were received during the public comment period related to the SLWRI purpose and need and objectives and included suggested changes to the SLWRI purpose and need statement and/or objectives. In addition to the discussion below, please see Master Comment Response ALTR-1, "Range of Alternatives," which describes NEPA requirements for alternatives development, the relationship of SLWRI to CALFED, and development of the SLWRI alternatives. Also, please see Master Comment Responses ALTD-1, "Alternative Development – Water Supply Reliability," and Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," related to measures considered during the plan formulation process to address water supply reliability and anadromous fish survival; and Master Comment Response ALTS-1 "Alternative Selection" for alternative selection (e.g., identification of the preferred alternative and Clean Water Act Section 404 compliance).

In 40 CFR 1502.13, the NEPA regulations state that an EIS "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action."

The "need" for action is the underlying problem the agency wants to fix or the opportunity to which the agency is responding with the action. The "purpose" is the goals or objectives that the agency is trying to achieve (Reclamation 2012).

Generally, Federal [a]gencies enjoy "considerable discretion" to define the purpose and need of a project. *Nat'l Parks & Conservation Ass'n (NPCA) v. BLM*, 606 F.3d 1058, 1070 (9th Cir. 2009) (citations omitted). "'[A]n agency cannot define its objectives in unreasonably narrow terms, 'such that 'only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action.'" *Id*. (citations omitted). On the other hand, the purpose and need statement should not be so broad as to require analysis of alternatives that are inconsistent with the project's overarching purpose. *Northwest Ecosystem Alliance v. Rey*, 380 F.Supp.2d (W.D. Wash. 2005). An agency's statement of purpose must be reasonable. *The Protect Our Communities Foundation v. Salazar, 2013 U.S. Dist LEXIS 159281 (S.D. Cal. 2013)*(citing *NPCA*, 606 F.3d at 1070). In *Protect Our Communities*, 2013 U.S. Dist. LEXIS 59281, the district court rejected an argument that a Bureau of Land Management (BLM) purpose and need statement was too narrow because it focused on the goal of building a wind generation facility, as opposed to the broader goal of encouraging renewable energy development.

Chapter 1, "Introduction," Section 1.2, "Purpose and Need/Project Objectives," of the Final EIS defines the purpose and need and the project objectives for the SLWRI. The purpose statement in this Final EIS has been clarified, from the Draft EIS, to state, "*…to improve operational flexibility of the Sacramento-San Joaquin Delta (Delta) watershed system to meet specified primary and secondary project objectives."* The Final EIS Plan Formulation Appendix provides detailed background on the SLWRI study authorization, project need, and project objectives.

Influence of Study Authorization and CALFED Programmatic ROD on Project Purpose and Need and Objectives Development of the SLWRI, particularly the purpose and need and objectives, was conducted consistent with both the Federal authorizations for conducting feasibility studies, and the CALFED Programmatic ROD.

Study Authorization Reclamation was directed to study potential enlargement of Shasta Dam and Reservoir under two separate authorities. Public Law 96-375 (October 3, 1980) provided initial Federal authorization, allowing the U.S. Secretary of the Interior to:

> *…engage in feasibility studies relating to enlarging Shasta Dam and Reservoir, Central Valley Project, California or to the construction of a larger dam on the Sacramento River, California, to replace the present structure.*

Section 103(c), "Authorizations for Federal Activities under Applicable Law," of the CALFED Bay-Delta Authorization Act (Public Law 108-361, October 25, 2004), authorizes the U.S. Secretary of the Interior to carry out the activities described in paragraphs (1) through (10) of Subsection (d), which include:

> *...(1)(A)(i) planning and feasibility studies for projects to be pursued with project-specific study for enlargement of (1) the Shasta Dam in Shasta County.*

Also, Section 103(a)(1) of Public Law 108-361 (October 25, 2004) states:

> *The Record of Decision is approved as a general framework for addressing the CALFED Bay-Delta Program, including its components relating to water storage, ecosystem restoration, water supply reliability (including new firm yield), conveyance, water use efficiency, water quality, water transfers, watersheds, the Environmental Water Account, levee stability, governance, and science.*

CALFED Programmatic ROD Section 103(a)(1) of Public Law 108-361 was the direct result of the CALFED Programmatic ROD, a multi-agency planning process which was begun in 1995 to resolve conflicts between water supply and fish and wildlife resources in the Bay-Delta system. In 2000, the CALFED Final PEIS/R identified a list of twelve potential surface storage projects for consideration. In this document, SLWRI was identified as one of three surface storage projects to be pursued through a project-specific study to expand CVP storage by 300 thousand acre-feet to increase the pool of cold water available to maintain lower Sacramento River temperatures needed by certain fish and provide other water management benefits, such as water supply reliability. The SLWRI's primary and secondary objectives are derivative of those identified in the CALFED Programmatic ROD.

Project Purpose and Need and Objectives

Project Purpose The Project Purpose was revised for clarification in the Final EIS (Chapter 1, "Introduction," Section 1.2.1, "Project Purpose and Objectives") as follows:

> *…to improve operational flexibility of the Sacramento-San Joaquin Delta (Delta) watershed system to meet specified primary and secondary project objectives.*

The Project Purpose statement in the Final EIS was revised to reflect the fact that many measures/alternatives were considered in the plan formulation process other than measures that would modify or raise Shasta Dam. As explained in ALTR-1, "Range of Alternatives – General", the Final EIS was also revised to clarify that Reclamation not only considered the CALFED Final PEIS/R in analyzing the environmental impacts of the SLWRI, but that this EIS tiers to the CALFED Final PEIS/R. These revisions were primarily made in EIS Chapters 1, "Introduction," Chapter 2, "Alternatives," and Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," and in Plan Formulation Appendix Chapter 2, "Management Measures."

The CALFED development process is also fully explained in ALTR-1, "Range of Alternatives – General." In developing the CALFED Final PEIS/R, the CALFED agencies, including Reclamation, evaluated a broad range of water management options (with and without storage) to be implemented to achieve the CALFED goals. Numerous alternatives were considered for improving ecosystem quality and water supply reliability as well as water quality and levee system integrity. Many of those alternatives were rejected through the CALFED process. The CALFED Programmatic ROD (page 6) specifically states that "documents tiering from the CALFED [Final PEIS/R] will not revisit the alternatives that were rejected during CALFED's alternative development process." Additionally, as explained in ALTR-1, "Range of Alternatives - General," Reclamation undertook a derivative, similar process for identifying reasonable alternatives in developing the action alternatives (i.e., comprehensive plans) for the SLWRI. Reclamation evaluated many alternatives, or management measures, beyond simply modifying or raising Shasta Dam. To reflect the much broader range of alternatives considered through the CALFED development process and in the SLWRI plan formulation process, the SLWRI Purpose statement has been revised as described above. Reclamation's purpose and need statement is reasonable and did not foreclose a reasonable range of alternatives.

Objectives On the basis of needs described below, the study authorities, and other pertinent direction, including the August 2000 CALFED Programmatic ROD, primary and secondary planning objectives were developed. The two primary project objectives (also referred to as planning objectives) and five secondary project objectives were developed for the SLWRI are:

- **Primary Project Objectives**

  - Increase the survival of anadromous fish populations in the Sacramento River, primarily upstream from the Red Bluff Pumping Plant (RBPP)

  - Increase water supply and water supply reliability for agricultural, M&I, and environmental purposes, to help meet current and future water demands, with a focus on enlarging Shasta Dam and Reservoir

- **Secondary Project Objectives**

  - Conserve, restore, and enhance ecosystem resources in the Shasta Lake area and along the upper Sacramento River

  - Reduce flood damage along the Sacramento River

  - Develop additional hydropower generation capabilities at Shasta Dam

  - Maintain and increase recreation opportunities at Shasta Lake

  - Maintain or improve water quality conditions in the Sacramento River downstream from Shasta Dam and in the Delta

Primary project objectives are those which specific alternatives are formulated to address. The two primary project objectives are considered to have coequal priority, with each pursued to the maximum practicable extent without adversely affecting the other. Secondary project objectives are considered to the extent possible through pursuit of the primary project objectives.

Some commenters suggest that the Primary Objectives are too narrowly drawn because "the water supply goal includes a 'focus on enlarging Shasta Dam and Reservoir.'" The objective, however, merely recognizes that studying the feasibility of raising Shasta Dam and Reservoir was not only an approved project in the CALFED Programmatic ROD, but authorized by two Federal statutes. If Reclamation did not provide some focus on raising Shasta Dam and Reservoir in the SLWRI plan formulation process, including the Final EIS, one could question Reclamation's authority to conduct the study in the first place. The objective does not state that Reclamation would not consider non-Shasta Dam enlargement alternatives, and nothing in the objective precludes Reclamation from doing so. The objective's focus on Shasta Dam and

Reservoir did not preclude Reclamation from considering other alternatives in the SLWRI plan formulation and alternative development process. As noted above, Reclamation considered numerous alternatives through the CALFED and SLWRI alternatives development processes. The Project's primary objectives are reasonable and did not preclude Reclamation from considering a reasonable range of alternatives.

Project Need As summarized in the Executive Summary and further described in Chapter 1 "Introduction," of the DEIS, the need for the SLWRI is for:

- **Anadromous Fish Survival** – The Sacramento River system supports four separate runs of Chinook salmon: fall-, late fall-, winter-, and spring-run. The adult populations of the four runs of salmon and other important fish species that spawn in the upper Sacramento River have considerably declined over the last 40 years. Several fish species in the upper Sacramento River have been listed under the Federal Endangered Species Act: Sacramento River winter-run Chinook salmon (endangered), Central Valley spring-run Chinook salmon (threatened), Central Valley steelhead (threatened), and the Southern Distinct Population Segment of North American green sturgeon (threatened). Two of these species are also listed under the California Endangered Species Act: Sacramento River winter-run Chinook salmon (endangered) and Central Valley spring-run Chinook salmon (threatened).

  Unsuitable water temperatures in the upper Sacramento River, especially in dry and critical years is a critical factor affecting the abundance of Chinook salmon and steelhead in the river. Water temperatures that are too high or, less commonly, too low, can be detrimental to the various life stages of Chinook salmon. Elevated water temperatures can negatively impact holding and spawning adults, egg viability and incubation, preemergent fry, and rearing juveniles and smolts, significantly diminishing the next generation of returning spawners. Stress caused by high water temperatures also may reduce the resistance of fish to parasites, disease, and pollutants. Releases of cold water from Shasta Reservoir can improve seasonal water temperatures in the Sacramento River downstream from Shasta Dam for anadromous fish during critical periods.

  Various Federal, State, and local projects are addressing factors contributing to declines in anadromous fish populations. Recovery actions range from changing the timing and magnitude of reservoir releases to structural changes at Shasta Dam. Despite these steps, additional actions are needed to

address anadromous fish survival in the upper Sacramento River.

- **Water Supply Reliability** – Demands for water in California exceed available supplies. Reclamation's 2008 Water Supply and Yield Study describes dramatic increases in statewide population, land use changes, regulatory requirements, and limitations on storage and conveyance facilities that have resulted in unmet water demands and subsequent increases in competition for water supplies among urban, agricultural, and environmental uses. The California Department of Water Resources (DWR) California Water Plan Update 2013 concludes that California is facing one of the most significant water crises in its history; drought impacts are growing, and climate change is affecting statewide hydrology. Challenges are greatest during drought years, when water supplies are less available.

  As the population of California grows, and the demand for adequate water supplies becomes more acute, the ability to maintain a healthy and viable industrial and agricultural economy while protecting aquatic species will be increasingly difficult. Compounding these issues, potential effects of climate change, such as changed precipitation patterns, less snowfall, and earlier snowmelt, may considerably increase the demands on available water supplies in the future. As owner and operator of the CVP, one of the largest water storage and conveyance systems in the world, Reclamation has identified the need to increase the reliability of CVP water deliveries to its water contractors, particularly during dry and critical water years. Similar needs and challenges are faced by the SWP and other water projects throughout the State. As one of many efforts to improve the reliability of California's water supply, the SLWRI was established to evaluate the potential to improve water supply reliability, primarily by modifying Shasta Dam and enlarging Shasta Lake.

- **Ecosystem Resources** – The quantity, quality, diversity, and connectivity of riparian, wetland, floodplain, and shaded riverine habitat in the Sacramento River ecosystem have been severely limited through confinement of the river system by levees, reclamation of adjacent lands for farming, bank protection, construction of dams and reservoirs, channel stabilization, and land development. This has contributed to a decline in habitat and native species populations. Ecosystem restoration along the Sacramento River has been the focus of several ongoing programs, including the Senate Bill 1086

Program, CVPIA, CALFED, Central Valley Habitat Joint Venture (CVHJV), and numerous local programs within the Central Valley. Despite these efforts, a significant need remains to conserve and restore ecosystem resources along the Sacramento River.

- **Flood Management** – Communities and agricultural lands in the Central Valley are subject to flooding along the Sacramento River that poses risks to human life, health, safety, and property. Physical impacts from flooding include damage to buildings, contents, automobiles, agricultural crops, and equipment. Threats from flooding are caused by many factors, including overtopping or sudden failures of levees, which can result in deep and rapid flooding with little warning. In addition, urban development in flood-prone areas has exposed the public to the risk of flooding.

- **Hydropower** – Although California is the most energy-efficient state per capita in the Nation, demands for electricity are growing at a rapid pace. Over the next 10 years, California's peak demand for electricity is expected to increase 30 percent, from about 50,000 megawatts (MW) to about 65,000 MW. In addition, Executive Orders S-14-08 and S-21-09, issued in 2008 and 2009, respectively, established a goal of using renewable energy sources, including hydropower, for 33 percent of the State's energy consumption by 2020. To meet renewable energy goals, significant increases in non-dispatchable intermittent renewable resources, such as wind and solar generation, will need to be added to California's power system. This means that other significant flexible generation resources, such as hydropower, will be needed to support and integrate renewable generation.

- **Recreation** – As California's population continues to grow, demands will increase substantially for water-oriented recreation at and near the lakes, reservoirs, streams, and rivers of the Central Valley. Further increases in demand, accompanied by relatively static recreation resources, will cause issues at existing recreation areas. These challenges will be especially pronounced at Shasta Lake, which is one of the most visited recreation destinations in the state and in the region. Even under current levels of demand, USFS, which manages recreation at Shasta Lake, has expressed concern about seasonal capacity problems at existing marinas and USFS facilities. A substantial and increasing need exists to improve recreation-related facilities and conditions at Shasta Lake.

- **Water Quality** – The Sacramento River and the Delta support fish and wildlife while providing water supplies for urban, agricultural, and environmental uses across the state. Saltwater intrusion, municipal discharges, agricultural drainage, and water project flows and diversions have led to water quality issues within the Delta, particularly related to salinity. In the Sacramento River, urban and agricultural runoff, and runoff and seepage from abandoned mining operations, have resulted in elevated levels of pesticides, phosphorous, mercury, and other metals. Additional operational flexibility could provide opportunities to improve Sacramento River and Delta water quality conditions.

33.3.4 Master Comment Response for Range of Alternatives – General

ALTR-1 – Range of Alternatives – General

Comments were received during the public comment period related to the SLWRI range of alternatives analyzed in the DEIS. These comments included suggested changes to SLWRI action alternatives, and the resulting range of alternatives evaluated in the EIS. In addition to the discussion below, please see Master Comment Response P&N-1, "Purpose and Need and Objectives," related to the development of the SLWRI purpose and need and objectives. Also, please see Master Comment Responses ALTD-1, "Alternative Development – Water Supply Reliability" and ALTD-2, "Alternative Development – Anadromous Fish Survival," related to measures considered during the plan formulation process to address water supply reliability and anadromous fish survival; and Master Comment Response ALTS-1, "Alternative Selection," for alternative selection (e.g., identification of the preferred alternative and Clean Water Act Section 404 compliance).

This Master Comment Response first describes the NEPA requirements for alternatives development; the CALFED alternative development process, the SLWRI alternative development process, and a conclusion paragraph summarizing how the range of alternatives meet NEPA requirements.

NEPA Requirements for Alternatives Development NEPA requires that an EIS "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources" (42 U.S. Code (USC) Sec. 4332(2)(E)). NEPA includes provisions that the draft environmental review analyze all reasonable alternatives, including the No-Action Alternative, that meet most of the purpose and need/objectives, and are potentially feasible (40 CFR § 1502.14; 43 CFR § 46.420(b)). Under NEPA, "reasonable" is generally understood to mean those technically and economically feasible project alternatives

that would satisfy the primary objectives of the project defined in the Purpose and Need statement (43 CFR 46.420). The CEQ's "Forty Questions" adds that "Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant.

The "rule of reason" applies to the choice of alternatives as well as the extent to which the EIS must discuss each alternative. *Citizens Against Burlington, Inc. v. Busey,* 938 F.2d 190, 195 (D.C. Cir 1991) (quoting *State of Alaska v. Andrus*, 580 F.2d 465, 475 (D.C. Cir 1978). The Federal Court of Appeal in *Friends of Southeast's Future v. Morrison*, 153 F. 3rd 1059 (9th Cir. 1998) stated that "[w]hen the purpose [of the project] is to accomplish one thing, it makes no sense to consider alternative ways by which another thing might be achieved." Additionally, an agency may eliminate an alternative from detailed discussion in an EIS, but must briefly explain the reason for doing so. 40 CFR 1502.14(a).

Recently, two Federal courts in California upheld the alternatives development process and range of alternatives considered by BLM in approving the construction, operation, and maintenance of two commercial-scale renewable energy projects. In *Protect Our Communities*, 2013 U.S. Dist. LEXIS 159281, the BLM authorized a commercial-scale wind energy project on public land. In developing its alternatives, the BLM considered eighteen potential alternatives, but only six alternatives were developed and evaluated in-detail in the EIS. *Id*. at 14. The five action alternatives all provided for the construction, operation, and maintenance of a wind energy project. *Id*. The BLM provided a short explanation as to why all of the non-wind alternatives were not carried forward and fully analyzed in the EIS. *Id*. at 15. Similarly, in *La Cuna De Aztlan Sacred Sites Protection Circle Advisory Committee v. Interior*, 2013 U.S. Dist. LEXIS 123331 (E.D. Cal. 2013), the BLM authorized a commercial-scale solar energy project. In developing the range of alternatives, the BLM considered 22 alternatives, but only fully evaluated three action alternatives in the final EIS, all of which proposed to construct, operate, and maintain a solar energy project. *Id*. at 8, 9, 17. In both cases, the court upheld the BLM's alternatives development process and the resulting range of alternatives carried forward for detailed analysis.

CALFED Alternatives Development Process CALFED evaluated numerous alternatives, and the resulting Preferred Program Alternative in the Final PEIS/R identified surface storage projects to be pursued with project-specific studies, in particular expanding CVP storage in Shasta Lake by approximately 300 thousand acre-feet. The SLWRI Final EIS was revised to clarify that, consistent with guidance in the

CALFED Programmatic ROD, this EIS tiers to the CALFED PEIS/R and relies on evaluations and alternatives development and screening included in the CALFED PEIS/R. The below discussion describes the CALFED alternatives development process and its relationship to the SLWRI alternatives development process.

CALFED is a consortium of federal and State agencies working to restore ecological health and improve water management for beneficial uses of the San Francisco Bay/Sacramento–San Joaquin River Delta estuary. The CALFED effort is a collaboration between these agencies and Bay-Delta "stakeholders"—urban and agricultural water users, fishing interests, environmental organizations, businesses, and others—who contribute to CALFED design, problem solving, and decision making (CALFED 2002).

The CALFED planning effort was divided into three phases. Phase I defined the problems and a range of solutions and Phase II included the selection of the Preferred Program Alternative. Phase III is implementation of the Preferred Program Alternative, which includes the project-specific environmental evaluation of projects, including SLWRI. Below describes the alternative development process associated with Phase I and Phase II of the CALFED planning process.

During Phase I of the CALFED planning effort, the CALFED participants identified actions to resolve Bay-Delta problems and developed these actions into a set of alternatives for programmatic environmental review. Early in Phase I, 50 categories of actions to resolve Bay-Delta problems and achieve program objectives were identified. Given the large number of categories and range of perspectives on solutions, thousands of potential alternatives could have been identified. Therefore, the program devised a methodology that defined the critical conflicts and defined approaches to those conflicts. Ultimately, 100 preliminary solution alternatives were identified. Continued consolidation and balancing of the alternatives brought the number to 20. These 20 alternatives were presented to stakeholders, BDAC members, and to the public at a workshop. Consolidation and refinement of the alternatives, based on the workshop, produced 10 alternatives which were then compared against the programs' solution principles and it was found that three basic alternative approaches could be formed around different configuration of Delta conveyance. Each approach included the same set of four programs that are common to all alternatives and involves water use efficiency, water quality, levee system integrity, and ecosystem quality. Storage for each alternative could be evaluated to support these programs and the Delta conveyance and seek a balance between attainment of program objectives and cost effectiveness and were considered variable program elements (CALFED 2000).

Three basic alternative approaches from Phase I were carried into Phase II of the CALFED planning effort. Seventeen variations of the three basic alternative approaches were then developed to further explore potential refinements for the two variable program elements, storage and conveyance. The narrowing process (which included focusing on technical deficiencies and conveyance options) refined the seventeen variations of the three basic alternative approaches to twelve variations. Impacts of the three basic alternative approaches were evaluated in the CALFED 1998 Draft PEIS/R. Some of the twelve variations were eliminated or consolidated for technical reasons, and four action alternatives, (including the Preferred Program Alternative), were evaluated in the CALFED Final PEIS/R. Each of the four action alternatives considered in the CALFED Final PEIS/R include the Ecosystem Restoration, Water Quality, Levee System Integrity, Water Use Efficiency, Water Transfer, Watershed Storage, and Conveyance elements. Each of the action alternatives included an assessment with additional storage up to 6 million acre feet (MAF) and without storage.

The Phase II Report, included as an appendix in the Final PEIS/R, presented potential near-term and long-term implementation strategies for implementation of the Preferred Program Alternative. The report discusses how CALFED and its cooperating agencies had conducted a preliminary screening of potential surface storage locations and project configurations, and then selected a smaller number for more detailed evaluation. Shasta Lake Enlargement, among other storage projects, was retained for additional CALFED consideration as it appeared to be promising in helping to meet CALFED goals and objectives. In addition, it was determined that Shasta Lake Enlargement would provide significant benefits and generally result in lower environmental impacts than the remaining sites. The Phase II Report states that CALFED will aggressively pursue Shasta Lake enlargement through full State and Federal commitment to the process and evaluations necessary for implementation.

Phase II concluded in August 2000 with the filing of the Programmatic ROD, including certification, for the CALFED Final PEIS/R (CALFED 2002). The CALFED Programmatic ROD states that expanding the CVP storage in Shasta Lake by approximately 300 thousand acre-feet would be pursed with a project-specific study.

The California Supreme Court upheld the validity of the CALFED Final PEIS/R and CALFED Programmatic ROD, including the alternatives development process and range of alternatives. *In Re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings*, 184 P.3d 709 (Cal. 2008). As described below, the SLWRI development process is a derivative of and similar to the CALFED development process, and the SLWRI EIS tiers to the CALFED Final PEIS/R.

The SLWRI Final EIS was revised to clarify that Reclamation not only considered the CALFED Final PEIS/R in analyzing the environmental impacts of the SLWRI, but that this EIS tiers to the CALFED Final PEIS/R. In developing the CALFED Final PEIS/R, the CALFED agencies, including Reclamation, evaluated a broad range of water management options (with and without storage) to be implemented to achieve the CALFED goals. The SLWRI Final EIS was also revised to clarify that, consistent with guidance in the CALFED Programmatic ROD, the SLWRI EIS relies on evaluations and alternatives development and screening included in the CALFED PEIS/R. These revisions were primarily made in EIS Chapters 1, "Introduction," and Chapter 2, "Alternatives," and in Chapter 2, "Management Measures," of the Plan Formulation Appendix.

SLWRI Alternatives Development Process The DEIS Plan Formulation Appendix provides detailed background on the SLWRI alternatives formulation/development process and the development of the project's range of alternatives. This information is summarized in the DEIS in Chapter 2, "Alternatives" and described below.

The SLWRI alternative formulation/development process and development of the project's range of alternatives started with the development of the purpose and need, planning objectives (also referred to as project objectives), constraints and criteria. See MCR P&N-1 regarding the development of the purpose and need and objectives.

After development of the purpose and need, planning objectives, constraints, and criteria, the next major step in plan formulation was to define management measures. A management measure is any structural or nonstructural project action or feature that could address the planning objectives and satisfies the other applicable planning considerations.

More than 60 potential management measures, described in detail in Chapter 2 of the Plan Formulation Appendix, "Management Measures," were identified, evaluated, and screened as part of the SLWRI plan formulation process to address the primary and secondary planning objectives and satisfy the other applicable screening criteria (see Chapter 2 of the Plan Formulation Appendix "Planning Constraints, Considerations and Criteria"). The Plan Formulation Appendix includes a wide range of management measures representing diverse viewpoints and needs based on both planning processes internal to Reclamation and public scoping, including interaction with key regulatory and land management agencies. Reclamation looked at many management measures, beyond simply modifying or raising Shasta Dam, as further described below. The management measures included constructing instream fish habitat on tributaries to the Sacramento River; increased instream flows on Clear, Cow, and Bear creeks; constructing a migrating

corridor from the Sacramento River to the Pit River; constructing new reservoirs in other locations, such as on the Sacramento River upstream from Shasta Reservoir, on tributaries downstream from Shasta Dam (e.g., Cottonwood Creek and Auburn Dam Projects); offstream storage near the Sacramento River downstream from Shasta Dam (e.g., Sites Reservoir); and many others. One important factor was the potential for a management measure to directly address a planning objective without adversely impacting other objectives. Management measures deleted from further consideration are described in detail in the Plan Formulation Appendix, along with the reasons for deleting measures from further consideration and development.

Many of the management measures evaluated during this process, including measures not related to the raising of Shasta Dam, were considered under CALFED. Since the SLWRI EIS tiers to the CALFED PEIS/R, it relies on the analysis and screening evaluations performed for the CALFED PEIS/R. While revisiting alternatives that were considered alongside CALFED's Preferred Program Alternative is not required, many of the management measures, including measures not related to the raising of Shasta Dam, were also evaluated in the *Initial Alternatives Information Repor*t (Reclamation 2004), the *Ecosystem Restoration Opportunities Report* (Reclamation 2003b), the *Plan Formulation Report* (Reclamation 2007). Text has been revised in Chapter 2, "Management Measures," of the Plan Formulation Appendix to clarify which measures were also evaluated under CALFED and to clarify the relationship of the CALFED evaluation and screening process to the evaluation and screening of SLWRI management measures.

Text has also been revised in Chapter 2 of the Plan Formulation Appendix to clarify the relationship of SLWRI management measures to actions under the CALFED Ecosystem Restoration Program (ERP). The ERP was included as part of the CALFED Preferred Program Alternative. The goal of the CALFED ERP is to improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta system to support sustainable populations of diverse and valuable plant and animal species. The CALFED ERP includes multiple actions to meet this goal. These actions encompass many of the management measures considered under the SLWRI to address increasing anadromous fish survival and conserving, restoring, and enhancing ecosystem resources.

Following management measures development and screening, the next phases of the plan formulation process involved combining retained management measures to formulate concept plans (plans which are conceptual in scope). The management measures and concept plans carried forward were then further refined and developed with more

specificity to formulate comprehensive plans (i.e., alternatives) to address the planning objectives.

In addition to the No-Action Alternative, the DEIS assesses a range of feasible alternatives (or comprehensive plans) that meets the project purpose and thoroughly describes the reasons why other potential actions were dismissed from further consideration. These alternatives provide decision makers with a refined, but feasible, action with which the study objectives may be accomplished. The adverse or beneficial environmental impacts of each alternative are evaluated within each resource area chapter. The alternatives analyzed in the DEIS are those that best meet the NEPA primary and secondary objectives, minimize negative effects, and are potentially feasible.

This development of SLWRI management measurement and alternative process was documented through a series of planning documents made available to the public, including:

- *Enlarged Shasta Lake Investigation Preliminary Findings Report* (1983)
- *Shasta Dam and Reservoir Enlargement, Appraisal Assessment of the Potential for Enlarging Shasta Dam and Reservoir* (1999a)
- *SLWRI Strategic Agency and Public Involvement Plan* (2003b)
- *SLWRI Mission Statement Milestone Report* (2003a)
- *Ecosystem Restoration Opportunities Report* (Reclamation 2003b)
- *SLWRI Initial Alternatives Information Report (2004), SLWRI Environmental Scoping Report (2006), and SLWRI Plan Formulation Report* (2007)

Conclusion As explained above, Reclamation considered an extensive range of management measures/alternatives that reflect a broad range of views about how to achieve the purpose and need and objectives of the SLWRI. The CALFED plan formulation and DEIS alternative development process included extensive public involvement with participants from a wide range of viewpoints. In this open process, Reclamation defined the primary and secondary objectives essential to SLWRI; developed over 60 potential management measures; refined the list of potential management measures; identified the best management measures and combined these measures into numerous alternatives; selected a wide range of potentially feasible alternatives; and rejected

management measures/alternatives that did not satisfy the project purpose, such as meeting only one of the primary objectives at the detriment of the other. This process fostered meaningful public participation in the development of alternatives and allowed for informed decision making in the refinement of the alternatives. The alternatives considered in the EIS represent a reasonable range of alternatives that will permit a reasoned choice by Reclamation.

Reclamation undertook a robust alternatives development process in developing the SLWRI and this EIS. Reclamation has thoroughly explained its process for developing the range of alternatives carried forward in the EIS and explained why alternatives and management measures were rejected from detailed discussion in the EIS, consistent with the alternatives development processes upheld in *Protect Our Communities* and *La Cuna* (discussed above). Reclamation is required to examine a reasonable range of alternatives, and provided a detailed analysis of the action alternatives and No Project/No Action Alternative, but is not obligated to undertake a detailed examination of every conceivable measure that could benefit water supply reliability or fisheries enhancements.

33.3.5 Master Comment Responses for Alternatives Development

ALTD-1 – Alternative Development – Water Supply Reliability

Comments received during the public comment period suggested that Reclamation consider additional measures or options for increasing water supply reliability. The following discussion addresses measures proposed by commenters to increase water supply reliability that were previously evaluated during the SLWRI plan formulation process. In addition, please see Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," related to measures considered to address anadromous fish survival and Master Comment Response P&N-1, "Purpose and Need and Objectives," related to regarding the development of the SLWRI purpose and need and objectives. Also, please see Master Comment Response ALTR-1, "Range of Alternatives," which describes NEPA requirements for alternatives development, the relationship of SLWRI to CALFED, and development of the SLWRI alternatives; and Master Comment Response ALTS-1, "Alternative Selection," for the alternative selection (e.g., identification of the preferred alternative and Clean Water Act Section 404 (b) (1) Least Environmentally Damaging Practicable Alternative compliance).

The Plan Formulation Appendix provides detailed background on the SLWRI purpose and need, project objectives, alternatives formulation/development process, and the development of the project's range of alternatives. This is summarized above in Master Comment

Responses P&N-1, "Purpose and Need and Objectives," and ALTR-1, "Range of Alternatives." As described, the plan formulation process for the SLWRI was deliberative and iterative and was separated into multiple phases. The first phases of this process focused on defining the problems, needs, and opportunities, and inventorying and forecasting conditions in the study area to define a specific set of planning objectives. The next phases of the plan formulation process were to define water management measures and ways of combining the most appropriate of these measures in to concept plans. Finally, the later phases of the plan formulation process were to formulate, evaluate and compare these concept plans to develop complete alternatives, called comprehensive plans in the EIS.

Management Measures Considered to Address Increasing Water Supply Reliability Chapter 2, "Management Measures," of the Plan Formulation Appendix, describes the identification, evaluation, and screening of management measures to address primary and secondary project objectives. A management measure is any structural or nonstructural project action or feature that could address the planning objectives and satisfies the other applicable planning considerations. As described in the Plan Formulation Appendix, more than 60 potential management measures were developed through study team meetings, field inspection, public outreach, and environmental scoping for the EIS.

Many of the management measures, including measures not related to the raising of Shasta Dam, were considered under CALFED. The SLWRI EIS tiers to the CALFED PEIS/R, it relies on the analysis and screening evaluations performed for the CALFED PEIS/R. While revisiting alternatives that were considered alongside CALFED's Preferred Program Alternative is not required, many of the management measures, including measures not related to the raising of Shasta Dam, were also evaluated in the *Initial Alternatives Information Repor*t (Reclamation 2004), the *Plan Formulation Report* (Reclamation 2007), and in the Plan Formulation Appendix, in Chapter 2, "Management Measures."

Management measures were evaluated and screened and either retained for potential inclusion in concept plans or deleted from further development. A primary consideration during this process is the potential ability of each management measure to address project objectives. During this process, 22 management measures were identified to address the primary objective of increasing water supply reliability for M&I, agricultural, and environmental purposes to help meet current and future water demands. Of the 22 measures considered to help increase water supply reliability, four were retained for possible inclusion in concept plans during the initial plans phase.

The following summary discusses 13 management measures considered to increase water supply reliability for which public comments were received on the DEIS. There were no comments on the other 9 management measures. The relevant measures are separated into categories including: increased surface water storage, improved conjunctive water management, demand reduction, and improved surface water treatment.

Increased Surface Water Storage The following management measures to increase surface water storage were evaluated for the SLWRI. These management measures, and rationale for retaining or deleting each measure, are described in more detail in the Plan Formulation Appendix, in Chapter 2, "Management Measures," under Subsection "Increase Water Supply Reliability," in Section "Measures to Address Primary Planning Objectives."

Construct New Conservation Storage Reservoir(s) Upstream from Shasta Reservoir This measure was considered under CALFED and consisted of constructing dams and reservoirs at one or more locations upstream from Shasta Lake, primarily for increased water conservation storage and operational flexibility. The construction of new conservation storage reservoir(s) upstream from Shasta Reservoir was deleted as it has limited potential to effectively contribute to increased system water supply reliability or other planning objectives. Upstream storage sites capable of CVP system-wide benefits (1) would only be capable of marginally improving water supply reliability to the CVP, (2) would not be consistent with screening criteria established in the CALFED Integrated Storage Investigations (e.g., would not provide a minimum storage capacity of at least 200,000 acre-feet), (3) would likely not be supported in the local area because the water would need to be developed for CVP system reliability (not retained for local use), and (4) would result in a relatively high unit water cost to implement.

Construct New Conservation Storage on Tributaries to the Sacramento River Downstream from Shasta Dam This measure consisted of constructing offstream reservoir storage along tributaries to the Sacramento River downstream from Shasta Dam. This measure was investigated under CALFED and in other past studies. Several projects were identified as having potential to contribute considerably to increasing water supply reliability, including the Cottonwood Creek Project, the Auburn Dam Project, and the Marysville Lake Project. However, these projects have been rejected by State and local interests. This measure was deleted from further consideration in the SLWRI as potential onstream surface storage projects downstream from Shasta Dam would not efficiently contribute to the primary planning objective of increasing water supply reliability (e.g., would result in a relatively high unit water cost to implement compared to enlarging Shasta

Reservoir and other storage projects identified in the CALFED Preferred Program Alternative) or because they would have significant overriding environmental issues and opposition.

Construct New Conservation Offstream Surface Storage near the Sacramento River Downstream from Shasta Dam This measure was considered under CALFED and consisted of constructing offstream reservoir storage near the Sacramento River downstream from Shasta Dam. All but one of the offstream reservoir storage projects were eliminated from further consideration in the CALFED Programmatic ROD. The one project retained for further consideration in the CALFED Programmatic ROD is Sites Reservoir. DWR and Reclamation are studying Sites Reservoir under the North-of-the-Delta Offstream Storage (NODOS) Project as an independent project from SLWRI. Therefore, this measure was deleted from further consideration.

Construct New Conservation Surface Water Storage South of the Sacramento-San Joaquin Delta This measure was considered under CALFED and consisted of constructing new conservation surface water storage south of the Sacramento-San Joaquin Delta. Except those included in the CALFED Preferred Program Alternative, all of the potential onstream or offstream storage projects south of the Delta were deleted from further consideration primarily because they would not (1) contribute to the primary objective of increasing anadromous fish survival in the upper Sacramento River or (2) be as efficient or effective at increasing water supply reliability as additional storage in an enlarged Shasta Reservoir. In addition, feasibility-scope investigations for both Los Vaqueros Reservoir and upper San Joaquin River storage were authorized in Section 215 of Public Law 108-7. Both studies are addressing specific planning objectives that are unique to their geographic areas, but differ from those of the SLWRI.

Increase Total or Seasonal Conservation Storage at Other CVP Facilities This measure was considered under CALFED and primarily consisted of providing additional conservation storage space in other major CVP (and/or SWP) reservoirs in the Sacramento River watershed through enlarging existing dams and reservoirs. This measure was deleted from further consideration in the SLWRI primarily because potential enlargement of other existing CVP (and/or SWP) facilities in the Sacramento River watershed would not efficiently contribute to the primary planning objective of increasing water supply reliability (e.g., would result in a relatively high unit water cost to implement compared to enlarging Shasta Reservoir) or because they would have significant overriding environmental issues. It is believed that, of the existing reservoirs in the CVP/SWP systems, increasing water supply reliability through modifying Shasta Dam and Lake would be the most cost-effective. Further, all known efforts to increase storage space in other

Northern California CVP (or SWP) reservoirs were rejected by CALFED and local interest groups.

Dredge Bottom of Shasta Reservoir This measure consisted of increasing the total storage space in Shasta Reservoir by excavating either deposited or native materials below full pool elevation. Dredging Shasta Reservoir was not retained as a management measure because it has limited potential to effectively contribute to increases in system water supply reliability or any other planning objective. Dredging the bottom of Shasta Reservoir would have an extremely high cost for new storage space with very small potential benefit and severe environmental impacts for disposal of materials.

Improved Conjunctive Water Management The following management measures to improve conjunctive water management were evaluated. These management measures, and rationale for retaining or deleting each measure, are described in more detail in the Plan Formulation Appendix, in Chapter 2, "Management Measures," Subsection "Increase Water Supply Reliability," within Section "Measures to Address Primary Planning Objectives."

Develop Conservation Offstream Surface Storage near the Sacramento River Downstream from Shasta Dam This measure was considered under CALFED and consisted of developing surface water transfer storage capabilities near the Sacramento River downstream from Shasta Dam to use in conjunction with storage in Shasta Reservoir. This storage would be an extension of storage space in Shasta Reservoir. One possibility identified would be to consider some of the space in the Sites Reservoir project, or the North-of-the-Delta Offstream Storage (NODOS) Project, which was previously described as new conservation surface storage for Shasta Reservoir. This possibility is being considered in studies by DWR and Reclamation. However, DWR and Reclamation are studying Sites Reservoir under the NODOS Project as an independent project from SLWRI. Therefore, this measure was deleted from further consideration.

Develop Conservation Groundwater Storage near the Sacramento River Downstream from Shasta Dam This measure consisted of developing groundwater storage near the Sacramento River. The development of conservation groundwater storage near the Sacramento River downstream from Shasta Dam in-lieu option of this measure was initially retained for further development primarily because it would have potential to increase water supply reliability. However, it was eliminated during the comprehensive plan phase because subsequent operations modeling indicated tradeoffs between conjunctive use water supply benefits and critical gains in fisheries accomplishments. The

resulting reduction in benefits to fisheries in dry and critical years was deemed unacceptable in terms of meeting primary project objectives.

Develop Additional Conservation Groundwater Storage South of the Sacramento-San Joaquin Delta This measure was considered under CALFED and consisted of either developing new groundwater recharge projects south of the Delta or contributing to existing recharge projects. This measure was deleted from further consideration in the SLWRI primarily because it would not be as effective or efficient as increased storage space in Shasta Reservoir and would not contribute to the primary planning objective of increasing anadromous fish survival in the upper Sacramento River.

Reduced Demand The following management measures to reduce demand were evaluated. These management measures, and rationale for retaining or deleting each measure, are described in more detail in the Plan Formulation Appendix, in Chapter 2, "Management Measures," Subsection "Increase Water Supply Reliability," within Section "Measures to Address Primary Planning Objectives."

Implement Water use Efficiency Methods This measure was considered under CALFED. This measure consisted of implementing water use efficiency methods to help reduce current and future water shortages by allowing a more effective use of existing supplies. The measure to implement water use efficiency methods was retained because urban and agricultural water use efficiency methods could help reduce current and future water shortages by allowing a more effective use of existing supplies. This measure was subsequently further refined and included as one of the eight common management measures, as the "Reduce Demand" measure, included in all action alternatives. The eight common management measures are described in EIS Chapter 2, "Alternatives," in Section 2.3.1, "Management Measures Common to All Action Alternatives."

As described in Chapter 2, "Alternatives," of the DEIS, all action alternatives include a water conservation program to augment current water use efficiency practices. The proposed program would consist of a 10-year initial program to which Reclamation would allocate approximately $1.6 million to $3.8 million to fund water conservation efforts. Funding would be proportional to additional water supplies delivered and would focus on assisting project beneficiaries (agencies receiving increased water supplies because of the project), with developing new or expanded agricultural and M&I water conservation and water recycling programs. Program actions would be a combination of technical assistance, grants, and loans to support a variety of water conservation projects, such as recycled wastewater projects, irrigation system retrofits, and urban utilities retrofit and replacement programs.

The program could be established as an extension of existing Reclamation programs, or as a new program through teaming with cost-sharing partners. Combinations and types of water use efficiency actions funded would be tailored to meet the needs of identified cost-sharing partners, including consideration of cost-effectiveness at a regional scale for agencies receiving funding.

Retire Agricultural Lands This measure consisted of retiring agricultural lands**.** The ability of this measure to meet future water demands in the Central Valley during drought periods is limited because marginal lands are already often allowed to fallow during drought periods. Further, there would be a high degree of uncertainty regarding the institutional ability to acquire sufficient additional land rights necessary to preclude future irrigated agriculture on lands identified for inclusion in a project/program. This measure was deleted from further consideration in the SLWRI as it likely has limited ability to actually help meet future water demands in the Central Valley and would not address the primary objective of increasing anadromous fish survival. Furthermore, at a large scale, this measure could have considerable negative impacts on agricultural production and related industries.

Improved Surface Water Treatment The following management measures to improve surface water treatment were evaluated. These management measures, and rationale for retaining or deleting each measure, are described in more detail in the Plan Formulation Appendix, in Chapter 2, "Management Measures," Subsection "Increase Water Supply Reliability," within Section "Measures to Address Primary Planning Objectives."

Implement Treatment/Supply of Agricultural Drainage Water This measure consisted of collecting agricultural drainage from farms along the Sacramento and San Joaquin Rivers and treating the drainage water for reuse. This measure was deleted from further consideration as it would be costly to initially implement and operate, problems would exist relating to brine disposal, and it would likely be unacceptable to stakeholders and the public.

Construct Desalination Facility This measure was considered as part of the CALFED Water Use Efficiency Program (CALFED 2006). This measure consisted of constructing seawater or brackish surface or groundwater desalination plants to supplement existing water supplies and help offset future demands. The construction of a desalination facility was not retained because desalination has low potential to address SLWRI planning objectives of agricultural water supply reliability. Desalination would not be an efficient alternative to new storage at Shasta Reservoir because it would be highly inefficient in

providing drought period supplies and its unit costs would be far greater than new supplies from Shasta Reservoir or other sources.

ALTD-2 – Alternative Development – Anadromous Fish Survival
Comments received during the public comment period suggested that Reclamation consider additional measures or options for increasing anadromous fish survival. The following discussion addresses measures proposed by commenters to increase anadromous fish survival that were previously evaluated during the SLWRI plan formulation process. In addition, please see Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability," related to measures considered to address water supply reliability and Master Comment Response P&N-1, "Purpose and Need and Objectives," related to regarding the development of the SLWRI purpose and need and objectives. Also, please see Master Comment Response ALTR-1, "Range of Alternatives," which describes NEPA requirements for alternatives development, the relationship of SLWRI to CALFED, and development of the SLWRI alternatives; and Master Comment Response ALTS-1, "Alternative Selection," for the alternative selection (e.g., identification of the preferred alternative and Clean Water Act Section 404 compliance).

The Plan Formulation Appendix provides detailed background on the SLWRI purpose and need, project objectives, alternatives formulation/development process, and the development of the project's range of alternatives. This is summarized above in Master Comment Responses P&N-1, "Purpose and Need and Objectives," and ALTR-1, "Range of Alternatives." As described, the plan formulation process for the SLWRI was deliberative and iterative and was separated into multiple phases. The first phases of this process focused on defining the problems, needs, and opportunities, and inventorying and forecasting conditions in the study area to define a specific set of planning objectives. The next phases of the plan formulation process were to define water management measures and ways of combining the most appropriate of these measures in to concept plans. Finally, the later phases were to formulate, evaluate and compare these concept plans to develop complete alternatives, called comprehensive plans in the EIS.

Management Measures Considered to Address Increasing Anadromous Fish Survival Chapter 2, "Management Measures," of the Plan Formulation Appendix, describes the identification, evaluation, and screening of management measures to address primary and secondary project objectives. A management measure is any structural or nonstructural project action or feature that could address the planning objectives and satisfies the other applicable planning considerations. As described in the Plan Formulation Appendix, more than 60 potential

management measures were developed through study team meetings, field inspection, public outreach, and environmental scoping for the EIS.

Many of the management measures, including measures not related to the raising of Shasta Dam, were considered under CALFED. The SLWRI EIS tiers to the CALFED PEIS/R, it relies on the analysis and screening evaluations performed for the CALFED PEIS/R. While revisiting alternatives that were considered alongside CALFED's Preferred Program Alternative is not required, many of the management measures, including measures not related to the raising of Shasta Dam, were also evaluated in the *Initial Alternatives Information Repor*t (Reclamation 2004), the *Ecosystem Restoration Opportunities Report* (Reclamation 2003b), the *Plan Formulation Report* (Reclamation 2007), and in the Plan Formulation Appendix, in Chapter 2, "Management Measures."

Specifically, the ERP was included as part of the CALFED Preferred Program Alternative. The goal of the CALFED ERP is to improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta system to support sustainable populations of diverse and valuable plant and animal species. The CALFED ERP includes multiple actions to meet this goal, including (1) protecting, restoring, and managing diverse habitat types representative of the Bay-Delta and its watershed, (which includes the Sacramento River and its tributaries), (2) modifying or eliminating fish passage barriers, including the removal of some dams, construction of fish ladders, and construction of fish screens that use the best available technology, and (3) restoring aspects of the sediment regime by relocating in-stream and floodplain gravel mining, and by artificially introducing gravels to compensate for sediment trapped by dams. These actions encompass many of the management measures considered under the SLWRI to address increasing anadromous fish survival. The ERP has prioritized restoration actions and funded approximately $630 million of ecosystem restoration activities, including $22 million for river channel restoration, $46 million in riparian habitat restoration, $103.1 million for fish screens, and $42.9 million for fish passage (DFG et al., 2010).

Management measures were reviewed for their ability to address the primary and secondary planning objectives. Management measures were evaluated and screened and either retained for potential inclusion in concept plans or deleted from further development. During this process, 22 management measures were identified to address the primary objective of increasing anadromous fish survival. Of the 22 measures considered to help increase water supply reliability, six were retained for possible inclusion in concept plans during the initial plans phase.

The following summary discusses 18 management measures considered to address increasing anadromous fish survival for which public comments were received on the DEIS. There were no comments on the other four management measures. The relevant measures are separated into categories including: improve fish habitat, improve water flows and quality, and improve fish migration.

Improve Fish Habitat The following management measures to improve fish habitat were evaluated. These management measures, and rationale for retaining or deleting each measure, are described in more detail in the Plan Formulation Appendix, in Chapter 2, "Management Measures," Section "Increase Anadromous Fish Survival," within Section "Measures to Address Primary Planning Objectives."

Construct Instream Aquatic Habitat Downstream from Keswick Dam This measure consisted of constructing aquatic habitat in and adjacent to the Sacramento River downstream from Keswick Dam to encourage use of this reach by anadromous fish for reproduction. This measure was retained for further development as part of the SLWRI, because it had potential to successfully address the first primary planning objective and due to high interest from fisheries agencies. Furthermore, this measure is likely to combine favorably with other potential measures related to Shasta Dam and Reservoir and their operation. This measure was further developed during the comprehensive plans phase, and included as side channel habitat restoration within the plan component "restoring riparian, floodplain, and side channel habitat in the upper Sacramento River," which was incorporated into CP4, CP4A, and CP5. This component is discussed further in Chapter 2 of the EIS in Section 2.3, "Action Alternatives." Further, the ERP has evaluated, prioritized, and funded ecosystem restoration actions identified in the CALFED Preferred Program Alternative. This measure and similar activities were encompassed in the ERP action related to protecting, restoring, and managing diverse habitat types representative of the Bay-Delta and its watershed, (which includes the Sacramento River and its tributaries).

Replenish spawning gravel in the Sacramento River – This measure initially consisted of a single application of spawning-sized gravel at a discrete location in the Sacramento River between Keswick and RBPP. Under this measure, gravel would be transported and placed into the Sacramento River downstream from Keswick Dam. This measure was retained for further development as part of the SLWRI because it has potential to successfully address the primary planning objective of increasing anadromous fish survival. Furthermore, it is likely to combine favorably with other potential measures related to Shasta Dam and Reservoir and their operation. This measure was further developed during the comprehensive plans phase to include a 10-year implementation and was included as the plan component "augment

spawning gravel in the upper Sacramento River," which was incorporated into CP4, CP4A, and CP5. This component is discussed further in Chapter 2, "Alternatives," of the EIS in Section 2.3, "Action Alternatives." Further, the ERP has evaluated, prioritized, and funded ecosystem restoration actions identified in the CALFED Preferred Program Alternative. This measure and similar activities were encompassed in the ERP action related to restoring aspects of the sediment regime by relocating in-stream and floodplain gravel mining, and by artificially introducing gravels to compensate for sediment trapped by dams.

Construct Instream Fish Habitat on Tributaries to the Sacramento River This measure consisted of improving instream aquatic habitat along the lower reaches of tributaries to the Sacramento River. Under this measure, various structural techniques would be employed to trap spawning gravels in deficient areas, create pools and riffles, provide instream cover, and improve overall instream habitat conditions. This measure would have benefits for tributaries. However, it was deleted from further development as part of the SLWRI, primarily because it is independent of hydraulic/hydrologic conditions in the upper Sacramento River, would not improve ecological conditions or fish habitat along mainstem Sacramento River, and, therefore would not directly contribute to increasing anadromous fish survival within the primary Sacramento River study area. The ERP has evaluated, prioritized, and funded ecosystem restoration actions identified in the CALFED Preferred Program Alternative. Further, this measure and similar activities were encompassed in the ERP action related to protecting, restoring, and managing diverse habitat types representative of the Bay-Delta and its watershed, (which includes the Sacramento River and its tributaries).

Remove Instream Sediment Along Middle Creek This measure consisted of implementing a sediment removal and control program along Middle Creek, an intermittent tributary to the Sacramento River between Keswick Dam and Redding. This measure was deleted from further development primarily because it is independent of hydraulic/hydrologic conditions in the upper Sacramento River, would not improve ecological conditions or fish habitat along mainstem Sacramento River, and, therefore would not directly contribute to increasing anadromous fish survival within the primary Sacramento River study area.

Rehabilitate Inactive Instream Gravel Mines Along Stillwater and Cottonwood Creeks This measure consisted of rehabilitating ecological conditions in former instream gravel mining sites along Stillwater Creek**.** This measure was deleted from further development primarily because it is independent of hydraulic/hydrologic conditions in the upper

Sacramento River, would not improve ecological conditions or fish habitat along mainstem Sacramento River, and, therefore would not directly contribute to increasing anadromous fish survival within the primary Sacramento River study area. Further, the ERP has evaluated, prioritized, and funded ecosystem restoration actions identified in the CALFED Preferred Program Alternative. This measure and similar activities were encompassed in the ERP action related to restoring aspects of the sediment regime by relocating in-stream and floodplain gravel mining, and by artificially introducing gravels to compensate for sediment trapped by dams.

Improve Water Flows and Quality The following management measures to improve water flows and quality were evaluated. These management measures, and rationale for retaining or deleting each measure, are described in more detail in the Plan Formulation Appendix, in Chapter 2, "Management Measures," Section "Increase Anadromous Fish Survival," within Section "Measures to Address Primary Planning Objectives."

Make Additional Modifications to Shasta Dam for Temperature Control This measure consisted of determining if making additional structural modifications to the outlets and existing TCD for temperature control is possible and feasible and, if so, implementing those modifications. This measure was retained for further development primarily because it could (1) improve the performance of the existing facility, (2) complement other measures under consideration to raise Shasta Dam, and (3) complement measures to improve aquatic spawning habitat in the Sacramento River. This management measure was further developed during the comprehensive plans phase and included as one of the eight common management measures, as the "Modify Temperature Control Device" measure, included in all action alternatives. The eight common management measures are described in EIS Chapter 2, "Alternatives," in Section 2.3.1, "Management Measures Common to All Action Alternatives."

Enlarge Shasta Lake Cold-water Pool This measure consisted of enlarging the cold-water pool by either raising Shasta Dam and enlarging the minimum operating pool, or increasing the seasonal carryover storage in Shasta Lake. This measure was retained for further development primarily because it would (1) directly contribute to both primary planning objectives for the SLWRI, (2) combine favorably with other measures, and (3) have a high certainty of providing the intended benefits once implemented. Further, the CALFED Preferred Program Alternative recommended project specific study of expanding CVP storage in Shasta Lake to increase the pool of cold water available to maintain lower Sacramento River temperatures needed by certain fish and provide other water management benefits, such as water supply

reliability. This management measure was further developed during the comprehensive plans phase and included as one of the eight common management measures included in all of the action alternatives. The eight common management measures are described in EIS Chapter 2, "Alternatives," in Section 2.3.1, "Management Measures Common to All Action Alternatives." At a minimum, all comprehensive plans include enlarging the cold-water pool by raising Shasta Dam to enlarge Shasta Reservoir. Some alternatives also increase the seasonal carryover storage in Shasta Lake. This measure is discussed in Chapter 2 of the EIS in Section 2.3, "Action Alternatives."

Modify Storage and Release Operations at Shasta Dam This measure consisted of enlarging Shasta Dam and modifying seasonal storage and releases to benefit anadromous fisheries. Although this measure could help provide greater flexibility in meeting water temperature targets, it would be aimed primarily at improving flows and influencing physical channel conditions for anadromous fish. This measure was initially deleted from consideration because analyses indicated a decreased fisheries benefit with increasing Sacramento River flows compared to increasing the cold-water pool. However, this measure was later retained for further development when combined with additional storage space in Shasta Reservoir, as part of an adaptive management plan, primarily because it could directly contribute to both primary objectives of the SLWRI and combine favorably with other measures. Further, the CALFED Preferred Program Alternative recommended project specific study of expanding CVP storage in Shasta Lake to increase the pool of cold water available to maintain lower Sacramento River temperatures needed by certain fish and provide other water management benefits, such as water supply reliability. This measure was further developed during comprehensive plans phase and was incorporated into CP4 and CP4A as the component "Adaptive Management of Cold-Water Pool." This measure is discussed further in Chapter 2 of the EIS in Section 2.3, "Action Alternatives."

Transfer Existing Shasta Reservoir Storage from Water Supply to Cold-water Releases This measure, requested as part of the environmental scoping process, consisted of reoperating the existing Shasta Dam and Reservoir for anadromous fishery resources. For this measure, it was assumed that storage space in Shasta Reservoir could be reoperated to provide flows similar to those identified in the January 2001 *Final Restoration Plan* for the Anadromous Fish Restoration Program. Although a portion of the cold-water releases could be diverted downstream for water supply, the overall effect would be a reduction in agricultural and M&I water supply deliveries. This measure was deleted from further consideration primarily because it violates at least one of the planning criteria concerning the potential to adversely impact existing project purposes, by reducing existing water supplies for

agricultural and M&I deliveries. Further, this measure would adversely impact the primary objective related to increasing agricultural and M&I water supply reliability.

Remove Shasta Dam and Reservoir This measure, requested as part of the environmental scoping process, consisted of removing the existing Shasta Dam and Reservoir to benefit anadromous fishery resources. The removal of Shasta Dam and Reservoir was deleted from further consideration primarily because it violates at least one of the planning criteria concerning the potential to adversely impact existing project purposes. Although the potential benefit to anadromous fish resources along the upper Sacramento River could be sizeable, these benefits are outweighed by the monetary benefit associated with the existing project. No known project or projects could replace the benefits provided by Shasta and Keswick dams, reservoirs, and appurtenant facilities at any price.

Improve Fish Migration The following management measures to improve fish migration were evaluated. These management measures, and rationale for retaining or deleting each measure, are described in more detail in the Plan Formulation Appendix, in Chapter 2, "Management Measures," Section "Increase Anadromous Fish Survival," within Section "Measures to Address Primary Planning Objectives."

Screen Diversions on Old Cow and South Cow Creeks This measure consisted of screening diversion intakes in the Cow Creek watershed to reduce fish mortality. This measure was deleted from further development primarily because it is independent of hydraulic/hydrologic conditions in the upper Sacramento River, would not improve ecological conditions or fish habitat along the mainstem Sacramento River, and, therefore would not directly contribute to increasing anadromous fish survival within the primary Sacramento River study area. Further, the ERP has evaluated, prioritized, and funded ecosystem restoration actions identified in the CALFED Preferred Program Alternative. This measure and similar activities were encompassed in the ERP action related to modifying or eliminating fish passage barriers, including the removal of some dams, construction of fish ladders, and construction of fish screens that use the best available technology.

Remove or Screen Diversions on Battle Creek This measure consisted of removing or screening diversions and other water control facilities on Battle Creek to allow full use of the watershed's high-quality, cold-water spawning habitat. This measure was deleted from further development primarily because it is independent of hydraulic/hydrologic conditions in the upper Sacramento River, would not improve ecological conditions or fish habitat along mainstem Sacramento River, and,

therefore would not directly contribute to increasing anadromous fish survival within the primary Sacramento River study area. Further, the ERP has evaluated, prioritized, and funded ecosystem restoration actions identified in the CALFED Preferred Program Alternative. This measure and similar activities were encompassed in the ERP action related to modifying or eliminating fish passage barriers, including the removal of some dams, construction of fish ladders, and construction of fish screens that use the best available technology.

Construct a Migration Corridor from the Sacramento River to the Pit River This measure consisted of providing passage to spawning areas upstream from Shasta Dam for anadromous fish from the Sacramento River. This measure and similar measures were initially deleted from further consideration during earlier phases of the SLWRI primarily because of (1) the high cost for complex infrastructure, (2) major impacts to other facilities and extensive long-term operation and maintenance requirements, and (3) high uncertainty for the potential to achieve and maintain successful fish passage and spawning. However, Reclamation is currently studying volitional fish passage above Shasta Dam under a separate Federal program as the result of the 2009 NMFS BO. For more information, please see Master Comment Response FISHPASS-1, "Fish Passage Above Shasta Dam."

Reoperate the CVP to Improve Overall Fish Management – This measure, which was requested as part of the environmental scoping process, primarily included reoperating all of the CVP facilities in the upper Sacramento River system to improve anadromous fish resources. This measure was deleted from further consideration in the SLWRI primarily because no opportunity appears to exist to effectively further reoperate the CVP facilities capable of affecting the Sacramento River that would not result in adversely impacting other project purposes.

Construct a Fish Ladder on Shasta Dam This measure primarily included constructing a fish ladder on Shasta Dam to allow anadromous fish to access Shasta Lake and approximately 40 miles of the upper Sacramento River, about 24 miles of the lower McCloud River, and various small creeks and streams tributary to Shasta Reservoir. This measure was initially deleted from further consideration during earlier phases of the SLWRI primarily because of the estimated high cost to construct and operate the fish ladder and potential inability for fish to successfully ascend the ladder. However, Reclamation is currently studying volitional fish passage above Shasta Dam under a separate Federal program as the result of the 2009 NMFS BO. For more information, please see Master Comment Response FISHPASS-1, "Fish Passage Above Shasta Dam."

Reintroduce Anadromous Fish to Areas Upstream from Shasta Dam
This measure, which was requested as part of the environmental scoping process, primarily included non-volitional fish passage above Shasta Dam, involving trapping anadromous fish along the upper Sacramento River likely just downstream from Keswick Dam, transporting the fish by tanker truck, and releasing the fish in the Sacramento River upstream from Shasta Lake or the McCloud River to spawn. It also included some method of trapping potential out-migrating fish and transporting them to the Sacramento River near Keswick for release into the lower river. This measure was deleted from further consideration in the SLWRI primarily because non-volitional fish passage above Shasta Dam to the upper Sacramento and McCloud rivers is being studied under a separate Federal program as the result of the 2009 NMFS BO. For more information, please see Master Comment Response FISHPASS-1, "Fish Passage Above Shasta Dam."

Additional Measures Benefiting Anadromous Fish In addition to the measures considered within the Section "Increase Anadromous Fish Survival," as described above, other measures were considered that would also benefit anadromous fish resources in the Upper Sacramento River. These are described in The Plan Formulation Appendix in Chapter 2, "Management Measures" under "Conserve, Restore, and Enhance Ecosystem Resources." Of these measures, the following measure was retained for further development.

Restore Riparian and Floodplain Habitat Along the Sacramento River
This measure consisted of restoring riparian and floodplain habitat at specific locations along the Sacramento River to promote the health and vitality of the river ecosystem. This measure was retained for further consideration primarily because it would have a high likelihood of success in accomplishing effective restoration and would indirectly benefit aquatic habitat conditions for anadromous fish. Further, the ERP has evaluated, prioritized, and funded ecosystem restoration actions identified in the CALFED Preferred Program Alternative. This measure and similar activities were encompassed in the ERP action related to protecting, restoring, and managing diverse habitat types representative of the Bay-Delta and its watershed, (which includes the Sacramento River and its tributaries). This measure was further developed during the comprehensive plans phase and was included within the plan component "restoring riparian, floodplain, and side channel habitat in the upper Sacramento River," which was incorporated into CP4, CP4A, and CP5. This component is discussed further in Chapter 2 of the EIS in Section 2.3, "Action Alternatives."

33.3.6 Master Comment Response for Alternative Selection

ALTS-1 – Alternative Selection

Comments were received during the public comment period included concerns about the alternative selection (e.g., identification of the preferred alternative and Clean Water Act Section 404 compliance). In addition to the discussion below, please see Master Comment Responses ALTD-1, "Alternative Development – Water Supply Reliability," and ALTD-2, "Alternative Development – Anadromous Fish Survival," related to measures considered during the plan formulation process to address water supply reliability and anadromous fish survival. Also, please see Master Comment Response P&N-1 "Purpose and Need and Objectives" related to the development of the SLWRI purpose and need and objectives and ALTR-1, "Range of Alternatives," which describes NEPA requirements for alternatives development, the relationship of SLWRI to CALFED, and development of the SLWRI alternatives.

Alternative Selection Chapter 32, "Final EIS," describes the rationale for the selection of the preferred alternative, which is CP4A. The preferred alternative is the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors.

As described in Chapter 32, "Final EIS," the environmentally preferable alternative will be identified in the ROD. The Environmentally Preferable Alternative, as explained by the CEQ's "Forty Questions" as "the alternative that will promote the national environmental policy as expressed in NEPA's Section 101(42 USC § 4331). Generally, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources." The concept of the agency's preferred alternative is different from the environmentally preferable alternative, although in some cases one alternative may be both the preferred alternative and the environmentally preferable alternative.

As described in Chapter 32, "Final EIS," Reclamation will seek an Individual Permit according to the requirements of 33 CFR 325.1, including a Section 404(b)(1) alternatives analysis and mitigation plan after the issuance of the ROD. To comply with CFR Part 230 Section 404(b)(1) guidelines, the USACE can only issue a permit for the Least Environmentally Damaging Practicable Alternative (LEDPA). Pursuant to NEPA, the USACE is a Cooperating Agency for this EIS. Reclamation has coordinated with USACE during development of the EIS.

33.3.7 Master Comment Responses for Air Quality and Climate Change

AQ-1 – Offsetting Greenhouse Gas Emissions with Increased Hydropower

Every action alternative would generally increase the volume of water stored in Shasta Lake and therefore the amount of electricity that can be produced by the hydropower facility at Shasta Dam. The analysis of greenhouse gas (GHG) emissions under Impact AQ-6 in Chapter 5, "Air Quality and Climate," assumed that the increase in hydropower production would reduce the need for fossil fuel-based generation and associated GHG emissions. Some commenters questioned this assumption or requested additional clarification. Some commenters also suggested that it would be equally reasonable to assume that some of the electricity would be produced by renewable sources such as solar and wind. However, the assumption used in the GHG analysis is reasonable given the superior cost-effectiveness of generating base load electricity with natural gas or other fossil fuels, as well as the regulatory context related to the California Global Warming Solutions Act of 2006 (Assembly Bill 32) and particularly California's Renewable Electricity Standard (RES). First, most of the baseload of electricity generation serving California comes from fossil fuel plants, nuclear plants, or hydroelectric power facilities because these are the most economical methods of producing electricity in the open market and because these forms of power generation, unlike solar and wind, can operate consistently and predictably on a long-term basis (i.e., 24 hours per day, 365 days a year). Second, RES essentially requires that 33 percent of the state's electricity come from eligible sources of renewable power by 2020 but the hydropower produced at Shasta Dam does not meet all the eligibility requirements necessary to qualify as renewable in the regulatory context of RES—most notably because its capacity exceeds 30 MW (CEC 2013: p. 27). Thus, because hydropower generated by the project is not eligible for Renewables Portfolio Standard (RPS) it cannot be argued that this power would replace power from generation sources that are RPS-eligible (e.g., solar, wind, geothermal). For these reasons, it is reasonable to assume that an increase in hydropower production at Shasta Dam would replace fossil fuel-generated power and therefore result in a GHG benefit.

AQ-2 – Loss of Carbon Sequestration and Carbon Sequestration Potential

The commenter criticizes the GHG analysis for not accounting for the fact that future carbon sequestration will not be generated by the vegetation that would be removed in the areas that would be inundated by water. The commenter is correct that the analysis does not differentiate between the loss of sequestered carbon during removal of vegetation and the loss of future sequestration potential from trees and

vegetation being removed before they could reach their maximum carbon storage potential (i.e., trees removed before reaching maturity). Instead of dividing the estimate of lost carbon sequestration into the two parts—the loss that would occur at the time the vegetation is removed and the loss if future potential sequestration—the analysis provides a conservative estimate of the loss of sequestered carbon with a simple calculation. The analysis assumed that the rate of carbon sequestration would be approximately 426 metric tons of carbon dioxide equivalent emissions (MT CO_2e) per acre of vegetation removal for all the action alternatives. For instance, it was estimated that the loss of sequestered carbon from removal of vegetation from 370 acres under Comprehensive Plan 1 (CP-1) would amount to a total 157,778 MT CO_2e and this value amortized over the 50-year life of the project would be 3,156 MT CO_2e/year.

As stated in Chapter 5, "Air Quality and Climate," Section 5.3.4, "Direct and Indirect Effects," (Page 5-43) of the DEIS, the calculation of sequestered carbon loss is conservative because it assumes that all of the inundated area is forested with stands of species that sequester relatively high quantities of carbon. Another reason the calculations used in the analysis are conservative is because they did not account for fact that much of the removed timber would continue to sequester carbon in the form of various wood products. Other analyses of carbon sequestration loss from timber removal projects in California estimate that 68 to 70 percent of merchantable wood volume would be converted to forest products (James, Krumland, and Eckert 2007; p. 29.).

The rate of carbon sequestration loss of 426 MT CO_2e/acre used in the analysis is also considered to be conservative when compared to the sequestration rates recommended in Air Resources Board's (ARB) Compliance Offset Protocol for USFS Projects (ARB 2013). In its protocol, ARB estimates that the Common Practice sequestration rates for forests in the Southern Cascades range from 49 to 128 MT CO_2e/acre. The rates are 70 to 88 percent lower than the rate used in the DEIS.

AQ-3 – Potential for Greenhouse Gas Emissions Generated by the Decomposition of Soil and Vegetative Material in the Expanded Reservoir

Vegetation management activities, including the clearing of trees and other vegetation from select areas around the reservoir, would be completed before inundation of new areas created by enlarging the reservoir, as explained in Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," (page 2-64) of the DEIS.

Increased GHG emissions from decomposition of remaining vegetation in areas with partial or no clearing are discussed in DEIS Chapter 5, "Air

Quality and Climate." In summary, the loss of vegetation presently in the area that would be inundated would likely result in a loss of CO_2 absorption by that vegetation, as well as increased emissions of decomposing material present in the lake as a result of increased volume. There may be some offset to this effect with increased surface area of Shasta Lake for absorption. These effects are speculative and infeasible to quantify at this time.

In its Climate Action Plan, DWR provides a useful and insightful summary of the current state of the science on whether water storage reservoirs in California, such as Shasta Lake, result in increased GHG emissions associated due to the decomposition or organic material (DWR 2012):

> *Several research studies have indicated that the surfaces of some reservoirs may be emitting or absorbing GHGs at material rates as a result of diffusion of CO_2 and CH_4 from the water into the atmosphere or from the atmosphere into the water. In addition, as stored water passes through hydroelectric turbines GHGs that had been dissolved in the water come out of solution and are released to the atmosphere. These types of emissions could represent sources or sinks of emissions from DWR's facilities; however, there are several factors that are not yet fully understood and that make it difficult to adequately quantify emissions rates from DWR's storage facilities.*
>
> *These factors have been identified in both the absorption and emission of GHGs from reservoirs and other aquatic systems. In general, organic inputs, soil type and vegetation inundated, water quality parameters (dissolved oxygen, CO_2, and CH_4, temperature, pH), and duration of inundation have all been found to affect the GHG absorption and emissions characteristics of aquatic systems.*
>
> *In addition to these factors, natural aquatic systems have been shown to be the primary pathway in the global carbon cycle for transmitting carbon sequestered at the watershed level back to the atmosphere, into sediment deposition, or as dissolved carbon to the oceans (Cole et al., 2007). Thus, even if emissions from the surface and tailraces of reservoirs could be accurately quantified, it would not be clear if the emission of GHGs by the reservoir was changing the actual flux of emissions or if the reservoir was only*

> *changing the temporal or spatial absorption and release of those emissions. Because rivers are significant GHG emissions pathways, it would be necessary to compare pre-reservoir watershed emissions with post-reservoir watershed emissions to determine the effect of the reservoir.*
>
> *Without extensive research and monitoring of DWR's facilities, DWR can rely only on existing data on similar facilities to estimate the impact of its facilities. Fifty-nine hydropower reservoirs, natural lakes, and rivers in the western and southwestern U.S. have been sampled to date (Soumis et al., 2004). This sampling shows that some reservoirs in California, Oregon, and Washington are GHG sinks while others have gross emissions equal to or less than natural lakes and rivers of the region (Tremblay et al., 2005). These studies suggest that net GHG emissions from [State Water Project] reservoirs are not substantial and are likely no higher than pre-development conditions.*

Reclamation believes that the state of the science on this question for its reservoirs in California, including Shasta Lake, is identical to the above findings by DWR.

Furthermore, on the international level, questions about the consistency of measurement and estimation techniques used to evaluate GHG emissions from reservoirs have culminated in a joint publication of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Hydropower Association (IAH) titled *GHG Measurement Guidelines for Freshwater Reservoirs* (UNESCO and IAH 2010). The primary objective of the *Guidelines* is to promote scientifically rigorous field measurement campaigns, and the evaluation of the net change in GHG emissions, from a representative set of freshwater reservoirs across the world. Potential important GHG pathways for CO_2 and CH_4 addressed by the *Guidelines* include ebullition (bubbling), diffusive fluxes from the reservoir surface, diffusion through plant stems, degassing just downstream from reservoir outlets, and increased diffusive fluxes along the river course downstream. Also of potential importance is the degree to which algae and vascular aquatic plants in reservoirs serve as a carbon sink and whether nitrification and denitrification processes in reservoirs result in a measurable nitrous oxide pathway. The *Guidelines* address the fact that there is little scientific consensus about the degree to which freshwater reservoirs contribute GHGs to the atmosphere. The *Guidelines* focuses on methodologies used to collect data in the field to better understand these pathways, including requirements regarding

sample size, measurement precision, spatial resolution (both horizontally and vertically), timing/seasonality, selection of sites for reference measurements, demarcation of a reservoir's drawdown zone, water quality parameters, requirements of gas analyzers and gas measurement technologies, standardization of units, and quality assurance and quality control procedures.

UNESCO/IHA will review all field data collection techniques to recognize compliance with the *Guidelines*. Data collected using the *Guidelines* will be used to develop predictive modeling tools for assessing the GHG status of unmonitored reservoirs and to develop general guidance for mitigating GHG emissions for sites that generate a high increase in net GHG emissions. Thus, such predictive modeling tools—that could potentially be used to support a NEPA or California Environmental Quality Act analysis—are not fully developed and therefore are not available at this time.

In light of all of these considerations, the DEIS does not attempt to quantify the net change in GHG emissions from the expansion of Shasta Lake or from the tailraces of its hydroelectric facilities. Thus, GHG emissions that were quantified in the DEIS do not include emissions from the expansion of the Shasta Lake or its hydroelectric facilities and impacts associated with GHG generation and Climate Change were found to be less than significant, as described in Chapter 5, "Air Quality and Climate." The comprehensive literature reviews conducted by both DWR and UNESCO/IHA suggest that attempting a quantitative analysis of these potential emission sources at this time would involve a high degree of speculation and uncertainty. That said, a change in emissions could occur in relation to this topic area due to implementation of the proposed action and alternatives. However, the reservoir is currently flooded and only a small portion of additional land would be inundated with project implementation. In addition, much of that land is currently highly disturbed upland habitat. This habitat does include vegetation that could decompose to result in additional GHG emissions, but it is important to note this vegetation is considered low density in its current state. Therefore, given the small area and the low density of vegetation, the potential increase in GHG emissions, though uncertain, is likely to be slight.

AQ-4 – Greenhouse Gas Emissions Associated with Cement Production

Comments were received relating to potential emissions associated with cement and concrete used to raise Shasta Dam. For this analysis, Reclamation has chosen to estimate and consider direct and indirect GHG emissions associated with the various action alternatives, and not attempt to quantify emissions associated with the manufacture of cement. Direct emissions are caused by the action itself, such as

emissions associated with the construction of a building whereas indirect emissions are also caused by an action but are removed from the action in either time or space, such as tailpipe emissions from construction worker vehicles. There are multiple reasons the analysis did not attempt to quantify emissions associated with the cement and concrete used in project construction, as described below.

First, the analysis did not attempt to perform a lifecycle analysis for the GHG emissions of each Comprehensive Plan. Emissions associated with the manufacturing of building materials are sometimes referred to as "embodied emissions" rather than direct or indirect emissions. Embodied emissions are included in life cycle assessments that attempt to account for many levels emissions-generating activities associated with an action or product. The challenge of presenting a lifecycle analysis is that there is much dissimilarity in determining the "boundary" or limits of that analysis. For instance, in a lifecycle assessment of concrete, the emissions used to operate equipment at a cement quarry would likely be included but the emissions associated with workers commuting to the quarry or the "upstream" emissions associated with any purchased solid fuels that are used for pyroprocessing may not be included. The broader the boundary of the life cycle analysis, the more speculation and uncertainty are introduced.

Draft NEPA guidance from the CEQ speaks to this reality as follows (CEQ 2010: 4 to 5):

> *Inherent in NEPA and the CEQ implementing regulations is a "'rule of reason,' which ensures that agencies determine whether and to what extent to prepare an EIS based on the usefulness of any new potential information to the decision-making process." DOT v. Public Citizen, 541 U.S. 752, 767 (2004). Where a proposed action is evaluated in either an EA or an EIS, the agency may look to reporting thresholds in the technical documents cited above as a point of reference for determining the extent of direct GHG emissions analysis that is appropriate to the proposed agency decision. As proposed in draft guidance above, for Federal actions that require an EA or EIS the direct and indirect GHG emissions from the action should be considered in scoping and, to the extent that scoping indicates that GHG emissions warrant consideration by the decision maker, quantified and disclosed in the environmental document. 40 CFR 1508.25. In assessing direct emissions, an agency should look at the consequences of actions over which it has control or authority.*

No government agency explicitly recommends conducting lifecycle analyses or suggests the quantification of embodied emissions in NEPA or CEQA analyses.

Another reason the analysis did not attempt to quantify embodied GHG emissions associated with the use of cement is that the cement industry is subject to California's Cap-and-Trade Program. The Cap-and-Trade Program covers major sources of GHG emissions in the State such as refineries, power plants, industrial facilities—including cement plants—and transportation fuels. The Cap-and-Trade Program includes an enforceable emissions cap that will decline over time. The state distributes allowances, which are tradable permits, equal to the emissions allowed under the cap. Sources under the cap, including cement plants, will need to surrender allowances and offsets equal to their emissions at the end of each compliance period (ARB 2012: pp. 13). Because emissions associated with cement production are already being addressed and controlled by the Cap-and-Trade Program, the analysis in the DEIS focused on the level of emissions associated with off-road equipment use and on-road vehicle use (i.e., haul truck trips, worker commute trips).

The approach used in the GHG analysis follows guidance that has been developed by various state agencies for CEQA documents because guidance of similar detail has not been developed by EPA, the CEQ, Reclamation, or other federal agencies.

33.3.8 Master Comment Responses for Costs vs. Benefits

COST/BEN-1 – Intent of EIS and Process to Determine Federal Interest

Several comments raised concerns over the estimated benefits and costs of the action alternatives. Some comments reflected concerns that the costs of the alternatives outweighed the potential benefits.

DEIS Chapter 1, "Introduction," Section 1.5, describes the "Intended Use of EIS." The purpose of an EIS is not to recommend approval or rejection of a project, but to describe the beneficial and adverse effects on the human environment of a proposed action and a reasonable range of alternatives. The SLWRI DEIS provides a full and fair discussion of significant environmental impacts (40 CFR 1502.1) through the evaluation of reasonable range of alternatives which could feasibly achieve the purpose and need to aid the public and decision makers and permitting agencies in the decision-making process. For further information related to NEPA compliance, please see Master Comment Response NEPA-1, "Sufficiency of EIS."

Consistent with 40 CFR 1502.23, a monetary cost-benefit analysis was not included in the DEIS or Final EIS. As stated in 40 CFR 1502.23:

> *…the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations. In any event, an environmental impact statement should at least indicate those considerations, including factors not related to environmental quality, which are likely to be relevant and important to a decision.*

Consistent with this guidance, although a monetary cost-benefit analysis was not included in the EIS because it is not required under NEPA, costs and non-monetized benefits for action alternatives were included in the DEIS and this Final EIS to provide additional basis and context for weighing the merits and drawbacks of alternatives. Estimated costs and potential non-monetary benefits of SLWRI action alternatives are presented in the EIS Engineering Appendix, Attachment 1, "Cost Estimates for Comprehensive Plans," and EIS Chapter 2, "Alternatives," Section 2.3, "Action Alternatives." The DEIS provides a full and fair discussion of beneficial and adverse environmental effects of action alternatives.

Consistent with P&G, a monetary cost-benefit analysis was performed and is presented in the Final Feasibility Report. So while the neither the DEIS or Final EIS includes monetary cost-benefit analyses, which is not required by NEPA, such an analysis was performed consistent with federal guidelines and is included in the Final Feasibility Report.

The Final Feasibility Report, together with this Final EIS, and supporting documents will be submitted by the Secretary of the Interior to Congress. Congress may take one or more of the following actions: (1) approve of the recommendations of the Secretary of the Interior, with or without further modifications; (2) approve the No-Action Alternative; (3) delay decisions and request additional information from the Secretary of the Interior; (4) authorize construction of the approved action via appropriate legislation, and, (5) appropriate funds via separate legislation.

COST/BEN-2 – Comments Related to the SLWRI Feasibility Report

Several comments were received that appear to be directly related to the SLWRI Draft Feasibility Report and related evaluations, which is not within the scope of the DEIS. Accordingly, these comments are not the subject of the public review process at this time, and a response to these comments is not required under NEPA because the comment does not raise a significant issue with the NEPA document (NEPA Regulations

40 CFR Part 1503.4(b)). Examples of these comments include comments related to feasibility evaluations presented in the Draft Feasibility Report.

The SWLRI Draft Feasibility Report had a separate public review and comment process. Reclamation released the Draft Feasibility Report and Preliminary DEIS to the public in February 2012 to share information generated since the completion of the SLWRI Plan Formulation Report in December 2007 and to provide additional opportunity for public and stakeholder input. This February 2012 release was followed by an October 2012 Reclamation news release requesting additional public comment on the Draft Feasibility Report for input on potential cost, benefits and impacts of enlarging Shasta Dam and Reservoir. Public comments on the Draft Feasibility Report were accepted through December 28, 2012. Comments received on the Draft Feasibility Report were considered in development of documentation and evaluations in the DEIS, this Final EIS, and the Final Feasibility Report.

The SLWRI Final Feasibility Report and related Economic Valuation Appendix and Cost Allocation Appendix were released concurrently with this Final EIS. Since the release of the Draft Feasibility Report in 2012, SLWRI action alternatives and related evaluations were further refined based several factors, including updates to CVP and SWP operational assumptions and stakeholder input. This is described in the DEIS and Final EIS in Chapter 2, "Alternatives," Section 2.1.6, "Development and Refinement of Comprehensive Plans," and Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.2.3, "Methods and Assumptions." As described in the DEIS and Final EIS, water operations modeling and related evaluations were updated to reflect the following:

- 2008 Long-Term Operation BA
- USFWS 2008 Formal Endangered Species Act Consultation on the Proposed Coordinated Operations of the CVP and SWP (2008 USFWS BO)
- 2009 NMFS BO
- Additional changes in CVP and SWP facilities and operations, such as implementation of the San Joaquin River Restoration Program
- Additional changes in non-CVP/SWP facilities and operations, such as the addition of the Freeport Regional Water Project

The alternatives evaluated and CVP and SWP operational assumptions in the Final EIS are the same as those in the Final Feasibility Report and related appendices. Accordingly, operational assumptions in the Final Feasibility Report reflect the 2008 Long-Term Operation BA, 2008 USFWS BO, and 2009 NMFS BO.

Comments provided during the DEIS public comment period related to the Draft Feasibility Report will be considered in the development of evaluations and documentation for the Final Feasibility Report. The Final Feasibility Report, together with this Final EIS, and supporting documents will be submitted by the Secretary of the Interior to Congress for potential construction authorization and related appropriations.

COST/BEN-3 – Increased Water Supply Reliability under Action Alternatives

Several comments stated that SLWRI action alternatives will not increase water supply reliability or decrease unmet contract amounts.

Estimated potential increases in water supply reliability under SLWRI action alternatives are described in in the DEIS in Chapter 2, "Alternatives," Section 2.3, "Action Alternatives," and summarized in Section 2.5, "Summary of Potential Benefits of Action Alternatives." As described in the DEIS, SLWRI action alternatives would increase water supply reliability by increasing water supplies for CVP and SWP irrigation and M&I deliveries. Estimated increases in water supply deliveries under SLWRI action alternatives reduce the previously unmet CVP contract and SWP Table A amounts. Estimated increases in dry and critical year water supplies for irrigation and M&I deliveries under SLWRI action alternatives range from about 47,300 acre-feet (for CP1) to about 113,500 acre-feet (for CP5). Estimated increases in average annual deliveries under SLWRI action alternatives range from about 31,000 acre-feet (for CP1) to about 75,900 acre-feet (for CP5).

Water supply reliability benefits of each action alternative were estimated using standard methodologies that are consistent with the current regulatory framework, using CalSim-II, which is the best available tool for evaluating system-wide water operations throughout the Central Valley. CalSim-II is the standard operations model used for CVP/SWP systems analysis, including in EISs prepared by Reclamation. For information related to the CalSim-II model and related assumptions used for evaluations in the EIS, please see EIS Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.1, "Methods and Assumptions," and the Modeling Appendix, Chapter 2, "CalSim-II." No other comparable tools have been suggested by commenters.

COST/BEN-4 – Non-monetary Benefits of Action Alternatives
Several comments sought clarification on the potential benefits of the action alternatives.

Potential non-monetary benefits of SLWRI action alternatives, are described in the DEIS in Chapter 2, “Alternatives,” Section 2.3, "Action Alternatives." Under SLWRI action alternatives, the additional storage in Shasta Reservoir would allow an increase in water supply reliability and expansion of the cold-water pool for downstream anadromous fisheries. Enlarging Shasta Reservoir would increase the depth and volume of the cold-water pool, increasing the ability of Reclamation to release cold water from Shasta Dam and regulate seasonal water temperatures for fish in the upper Sacramento River. This could improve water temperature and flow conditions, increasing anadromous fish survival in the upper Sacramento River. SLWRI action alternatives would also increase water supply reliability for agricultural, M&I, and environmental purposes and help reduce future water shortages, primarily during drought periods (see Master Comment Response COST/BEN-3, “Increased Water Supply Reliability under Action Alternatives”).

Other potential benefits of SLWRI action alternatives that contribute to meeting project objectives include the following:

- Increased capacity in Shasta Reservoir for capture of high flood flows
- Increased hydropower generation
- Conservation, restoration, and enhancement of ecosystem resources in the Sacramento River
- Improved Delta water quality and Delta emergency response capability
- Increased recreation opportunities at Shasta Lake

Quantified estimates of non-monetized benefits under SLWRI action alternatives were based on modeling efforts that are described in several parts of the DEIS. Increased water supply reliability was estimated using CalSim-II, which is described in EIS Chapter 6, “Hydrology, Hydraulics, and Water Management,” Section 6.3.1, “Methods and Assumptions,” and the Modeling Appendix, Chapter 2, “CalSim-II.” Increased anadromous fish survival was estimated using SALMOD, Version 3.8 (based on inputs from CalSim-II and water temperature modeling), which is described in EIS Chapter 11, “Fisheries and Aquatic Resources,” Section 11.3.1, “Methods and Assumptions,” and the

Modeling Appendix, Chapter 5, "Anadromous Fish Production Simulation (SALMOD)." Increased hydropower generation was estimated using the LongTermGen, Version 1.18, and SWP Power, BST April 2010 Version, modeling tools for the CVP and SWP, respectively, which are described in Chapter 23, "Power and Energy," Section 23.3.1, "Methods and Assumptions, and Modeling," and Modeling Appendix Chapter 8, "Hydropower Modeling." The methodology used to estimate increased recreation user days is described in the Modeling Appendix Chapter 10, "Recreational Visitation."

COST/BEN-5 – Potential Project Financing

Several comments were related to CVP financing topics and/or the SLWRI Draft Feasibility Report potential funding analyses, which are outside the scope of the EIS, and therefore does not require a response under NEPA (40 CFR 1503.4(b)). Some of these comments directly referred to the Draft Feasibility Report and the corresponding Draft Economic Valuation Appendix (which were released to the public in February 2012), not the 2013 DEIS. Other comments were directed toward the DEIS, but were on financial topics outside the scope of the SLWRI or on topics related to the Feasibility Report, that were not included in the DEIS because they were not required under NEPA. These financial topics include historical CVP repayment policies, potential water beneficiaries' payment capacities, and SLWRI preliminary cost allocation. As described in Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," evaluations in the SLWRI Final Feasibility Report, including preliminary cost allocation and potential water beneficiaries' payment capacities, will be updated based on alternatives refinements and updated operational assumptions included in the DEIS. Comments provided on the Draft Feasibility Report and related evaluations were considered in the development of evaluations and documentation for the Final Feasibility Report.

33.3.9 Master Comment Responses for Engineering and Design

ENG-2 – Borrow Materials

During the public comment period, comments were received regarding the potential sources of borrow material that would be used for construction during the raising of Shasta Dam.

As described in the DEIS Engineering Summary Appendix, Chapter 3, "Design Considerations for Dam and Appurtenances of Dam Enlargements," multiple borrow sources are available to meet project needs. Material availability would vary with market demand and production restrictions, but it is expected that sufficient materials will be available when needed for construction. Table 3-17 in the DEIS Engineering Summary Appendix lists the quantities and type of borrow

material that would be most restrictive for the dam raise and facility relocations (e.g., materials required for dike construction). Borrow sources could include: (1) commercial sources, and (2) borrow areas developed on Federal lands. Borrow areas on Federal lands could include areas of the dike construction sites, areas located below the reservoir's inundation zone, and other Federal lands within the reservoir area. The volume of material includes the amounts that may be supplied by commercial sites. Any commercial source would need to meet all applicable local, state, and federal regulatory requirements. In the DEIS Appendices Engineering Summary, Appendix Plate 25 shows potential locations for both private/commercial sources and sources located on federal lands. The Final EIS includes clarification about the potential use of Federal lands in the reservoir area.

The proposed Moody Flats Quarry is not on Federal lands and is still in the preliminary phases of environmental documentation (EIR is under development), and accordingly, it was not identified as a borrow source for the project. However, in response to public comment and information recently made available by the project proponents, the Moody Flats Quarry is included in the cumulative effects analysis and is described in Final EIS Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.2.9, "Cumulative Effects," Further, Moody Flats Quarry is included in the cumulative effects analysis within related resources chapters of the Final EIS (Chapters 4 through 25), as appropriate.

33.3.10 Master Comment Responses for General

GEN-1 – Comment Included as Part of the Record

Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process. A response to this type of comment is not required under NEPA because the comment does not raise a significant environmental issue (40 CFR 1503.4). This comment will be included as part of the record and made available to decision makers before a final decision on the proposed action.

GEN-2 – Unsubstantiated Information

The information provided by the comment author in the comment is not known to Reclamation and could not be found through library database queries, internet research and research in the Reclamation data archives. The EIS did rely on the best available science to support the NEPA analysis and absent any additional information to substantiate this comment, no further response is required.

GEN-4 – Best Available Information

NEPA requires that agencies ensure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements; identify any methodologies used and make explicit reference by footnote to the scientific and other sources that were relied upon for conclusions in the statement. An agency may place discussion of methodology in an appendix (40 CFR 1502.24).

Reclamation, through the scoping process and discussions with agencies and stakeholders, has performed information gathering and focused studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The tools used to evaluate impacts of the alternatives were selected based upon Reclamations standard practices, procedures, directives, and policies, and input from agencies and subject matter experts. DEIS Chapter 29, "List of Preparers," lists the people and disciplines involved in the preparation of the DEIS including engineers, geologists, biologists, cultural resources specialists, architects, and economists.

Methodologies used in the analysis of the effects of the alternatives are documented in each resource chapter of the EIS (Chapters 4 through 25) under the subsection "Methods and Assumptions." Additional details of the methods used to evaluate the alternatives are located in the various Appendices to the EIS, where there are full descriptions of the methods, their derivation, uncertainties, and how they are used to support the analyses within the EIS. Primary models/tools used in the evaluation of SLWRI alternatives are shown in Table 33.3-2. All methods used were the best available for the analyses to be performed.

Table 33.3-2. Primary Models Used in the Analysis of the Effects of Action Alternatives

Analysis Area	Model	Primary Description in EIS	Appendix
Water Supply – CVP/SWP Operations	CalSim-II	Chapter 6, "Hydrology, Hydraulics, and Water Management"	Modeling Appendix Chapter 2, "CalSim-II"
Water Quality – Delta Water Quality	Delta Simulation Model 2 (DSM2)	Chapter 6, "Hydrology, Hydraulics, and Water Management" & Chapter 7, "Water Quality"	Modeling Appendix Chapter 7, "Delta Hydrodynamic Model"
Water Quality – River and Reservoir Temperature	Sacramento River Water Quality Model (SRWQM)	Chapter 7, "Water Quality"	Modeling Appendix Chapter 4, "Sacramento River Water Quality Model"
Fisheries – Anadromous Fish Production	Anadromous Fish Production Simulation (SALMOD)	Chapter 11, "Fisheries and Aquatic Resources"	Modeling Appendix Chapter 5, "Anadromous Fish Production Simulation"

Table 33.3-2. Primary Models Used in the Analysis of the Effects of Action Alternatives (contd.)

Analysis Area	Model	Primary Description in EIS	Appendix
Power – Hydropower Generation and Consumption (CVP)	LongTermGen (LTGen)	Chapter 23, "Power and Energy"	Modeling Appendix Chapter 8, "Hydropower Modeling"
Power – Hydropower Generation and Consumption (SWP)	State Water Project Power (SWPPower)	Chapter 23, "Power and Energy"	Modeling Appendix Chapter 8, "Hydropower Modeling"
Economics – Regional Agricultural Production and Economic Optimization	Statewide Agricultural Production Model (SWAP)	Chapter 16, "Socioeconomics, Population, and Housing"	Modeling Appendix Chapter 6, "Statewide Agricultural Production Model"
Economics – Regional Economics	IMpact analysis for PLANning model (IMPLAN)	Chapter 16, "Socioeconomics, Population, and Housing"	Modeling Appendix Chapter 9, "Regional Economic Impact Modeling"
Geology – Geomorphology	Shoreline Erosion Conceptual Model	Chapter 4, "Geology, Geomorphology, Minerals, and Soils"	Geologic Technical Report Attachment 1, "Shoreline Erosion Technical Memorandum"
Air Quality – Emissions	California Emissions Estimator Model (CalEEMod)	Chapter 5, "Air Quality and Climate"	Air Quality Technical Report Attachment 1, "Air Quality and Greenhouse Gas Modeling Results"
Air Quality – Emissions	Motor Vehicle Emission Factor Model (EMFAC)	Chapter 5, "Air Quality and Climate"	Air Quality Technical Report Attachment 1, "Air Quality and Greenhouse Gas Modeling Results"
Air Quality – Emissions	OFFROAD	Chapter 5, "Air Quality and Climate"	Air Quality Technical Report Attachment 1, "Air Quality and Greenhouse Gas Modeling Results"
Air Quality – Emissions	Sacramento Metropolitan Air Quality Management District's (SMAQMD) Road Construction Emissions Model	Chapter 5, "Air Quality and Climate"	Air Quality Technical Report Attachment 1, "Air Quality and Greenhouse Gas Modeling Results"
Watershed Erosion	Watershed Erosion Prediction Project (WEPP)	Chapter 7, "Water Quality"	-

Key:
CVP = Central Valley Project
SWP = State Water Project

Quality Control/Peer Reviews for SLWRI EIS Quality control reviews were conducted for this Final EIS to verify that documentation and related evaluations meet Reclamation's quality requirements and

comply with applicable laws, regulations, and sound technical practices of the disciplines involved. These reviews included independent peer reviews by Reclamation, Cooperating Agency, and other State and Federal agency technical/resource area experts; targeted Reclamation reviews; and routine quality reviews during development of technical evaluations and documentation.

Reclamation technical/resource area experts conducted independent peer reviews of documentation and related evaluations throughout the development of the EIS, including the DEIS and Final EIS. Similar peer reviews were also conducted for appropriate resource areas by members of Cooperating Agencies and other State and Federal agencies. During these reviews, documentation and related evaluations were reviewed for:

- Compliance with established laws, policies, regulations, and other appropriate guidance
- Adequacy of the scope of the document
- Appropriateness of all planning, engineering, design, and environmental assumptions and methods
- Appropriateness of data used, including level of detail
- Appropriateness of alternatives evaluated
- Accuracy
- Comprehensiveness
- Reasonableness of results

Reclamation has also conducted targeted reviews of evaluations and documentation in the EIS, including:

- A Design, Engineering, and Construction (DEC) Review of designs and cost estimates for SLWRI action alternatives and a follow-up DEC Special Assessment to verify completion of DEC Review recommendations.
- A Policy Compliance Review of the Final EIS and Final Feasibility Report to ensure that all applicable policy requirements and directives have been addressed.

In addition, reviews were performed routinely during development of EIS technical evaluations and documentation. Routine technical analysis reviews were conducted by subject matter experts and included (1) review of tool selection, (2) review of tool assumptions and inputs, (3)

review of tool outputs, and (4) review of modeling results and interpretation. Routine documentation reviews included independent review by subject matter experts to confirm agreement with scope, appropriateness of assumptions and methodology, accuracy of data and findings, interpretation of findings, and that conclusions were supported by information presented.

GEN-5 – Some People Support Dam Raise and Others Oppose Dam Raise

Reclamation acknowledges that there are many people who support raising the dam and there are many who maintain that the dam should remain unchanged. There are a range of reasonable alternatives presented in the EIS which have been refined from the November 2011 Draft Feasibility Report; six of which are examined in detail using the best available science. Reclamation recognizes that there are positive and negative aspects for each of these alternatives. The potential effect of each alternative is discussed in the EIS and will be fully considered by the decision-maker, along with public input before making a final recommendation. Also any modifications to the dam or facilities will require Congressional authorization as well as refinements to design, obtaining permits, and fulfilling mitigation requirements.

GEN-7 – Rules and Regulations for Water Operations Under Action Alternatives

Water operations under SLWRI action alternatives are described in DEIS in Chapter 2, "Alternatives," Section 2.3, "Action Alternatives." As described, Shasta Dam is operated in conjunction with other CVP facilities and SWP facilities to manage floodwater, storage of surplus winter runoff for irrigation in the Sacramento and San Joaquin valleys, M&I use, maintenance of navigation flows, protection and conservation of fish and other beneficial uses in the Sacramento River and Delta, and generation of hydroelectric energy. The SLWRI No-Action Alternative and action alternatives would not include changes to any rules and regulations that govern operations at Shasta Dam in the form of flow requirements, water quality requirements, and water supply and hydropower commitments.

SLWRI alternatives would not supersede existing laws or regulations and would not exempt any actions from compliance with applicable laws, including NEPA or Federal Endangered Species Act (ESA). SLWRI alternatives would not increase existing maximum CVP or SWP contract quantities or expand the place of use. Similarly, SLWRI action alternatives would not modify existing priorities for water supply deliveries. The power generated by the CVP is marketed through contracts with the Western Area Power Administration (Western). Changes in Western’s priorities are not anticipated to change under SLWRI action alternatives.

SLWRI action alternatives would, however, include potential for modification to existing operational guidelines or rule curves for flood control at Shasta Dam and Reservoir. However, these changes would primarily be to accommodate physical modifications of action alternatives, such as increased dam height. Although the volume of the flood control pool would remain the same as under existing operations (1.3 MAF), the bottom of the flood control pool elevation would likely be increased based on increased dam height and reservoir capacity. The rule curves would be revised with the goal of reducing flood damage and enhancing other objectives to the extent possible.

The Federal, State, and local regulatory framework for the SLWRI is generally described in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.4, "Regulatory Framework," of the DEIS. Chapters 4 through 25 contain more detailed discussions of the "Regulatory Framework" by resource area. In addition, Chapter 26, "Other Required Disclosures," further describes the Federal and State laws, rules and regulations, Executive Orders, and compliance requirements that may be required if an alternative is selected for implementation.

GEN-8 – Public Outreach and Involvement

Comments received during the public comment period included remarks on the public release of the DEIS, meetings with local governments, and the public hearing process.

General Public Outreach and Involvement 40 CFR 1506.6(a,d) states:

- "Agencies shall make diligent efforts to involve the public in preparing and implementing their NEPA procedures;"
- "Agencies shall solicit appropriate information from the public."

Reclamation consulted and coordinated with various public agencies, organizations, and Native American Tribal Groups during the public outreach process and throughout the development of the SLWRI DEIS to obtain feedback on SLWRI, including, but not limited to, the USFS; Colusa Indian Community Council of the Cachil Dehe Band of Wintun Indians; USACE; U.S. Department of the Interior, Bureau of Indian Affairs (BIA); USFWS; NMFS; DWR; California Department of Fish and Wildlife (CDFW); and the Winnemem Wintu.

In addition, other public outreach activities included workshops, presentations, project briefings, and project update meetings (including

those with property owners and/or business interest in the Shasta Lake area).

For additional information on consultation and coordination, see Chapter 27, "Public Involvement, Consultation, and Coordination," Section 27.4, "Consultation and Coordination."

DEIS Public Review 40 CFR 1506.6 states, "Agencies shall provide public notice of NEPA-related hearings, public meetings, and the availability of environmental documents so as to inform those persons and agencies who may be interested or affected" and 40 CFR 1506.10(c) states "…agencies shall allow not less than 45 days for comments on draft statements."

The DEIS was released on July 1, 2013, for public and agency review and comment for a 90-day period that ended September 30, 2013. The document's Notice of Availability (NOA) was posted by U.S. Environmental Protection Agency (EPA) in the July 1, 2013, *Federal Register*.

Reclamation met and exceeded the 45-day mandatory time limit. For more information, please see the Master Comment Response COMMENTPERIOD-1, "Comment Period."

Public Hearings NEPA regulations 40 CFR Section 1506.6(c) states:

> *"Agencies shall hold or sponsor public hearings or meetings whenever appropriate or in accordance with statutory requirements applicable to the agency."*

Consistent with NEPA requirements, three public hearings were held in diverse geographical areas (Los Banos, Redding and Sacramento) to allow potentially affected communities to provide comments on the DEIS. These public hearings occurred before the close of the public comment period. Before the public hearings, Reclamation issued a news release to its statewide media list and posted advertisements in newspaper of record for each community, which were the Los Banos Enterprise, Redding Record-Searchlight and The Sacramento Bee.

The public hearings were held September 11, 12, and 13, 2013, in Sacramento, Los Banos and Redding, respectively. The total number of people that signed in for the meetings was 9, 5, and 138, respectively.

Cooperating Agencies 40 CFR 1501.6 states "Upon request of the lead agency, any other Federal agency which has jurisdiction by law shall be a cooperating agency. In addition any other Federal agency which has special expertise with respect to any environmental issue, which should be addressed in the statement, may be a cooperating

agency upon request of the lead agency. An agency may request the lead agency to designate it a cooperating agency."

Cooperating agencies on the DEIS include the USFS, Colusa Indian Community Council of the Cachil Dehe Band of Wintun Indians; USACE; and BIA.

For additional information on public outreach and involvement, see Chapter 27, "Public Involvement, Consultation, and Coordination," and Chapter 32, "Final EIS," Section 32.2, "Public Involvement for the SLWRI EIS."

COMMENTPERIOD-1 – Comment Period

In accordance with NEPA review requirements, the DEIS was circulated for public and agency review and comment for a 90-day period, from July 1, 2013 to September 30, 2013, after the EPA published the notice of availability in the Federal Register. The 90-day review period was twice the required 45 day review period. Written comments from the public, reviewing agencies, and stakeholders were accepted during the public comment period. Similar to the approach to public scoping, public hearings were held in various locations statewide to solicit and receive public input on the DEIS. These hearings were held during the public comment period and recorded by a certified court reporter so that any comments received at the hearings were addressed in the Final EIS. All written comments received on the DEIS, and all verbal comments received during the public meetings and by September 30, 2013 are fully considered and addressed. The DEIS is available on-line through the Reclamation website, as well as available at 6 local public libraries, and Reclamation's office in Sacramento and Washington, D.C.

MAILINGLIST-1 – Addition to the Mailing List

Thank you for the contact information, the SLWRI mailing list has been updated.

33.3.11 Master Comment Responses for Noise and Vibration

NOISE-1 – Traffic Noise Analysis

The traffic noise analysis is provided DEIS Chapter 8, "Noise and Vibration," Section 8.3.4, "Direct and Indirect Effects," under the heading *Off-Site Construction Traffic* on page 8-27 under Impact Noise-1 (CP1). A more comprehensive traffic noise analysis is provided here to address the multiple comments that raised concerns about the evaluation of traffic noise levels that would occur during project construction.

This additional analysis focuses on whether project-generated construction-related traffic would cause traffic noise levels to exceed

local transportation noise standards. It specifically addresses noise from traffic traveling to and from the dam site where construction activity would be the most intense, attract the most trips, and take place for the longest period of time. Because the primary access routes between the dam site and Interstate 5, including Shasta Dam Boulevard (State Route 151) and Lake Boulevard (Road 418), travel through the City of Shasta Lake, the analysis applies the transportation noise standards that have been established by the city. The city's transportation noise standards are provided in Table N-1 of the City of Shasta Lake General Plan (City of Shasta Lake 1999:24), which is reproduced below. The previous analysis used a generally acceptable method for construction noise. However, due to the comments received, this additional analysis has been done using specific standards. This approach is more comprehensive than the simpler approach presented in the DEIS (beginning on page 8-27) which focused solely on whether construction-related traffic noise increases along any affected roadways would be noticeable (i.e., 3 A-weighted decibels [dBA or dB] or greater). The City of Shasta Lake has not established any standards regarding the relative increase in noise due to a project, even for long-term increases that would occur for an indefinite period of time.

Table 33.3-3. Noise Sensitivity Standards

New Land Use	Outdoor Activity Area (L_{dn} dBA)	Interior Activity Area (L_{dn}/Peak Hour L_{eq} dBA)[1]	Notes
All Residential	60 – 65	45	2, 3, 4
Transient Lodging	65	45	5
Hospitals & Nursing Homes	60	45	6
Theaters & Auditoriums	—	35	
Churches, Meeting Halls, Schools, Libraries, etc.	60	40	
Office Buildings	65	45	7
Commercial Buildings	65	50	7
Playgrounds, Parks, etc.	70	—	
Industrial Facilities	65	50	7

Source: City of Shasta Lake General Plan 1999

Notes:

[1] For traffic noise within the City of Shasta Lake, Ldn and peak-hour Leq values are estimated to be approximately similar. Interior noise level standards are applied within noise-sensitive areas of the various land uses, with windows and doors in the closed positions.

[2] Outdoor activity areas for single-family residential uses are defined as back yards. For large parcels or residences with no clearly defined outdoor activity area, the standard shall be applicable within a 100 foot radius of the residence.

[3] For multi-family residential uses, the exterior noise level standard shall be applied at the common outdoor recreation area, such as at pools, play areas or tennis courts. Where such areas are not provided, the standards shall be applied at individual patios and balconies of the development.

[4] Where it is not possible to reduce noise in outdoor activity areas to 60 dB Ldn or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB Ldn may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

[5] Outdoor activity areas of transient lodging facilities include swimming pool and picnic areas.

[6] Hospitals are often noise-generating uses. The exterior noise level standards for hospitals are applicable only at clearly identified areas designated for outdoor relaxation by either hospital staff or patients.

[7] Only the exterior spaces of these uses designated for employee or customer relaxation have any degree of sensitivity to noise.

While the city's noise standards were established for the evaluation of new noise-sensitive receptors, they are the only quantitative noise standards established by the city and are similar to the standards established by Shasta County, Tehama County, and other local jurisdictions in California for evaluating transportation noise (e.g., Tables 8-7, 8-8, and 8-10 in the DEIS). Thus, the criteria listed in Table N-1 are used to evaluate increased noise levels that would result from construction-related traffic.

Quantitative traffic noise modeling was also conducted consistent with the U.S. Department of Transportation, Federal Highway Administration's Traffic Noise Model (FHWA 2006) and, therefore, takes into account potentially important attributes including the proportion of traffic that consists of automobiles, medium trucks, and heavy trucks to account for the relatively higher noise levels generated by haul trucks; the speed of travel; and the distance between noise-sensitive receptors and the roadway. As necessary, separate modeling runs were conducted for different segments of the same roadway to account for changes in these attributes.

In addition, the baseline traffic volume data used in the modeling are representative of the year 2012, which is the most recent year for which Caltrans provides data at the time of writing this response (Caltrans 2014). This distinction is important because traffic volumes for 2012 are generally higher than the 2006 traffic volumes used in the DEIS, and, therefore, result in higher traffic noise levels.

Lastly, the traffic volume increases resulting from project construction that are used in the modeling are consistent with the trip generation values provided in Chapter 20, "Transportation and Traffic," of the DEIS, which are higher than the trip generation rates discussed in Chapter 8, "Noise and Vibration." According to Chapter 20, "Transportation and Traffic," of the DEIS, the highest number of worker commute trips would be generated under CP-3, at 700 one-way trips per day, and the highest number of haul truck trips to and from the dam site would occur under CP-4, at 350 one-way trips per day. To conduct a conservative analysis that addresses all the CPs, the combination of these two values was used in the traffic noise modeling of baseline-plus-construction conditions. Results of the traffic noise modeling for both baseline and baseline-plus-construction conditions are summarized in the table below.

Table 33.3-4. Summary Exterior Traffic Noise Levels (L_{dn}, dBA)[1]

Roadway Segment	Baseline	Baseline Plus Construction
Lake Boulevard from Shasta Dam to Shasta Dam Boulevard	58.6	63.9
Shasta Dam Boulevard from Shasta Dam to Lake Boulevard	41.0	53.7
Shasta Dam Boulevard from Lake Boulevard to Toyon Neighborhood	56.6	62.1
Shasta Dam Boulevard from Toyon Neighborhood to Southern Pacific Railroad	58.2	62.6
Shasta Dam Boulevard from Southern Pacific Railroad to Ashby Road couplet	59.9	62.8
Shasta Dam Boulevard from Ashby Road couplet to Front Street/Hardenbrook Avenue	57.5	61.1
Shasta Dam Boulevard from Front Street/Hardenbrook Avenue to Cascade Boulevard	62.3	64.1
Shasta Dam Boulevard from Cascade Boulevard to Interstate 5	61.7	63.0
Roadway Segments Near Schools	**Baseline**	**Baseline Plus Construction**
Lake Boulevard along Mountain Lakes High School and Shasta Lake Elementary School[3]	53.0	59.8
Shasta Dam Boulevard along Mountain Lakes High School and Shasta Lake Elementary School[3]	46.8	54.5

Source: Modeling conducted by Ascent Environmental, Inc. 2014.

Notes:

[1] Refer to Traffic Noise Modeling Appendix for detailed modeling input parameters and output results.

[2] For both the segment of Lake Boulevard between Shasta Dam and Shasta Dam Boulevard and the segment of Shasta Dam Boulevard between Shasta Dam and Lake Boulevard, it was conservatively assumed that all trips generated by construction activity at the dam site would use these roadway segments, to be conservative.

[3] Separate modeling was conducted for the portions of Lake Boulevard and Shasta Dam Boulevard that pass along Mountain Lakes High School and Shasta Lake Elementary School where the posted speed limit is 25 mph. This modeling also accounted for the specific distance between the school buildings or their outdoor activity areas and the modeled roadway.

Key:

dBA =A-weighted decibels

L_{dn} = day-night noise level

As shown in the table, construction-related traffic would not result in traffic noise levels that exceed 65 dBA day-night noise level (L_{dn}) at receptors along any of the modeled roadway segments. Thus, traffic noise levels during project construction would not exceed the noise sensitivity standards established by the City of Shasta Lake for residential land uses or commercial land uses (Table 33.3-3). Reclamation recognizes that the city's noise standard for residential land uses consists of a range of 60 to 65 dBA L_{dn}; however, given that construction phase would not last for an indefinite period of time, it is reasonable to apply the 65 dBA L_{dn} to make a significance determination. This approach is consistent with the maximum allowable noise exposure standards established by Shasta County for transportation noise which state, "Where it is not possible to reduce noise in outdoor activity areas to 60 dBA L_{dn} per community noise equivalent level (CNEL) or less using a practical application of the best-available noise

reduction measures, exterior noise levels of up to 65 dBA L_{dn}/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table" (See Table 8-7 on page 8-17 in Chapter 8, "Noise and Vibration," in the DEIS). This approach is also consistent with Shasta County's "conditionally acceptable" noise standards for transportation noise shown in Table 8-8 on page 8-18 of the DEIS, as well as the "conditionally acceptable" noise-compatibility guidelines recommended by the Governor's Office of Planning and Research shown in Table 8-4 on page 8-13 of the DEIS. Also shown in the table, estimated traffic noise levels along the segments of Lake Boulevard and Shasta Dam Boulevard that pass Mountain Lakes High School and Shasta Lake Elementary School would not exceed 60 dBA L_{dn}, which is the criterion established by the City of Shasta Lake for schools. Assuming the average exterior-to-interior noise level reduction of 20 dBA provided by wood frame buildings with the windows closed (Caltrans 2011a:H-17), the interior noise levels at roadside residential and commercial buildings would not exceed the city's interior noise standard of 45 dBA L_{dn}. Similarly, the interior noise levels at the schools would not exceed the city's interior noise standard of 40 dBA L_{dn} at the two schools. For these reasons, levels of traffic noise exposure under all five action alternatives would not exceed any of the exterior or interior noise standards established by the City of Shasta Lake.

For analysis about whether truck passbys would result in sleep disturbance, see Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors."

NOISE-2 – Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors

Several comments raised issues about the potential impact of noise generated by haul trucks transporting materials to and from various construction sites, particularly the potential for the noise generated by single haul truck passbys to result in sleep disturbance during the more noise-sensitive nighttime hours at residences located along haul routes.

In addition to increases in average daily traffic noise, intermittent Single-Event Levels (SEL) and increases in the frequency of occurrence of such levels would be of additional concern, particularly during the more noise-sensitive nighttime hours. Although the average daily noise descriptors (i.e., L_{dn} and CNEL) incorporate a nighttime weighting or "penalty" that is intended to reflect the expected increased sensitivity to noise at night, L_{dn} and CNEL standards do not fully protect residents from sleep disturbance. The SEL describes a receiver's cumulative noise exposure from a single impulsive noise event (e.g., an automobile passing by or an air craft flying overhead), which is a rating of a discrete

noise event that compresses the total sound energy of the event into a 1-second time period, measured in decibels (Caltrans 2011a:D-20).

The City of Shasta Lake, Shasta County, Tehama County, and the Governor's Office of Research and Planning, as well as most cities and counties have not established noise level standards for the effects of single-event noise. However, following the court decision in *Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners of the City of Oakland, 2001* there has been increased attention to the evaluation of single-event noise levels and their effects on sleep. Because the *Berkeley* case involved aircraft, and the SLWRI would involve construction-related haul truck trips, the situations are not entirely the same. Nonetheless, the SELs from truck passbys associated with construction under the SLWRI are evaluated here.

Many studies have been conducted regarding the effects of single-event noise on sleep disturbance, but due to the wide variation in the reaction of test subjects to SELs of various levels no definitive consensus has been reached with respect to a universal criterion to apply. Upon a review of studies about sleep disturbance and aircraft-generated SELs, the Federal Interagency Committee on Aviation Noise (FICAN) provided estimates of the percentage of people expected to be awakened when exposed to specific SELs inside a home (FICAN 1997). According to the FICAN's review, 10 percent of the population is estimated to be awakened when the SEL interior noise level is 81 dBA. An estimated 5 to 10 percent of the population is affected when the SEL interior noise level is between 65 and 81 dBA, and few sleep awakenings (less than 5 percent) are predicted if the interior SEL is less than 65 dBA. However, FICAN did not recommend a threshold of significance based on the percent of people awakened.

The threshold for sleep disturbance is not absolute because there is a high degree of variability from one person to another. Thus, the means of applying such research to land use decisions is not completely clear. As a result, no government agency has suggested what frequencies of awakenings are acceptable (Caltrans 2011a:4-10). For these reasons, the Federal Interagency Committee on Noise , the Governor's Office of Research and Planning, and most as most cities and counties (including the City of Shasta Lake, Shasta and Tehama counties), continue to use L_{dn} or CNEL as the primary tool for the purpose of land use compatibility planning (Caltrans 2011a:4-9, 4-13). In fact, the L_{dn} and CNEL represents the cumulative exposure to all single events, that is, the exposure of all SELs taken together, weighed to add penalties for nighttime occurrences, and averaged over a 24-hour period. Thus, it can be argued that the L_{dn}/CNEL standards established by Shasta County, which are shown in Table 8-7 on page 8-17 (Chapter 8, "Noise and Vibration," Section 8.3.4, "Direct and Indirect Effects") of the DEIS, or

the City of Shasta Lake's L_{dn} standards, as shown in Master Comment Response NOISE-1, "Traffic Noise Analysis," already account for the individual impacts associated with the SELs. (Note that CNEL and L_{dn} are often used interchangeably, as there is only a subtle difference in noise level penalties during evening hours used to formulate the two metrics.)

Because the *Berkeley* case drew concerns due to interior SEL values in excess of 65 dBA, this analysis uses a similar threshold of 65 dBA SEL within residences. Exposure to 65 dBA SEL would result in a chance of sleep disturbance of less than 5 percent.

Reference SELs for heavy truck passbys were measured by Bollard Acoustical Consultants and reported in an EIR for a proposed commercial center (City of Ceres 2010:4.10-10). The results of the measurements indicated that heavy truck passby levels ranged from 77 to 85 dBA SEL, with a mean of 83 dBA SEL at a reference distance of 50 feet.

Assuming the average exterior-to-interior noise level reduction of 20 dBA provided by wood frame buildings with the windows closed (Caltrans 2011a:H-17), the maximum SEL in the interior of rooms located closer than 50 feet from a passing truck would exceed 65 dBA SEL. As discussed under Impact Noise-1 and in Master Comment Response NOISE-1, "Traffic Noise Analysis," transport of equipment, aggregate, and other materials to and from construction areas would be performed by haul trucks that may pass by residential dwelling units and other noise-sensitive receptors. Affected receptors would include the houses on Shasta Dam Boulevard (State Route 151) between Interstate 5 and the dam site, as well as the houses along the segments of Lake Boulevard (Road 418) both north and south of Shasta Dam Boulevard. Because some of the houses along these routes have inhabitable rooms located closer than 50 feet to the roadway, these rooms would experience SELs that exceed the threshold of 65 dBA and, therefore, the percentage of people expected to be awakened when inside the affected homes would exceed 5 percent. As a result, this impact would be significant. This conclusion is consistent with the less-than-significant impact conclusion determined Impact Noise-1 in the DEIS. To reduce this impact to a less-than-significant level, Mitigation Measure Noise-1 and accompanying text is revised as follows.

Under Mitigation Measure Noise-1 (CP1), "Implement Measures to Prevent Exposure of Sensitive Receptors to Temporary Construction Noise at Project Construction Sites," Reclamation and its primary construction contractors will implement the measures listed below during construction:

- Construction activities producing high impact noise at non-dam sites will be limited to the less noise-sensitive daytime hours (7 a.m. to 10 p.m., Monday through Friday). Nighttime (10 p.m. to 7 a.m.) construction activities at non-dam sites noise levels shall not exceed county standards.

- All contractors and subcontractors shall be specific in their contracts and purchase orders for equipment, gravel, aggregate, and other building supplies, as well as for debris removal, that all truck deliveries and debris removal trips that use roadways that pass within 50 feet of inhabitable rooms of residential dwellings shall be limited to the less noise-sensitive daytime hours (7 a.m. to 10 p.m.). Applicable roadways where nighttime truck travel shall be prohibited include the segment of Shasta Dam Boulevard (State Route 151) between Interstate 5 and Lake Boulevard (Road 415) and/or the segments of Lake Boulevard immediately north and south of Shasta Dam Boulevard.

- All construction equipment and staging areas will be located at the farthest distance feasible from nearby noise-sensitive land uses.

- All construction equipment will be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds will be closed during equipment operation.

- All motorized construction equipment will be shut down when not in use to prevent idling.

- A temporary barrier will be placed as close to the noise source or receptor as possible and will break the line of sight between the source and receptor.

- A disturbance coordinator will be designated and the person's telephone number conspicuously posted around the project sites and supplied to nearby residences. The disturbance coordinator will receive all public complaints and be responsible for determining the cause of the complaint and implementing any feasible measures to alleviate the problem.

Implementation of Mitigation Measure Noise-1, as revised above, would reduce temporary project generated construction source noise levels and limit them to the less sensitive daytime hours, thus preventing exposure of sensitive receptors to temporary construction noise at dam and non-

dam sites. Implementation of this mitigation measure would also eliminate exposure of off-site residential uses to truck-generated SELs that would cause substantial levels of sleep disturbance. As a result, Impact Noise-1 would be reduced to a less-than-significant level for all the action alternatives.

In addition, for sake of consistency, text in Chapter 20, "Traffic and Transportation," Section 20.3.1, "Methods and Assumptions," (page 20-25) of the DEIS is revised as follows.

Construction would typically occur during daylight hours Monday through Friday, but the construction contractor may extend the hours and may schedule daytime construction work on weekend days with the approval of Reclamation. The average workday would be 8 hours.

33.3.12 Master Comment Responses for Cost Estimates

COSTEST-1 – Development of Cost Estimates

During the public comment period, comments were received regarding the cost estimates and the various components that contributed to their development. Some comments questioned the use of contingencies and time periods applied for the cost of the comprehensive plans. Several comments were related to specific items in the cost estimates, such as real estate and demolition costs, the gravel augmentation program, and increased public service costs.

Overall cost estimates for each alternative can be found in the DEIS, Engineering Summary Appendix, Attachment 1, "Cost Estimates for Comprehensive Plans." Detailed cost estimates for action alternative can be found in the DEIS Engineering Summary Appendix, Attachment 2, "6.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates," Attachment 3, "12.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates," and Attachment 4, "18.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates." As described in DEIS Engineering Summary Appendix, Chapter 5, "Opinion of Probable Construction Cost," significant features were included separately related to (1) the dam and reservoir and (2) relocations. The cost estimates were intended to capture the most current pricing for materials, wages and salaries; accepted productivity standards; and typical construction practices, procurement methods, current construction economic conditions, and site conditions for the current level of design.

As stated in the DEIS Engineering Summary Appendix, Chapter 5, "Opinion of Probable Construction Cost," total annual costs were estimated based on interest and amortization of the capital costs for 100 years at the current federal discount rate.

The DEIS Engineering Summary Appendix, Chapter 5, "Opinion of Probable Construction Cost," details the contingencies that are included according to Reclamation standards. Field costs, which are estimates of capital costs of features or projects, include mobilization, design contingency, allowance for procurement strategies, and construction contingencies. The amount of contingency varies based on the construction feature. Detailed cost estimates for SLWRI action alternatives, including contingencies for various construction features, can be found in the DEIS Engineering Summary Appendix, Attachments 2 through 4. Feasibility cost estimates have inherent risk associated with possible changes in market conditions and are subject to change. The cost estimates provided are based on normal market conditions and are not guaranteed. To identify the potential cost risks associated with the project Reclamation performed a Monte Carlo simulation using Oracle Crystal Ball software. The analysis was only performed for CP4 for demonstration of the cost risk, and additional information on the Monte Carlo Simulation can be found in the DEIS Engineering Summary Appendix Attachment 6 "CP4 Crystal Ball Estimate."

As stated in the DEIS Engineering Summary Appendix, Chapter 4, "Design Consideration for Reservoir Area Infrastructure Modifications and/or Relocations," costs for demolition of nonrecreation structures are included as part of the utilities and miscellaneous minor infrastructure cost estimate. Costs associated with demolition of recreation structures are included as part of the recreation facilities cost. Costs for demolition are not included as part of the real estate and land acquisition portion of the cost estimate for each alternative.

For the DEIS Real Estate Appendix, "Value Estimate," fee titles and permanent easements were assumed to be 80 percent of the high market value of a property. Reclamation has reviewed this assumption and has determined that a 100 percent of the high market value would be a more prudent value. The Final EIS has been updated to reflect the change fee title and permanent easements value assumption.

Costs for the gravel augmentation are included only for CP4, which focuses on anadromous fish survival with water supply reliability, and CP5, which has a combined focus on water supply reliability, anadromous fish survival, Shasta Lake area environmental resources, and increased recreation opportunities. The DEIS Chapter 2 "Alternatives," Section 2.3, "Action Alternatives," provides background on the gravel augmentation program included under CP4 and CP5 and a general description of gravel placement and related construction activities. The program would complement the CVPIA gravel augmentation program and be planned to avoid redundancy in the placement of gravel. As stated in the DEIS, the program would be

assessed after the initial 10-year period to assess the need for continued spawning gravel augmentation, and to identify opportunities for future gravel augmentation actions or programs.

The DEIS states in Chapter 21, "Utilities and Service Systems," under Impact Util-2 that Reclamation is committed to the funding and relocation of existing infrastructure and construction of replacement infrastructure, including localized wastewater treatment plants that might replace some individual septic systems. The costs for relocations of utilities and the proposed waste water collection systems have been included in cost estimates for action alternatives and can be found in DEIS Engineering Summary Appendix, Attachment 2, "6.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates," Attachment 3, "12.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates," and Attachment 4, "18.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates."

The DEIS Engineering Summary Appendix, Chapter 5, "Opinion of Probable Construction Cost," describes the process used to develop cost estimates for demolition and construction. Unit prices were developed using a semi-detailed method and applied to the quantities developed from the feasibility-level designs. Contingencies for all cost estimates are included as described in the DEIS Engineering Summary Appendix, Chapter 5, "Opinion of Probable Construction Cost." Description of the non-contract costs used in the cost estimates are also described in the DEIS Engineering Summary Appendix Chapter 5, "Opinion of Probable Construction Cost," and include planning, engineering, design, construction management, land acquisition, environmental mitigation, cultural resources mitigation, and water use efficiency actions. These non-contract costs have been updated for the Final EIS.

Guidance in the development of the cost estimates comes from Reclamation Manual, Directives and Standards, Project Planning and Facility Operations, Maintenance, and Rehabilitation (FAC) 09-01, 09-02, and 09-03. FAC 09-01 describes specific levels of estimates along with the attributes of each, FAC 09-02 identifies how cost estimates are used in the development of the construction cost estimate and project cost estimate, and FAC 09-03 describes how various levels of cost estimates are to be used.

The DEIS cost estimates are at a feasibility level, which FAC 09-01 describes as follows:

> *Feasibility cost estimates are based on information and data obtained during investigations for pre-authorization activity. These investigations provide sufficient information to permit the preparation of*

> *preliminary layouts and designs from which the approximate quantities for each kind, type, or class of material, equipment, or labor may be obtained. These estimates are used to assist in the selection of a preferred plan, to determine the economic feasibility of a project, and to support seeking construction authorization from the Congress.*

To ensure that cost estimates were standardized and completed to the level described above, Reclamation performed a review by staff external to the SLWRI staff (e.g., independent review). The Design, Estimating, and Construction (DEC) Review process has been completed for all action alternatives.

The following Table 33.3-5 from FAC 09-01, displays the project status, stage, and level of cost estimates that correspond. The feasibility cost estimates fall in the Planning Stage. If a project is authorized by Congress, the authorized plan will move into the design phase where the designs and cost estimates will be further refined.

Table 33.3-5. Sequence of Development of Cost Estimates

Project Status	Project Stage	Level of Cost Estimate Period
Planning	Planning	Preliminary
		Appraisal
		Feasibility
Construction	Design	Percent Design (Updated Feasibility)
		Prevalidation of Funds
	Solicitation	Independent Government Cost Estimate (Award)
	Construction	Independent Government Cost Estimate for Contract Modifications
Operations and Maintenance	Operations	One or more of the previously identified estimates

COSTEST-3 – Costs for Marina Relocations

Several comments received during the public comment period expressed concern over the costs associated with the marina relocations and the possibility of marina facility reductions because of the proposed project.

As stated in the DEIS Chapter 2 “Alternatives,” Section 2.3.8, “Comprehensive Plan Construction Activities,” at a minimum, the existing recreation capacity around the lake would be maintained under all action alternatives. During construction, the scheduling and sequencing of the relocations would strive to minimize disruption to recreation facilities. Generally, marina relocations would take place on fill in place, upslope out of the inundation area. DEIS designs and cost

estimates for all action alternatives in the DEIS also provide for up to 50 percent of relocated structure square footage be moved to floating facilities. Road relocations would continue to provide access to the marinas during and after construction. The DEIS Engineering Summary Appendix, Chapter 4, "Design Consideration for Reservoir Area Infrastructure Modifications and/or Relocations," states that the USFS has not approved relocation sites or any plans for relocations. After the authorization of the project, further detailed design and analysis would take place.

For each of the action alternatives, relocation costs for recreational facilities were developed using the assumptions outlined in the DEIS Engineering Summary Appendix, Chapter 5, "Opinion of Probable Construction Cost." A semi-detailed method of developing unit costs was used to determine the costs of materials, construction activities, and demolition. Detailed cost estimates for the relocation of marinas can be found for each alternative in the DEIS Engineering Summary Appendix, Attachment 2, "6.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates," Attachment 3, "12.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates," and Attachment 4, "18.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates. To identify the potential cost risks associated with the project Reclamation performed a Monte Carlo simulation using Oracle Crystal Ball software. The analysis was only performed for CP4 for demonstration of the cost risk, additional information on the Monte Carlo Simulation can be found in the DEIS Engineering Summary Appendix Attachment 6 "CP4 Crystal Ball Estimate."

As stated in the DEIS Engineering Summary Appendix, Chapter 4, "Design Consideration for Reservoir Area Infrastructure Modifications and/or Relocation," the USFS has not approved any relocation sites or any plans for relocations, and preliminary relocation plans were developed with USFS for the purposes of the DEIS. The goal of the preliminary plans was to verify that recreational capacity could be maintained, and if a project is authorized, further detailed designs and plans would be developed.

COSTEST-4 – Procurement and Construction Contract Requirements

Comments received during the public comment period expressed concern over procurement and construction contract requirements. As stated in the DEIS Engineering Summary Appendix, Chapter 5, "Opinion of Probable Construction Cost," the cost estimates were developed to capture the current pricing of materials, wages, and procurement strategies. All contracted labor for construction would be implemented under the current Federal Acquisition Guidelines Subpart 22.403 "Statutory and Regulatory Requirements."

33.3.13 Master Comment Responses for Cultural Resources

CR-1 – Potential Effects to Cultural Resources

Several comments reflect concerns regarding the loss of cultural resources, including archaeological, ethnographic, and historic sites, and places of traditional, sacred, and ceremonial use. In particular, several commenters expressed concerns that additional Winnemem Wintu sacred places would be inundated more frequently if the project moves forward.

The DEIS acknowledges concerns over the loss of cultural resources and identifies this as an area of controversy, as well as acknowledgement of no feasible mitigation for potential impacts to places of traditional and ceremonial use from the Action Alternatives. Chapter 1, "Introduction," Section 1.6, "Areas of Controversy," of the DEIS state that Native American concerns and cultural resources remain an area of controversy. Impacts from inundation of Traditional Cultural Properties and Sacred Land Filings ("Impact Culture-2") in Chapter 14, "Cultural Resources," Section 14.3.4, "Mitigation Measures," for "CP1," "CP2," "CP3," "CP4," and "CP5," are identified as significant and unavoidable, with no feasible mitigation identified.

Chapter 14, "Cultural Resources," of the DEIS outlines the methods used to identify cultural resources in the study area, the results of those efforts, and an assessment of potential effects of each proposed alternative with mitigation measures. Identification efforts included archival and records searches; ethnographic studies; discussions and meetings with Native American tribes, groups, and individuals; and site sensitivity analyses. These efforts resulted in the identification of the types of cultural resources present in the study area and estimations of the density and distributions of those resources. Information concerning potential Native American concerns was gathered from historic and ethnographic literature and from discussions with tribes and Native American individuals, and was incorporated into the DEIS in Chapter 14, "Cultural Resources," Section 14.1, "Affected Environment," and Section 14.3, "Environmental Consequences and Mitigation Measures." Cultural resources types addressed in comments, including places of continued and current importance and use for traditional, ceremonial, and sacred purposes by the Winnemem Wintu, are presented and discussed in the DEIS. Section 14.3, "Environmental Consequences and Mitigation Measures," presents the environmental consequences of each alternative on the types of cultural resources identified based on the context and intensity of the environmental effects that would be caused by, or result from, the proposed action. Mitigation for Action Alternatives includes resuming additional National Historic Preservation Act (NHPA) Section 106 consultations early in the planning process, should Congress authorize an Action Alternative, to avoid, minimize, or

mitigate effects when feasible, as discussed in Section 14.2.3 "Regulatory Compliance." Impacts from inundation of Traditional Cultural Properties and Sacred Land ("Impact Culture-2") in Section 14.3.4, "Mitigation Measures" for "CP1," "CP2," "CP3," "CP4," and "CP5," are identified as significant and unavoidable, with no feasible mitigation identified. The Final EIS will be revised to clarify this in Section 14.3.4 "Mitigation Measures," in Table 14-7 "Summary of Mitigation Measures for Cultural Resources" and in the text of that section.

CR-2 – Federal Recognition

Several commenters made remarks regarding past grievances with the Federal Government over Federal Recognition, treaties, and acts.

The Office of Federal Acknowledgment (OFA) within the Office of the Assistant Secretary – Indian Affairs of the Department of the Interior implements Part 83 of Title 25 of the CFR, Procedures for Establishing that an American Indian Group Exists as an Indian Tribe. The acknowledgment process is the Department's administrative process by which petitioning groups that meet the criteria are "acknowledged" as Indian tribes. To the extent any non-Federally recognized Native American group seeks Federal recognition, the proper forum is the OFA or Congress. *See also Winnemem Wintu Tribe v. Interior*, No. 2:09-cv-01072-FCD-KJN (E.D. Cal. 2010) (concluding that Federal recognition is a non-justiciable political question and denying plaintiffs' claim that the Government must Federally recognize them as an Indian Tribe). Reclamation has no authority or jurisdiction in the process of determining whether any group should be Federally recognized as an Indian Tribe.

To the extent commenters claim the right to land or compensation under the Treaty of Cottonwood Creek and the Act of July 30, 1941, 55 Stat. 612, the rights of any and all Indian tribes and allottees to property withdrawn for the purpose of creating Shasta Dam and Reservoir were extinguished. Section 1 of the Act "granted to the United States . . . all the right, title, and interest of the Indians in and to the tribal and allotted lands within the area embraced by the Central Valley project." To the extent any commenter seeks compensation for that transfer (and the inundation created by Shasta Dam) or a declaration that any such land remains tribal or allotted land, the SLWRI process is not the proper forum to seek redress. Further, Reclamation is unaware of any Indian lands, whether tribal or allotted land, that will be inundated by any of the alternatives to raise Shasta Dam, but were not previously transferred to the United States under the 1941 Act.

Other comments argue that the Shasta Reservoir Indian Cemetery, created through Section 4 of the 1941 Act, should be held in trust for the

benefit of the Winnemem Wintu or be dedicated to use by the same. Section 4 of the Act states that the cemetery "shall be held in trust by the United States for the appropriate tribe, or family, as the case may be." The cemetery is federal property that has been withdrawn from public entry and, by operation of law pursuant to the 1941 Act, it is held by the United States for appropriate Indian tribes and families. However, the United States has no specific fiduciary trust duties to Indian tribes and families with respect to the cemetery under the 1941 Act. *See United States v. Navajo Nation*, 537 U.S. 488, 506 (2003); *United States v. Mitchell*, 463 U.S. 206, 216-17, 19 (1983). Additionally, in *Winnemem Wintu v. Interior*, No. 2:09-cv-01072-KJM-KJN (E.D. Cal. 2012), the District Court denied the plaintiffs' request for a declaration that the Shasta Indian Cemetery be held in trust for the benefit of the Winnemem Wintu. The Winnemem Wintu have been and are permitted to use the Shasta Reservoir Indian Cemetery, but that does not mean that it is held in Indian trust for the benefit of the Winnemem Wintu or that they have the exclusive right to access and use the cemetery.

CR-3 – Current Effects to Cultural Resources

Several comments reflect concerns regarding current inundation of traditional sites under Shasta Reservoir due to the original construction of Shasta Dam.

Current conditions and impacts to cultural resources, including traditional use sites, are acknowledged and presented in Chapter 14 "Cultural Resources." The SLWRI evaluates the potential effects on cultural resources of implementing alternatives to modify the existing Shasta Dam and Reservoir. Section 14.3.3, "Direct and Indirect Effects," under "No-Action Alternative," acknowledges ongoing effects and states, under "Shasta Lake and Vicinity": "There may be ongoing impacts to cultural resources, but there is no responsibility to mitigate them. Mitigation is not required for the No-Action Alternative." This statement will be corrected in the Final EIS to clarify that no mitigation is required for the SLWRI alternatives under the No-Action Alternative as the proposed activities would not occur. Responsibilities to manage ongoing impacts may fall under other Federal or State laws which would be separate from the SLWRI requirements.

In Section 14.3.3, "Direct and Indirect Effects" for "CP1," "CP2," "CP3," "CP4," and "CP5," "Impact Culture-2," potential impacts to traditional cultural properties and places used for traditional practices are specifically identified and discussed with consideration given to increased impacts for each alternative combined with current impacts. Section 14.3.5, "Cumulative Effects," concludes that "While it may not be possible to predict all future impacts to cultural resources within the study area, it is clear that raising Shasta Dam would result in cumulative

effects on historic properties. Such properties have already been identified, and there are known ongoing effects."

CR-5 – Environmental Justice

Several comments indicated that the Winnemem Wintu should be considered a protected group under Environmental Justice.

The conclusions reached in Chapter 24 "Environmental Justice," Section 24.3.4, "Direct and Indirect Effects," are that while there are no disproportionately high or adverse effects on minority or low-income populations, there is a potential disproportionate high and adverse effect on Native American populations from disturbance or loss of sacred locations in the vicinity of Shasta Lake. Both the Winnemem Wintu and Pit River Madesi Band members attach religious and cultural significance to locations in the vicinity of Shasta Lake. Mitigation for these impacts is not feasible to avoid or reduce these adverse impacts. The potential loss of these important cultural and religious sites of the Winnemem Wintu and Pit River Madesi Band would be a cumulatively considerable and disproportionate placement of environmental impacts on Native American populations. This impact is significant and unavoidable, as documented in the DEIS.

Chapter 24, "Environmental Justice," Section 24.3.1, "Methods and Assumptions," describes the methods and assumptions for determining whether there are disproportionately high and adverse effects on minority or low-income populations. Chapter 24, "Environmental Justice," Section 24.3.2, "Criteria for Determining Disproportionately High and Adverse Effects," describes the process and criteria for determining disproportionately high and adverse effects.

CR-6 – United Nations Declaration on "The Rights of Indigenous Peoples"

Several comments reflect concerns that Reclamation is in violation of the United Nations Declaration on "The Rights of Indigenous Peoples." Several comments also suggested that Reclamation consider such international treaties, declarations, and agreements in their decision making process.

In September 2007, the United Nations passed a Declaration on "The Rights of Indigenous Peoples." The United States did not vote in favor of the resolution at that time citing various flaws in the Declaration as it would pertain to the Indigenous Peoples of the United States. However, this position was reviewed by the Obama Administration after consultation with many Native American tribes and other individuals and groups who urged the U.S. to support the Declaration. On January 12, 2011 the Obama Administration announced the U.S. support for the United Nations Declaration on the Rights of Indigenous Peoples. As part

of this Announcement, the Administration detailed initiatives to promote the Government-to-Government Relationship and improve the lives of Indigenous Peoples. In the Announcement it is stated that "The United States aspires to improve relations with indigenous peoples by looking to the principles embodied in the Declaration and its dealings with federally recognized tribes, while also working, as appropriate, with all indigenous individuals and communities in the United States."

The Administration recognized, however, that the Declaration "is not legally binding or a statement of current international law." See also Prophet v. United States, 2011 U.S. dist. LEXIS 115801 (S.D. Oh. 2011); Bey v. Roberts, 2011 U.S. Dist. LEXIS 139460 (N.D. Oh. 2011). Rather than create any new rights or obligations, the Declaration expresses "aspirations that this country seeks to achieve within the structure of the U.S. Constitution, laws, and international obligations, while also seeking, where appropriate, to improve our laws and policies." The Declaration is an important statement of U.S. policy, but neither it nor the Announcement has changed existing law, created new obligations, or resulted in any new procedural or substantive rights. The Declaration must be read as intended to work within the existing legal environment. Reclamation supports the Declaration, as outlined in the Announcement, but it does not alter Reclamation's obligations, in developing the SLWRI, under applicable law and policy. Reclamation has undertaken the SLWRI consistent with the Declaration and this Administration's Announcement of support.

Information on current federal laws relating to Native American relationships and cultural resources is found in Chapter 14, " Cultural Resources," Section 14.2, "Regulatory Framework," of the DEIS.

CR-8 – Native American Connection to Salmon

Several comments raised concerns that salmon are an integral part of the Winnemem Wintu culture and historically have served as an essential food source.

Chapter 14, "Cultural Resources," Section 14.1.1, "Regional Setting," describes the history of salmon resources as an important component of the diet of Native American's, as shown in the archaeological record, in the vicinity of the current Shasta Reservoir, most recently by the Wintu peoples. Shasta Dam, which started filling in 1943, completely blocked the historic salmon runs from the upper Sacramento River system. This was a major change for the 20th century Native American peoples.

Efforts called for as part of the 2008 USFWS BO, and 2009 NMFS BO investigations are underway to explore the feasibility of providing fish passage around Shasta Dam for salmonids. See Master Comment Response FISHPASS-1, "Fish Passage Above Shasta Dam" for a

description of the fish passage pilot program under development by Reclamation. Fish Passage investigations are separate from the SLWRI and not part of any of the alternatives under consideration. If implemented, a separate NEPA document will be prepared.

The SLWRI DEIS Chapter 1, "Introduction," Section 1.2.1, "Project Purpose and Objectives," states one primary project objective as: *Increase the survival of anadromous fish populations in the Sacramento River, primarily upstream from the Red Bluff Pumping Plant (RBPP).* This project objective is met primarily by providing a larger cold water storage pool in Shasta Reservoir for release downstream to support salmonid that spawn in the Upper Sacramento River below Shasta Dam. Native American groups would benefit from these spawning improvements to the same extent as the general public by recreational fishing opportunities which should increase with the implementation of the SLWRI project alternatives. See Chapter 11, "Fisheries and Aquatic Ecosystems," of the DEIS for a complete discussion of the effects of the project alternatives on salmonid resources of the Sacramento River.

CR-11 – Cultural Resources and NEPA

Several comments raised concerns that the cultural resource impact evaluations and mitigation measures in the DEIS do not meet NEPA requirements.

Chapter 14, "Cultural Resources," summarizes cultural resources identification efforts and impact analysis methods, as well as consultation and coordination with Native American tribes and other non-federally recognized groups and individuals, that were all used to evaluate the impacts of each alternative and approaches to mitigate significant impacts. The impact analyses and mitigation measures are comparable to the information available for the alternatives identified for purposes of the SLWRI. Impacts from inundation of Traditional Cultural Properties and Sacred Land Filings ("Impact Culture-2") in Section 14.3.4, "Mitigation Measures" for "CP1," "CP2," "CP3," "CP4," and "CP5," are identified as significant and unavoidable, with no feasible mitigation identified. Should authorization by Congress lead to implementation of one of the Action Alternatives, subsequent processes under NEPA, NHPA Section 106, and other applicable laws would be included in early planning efforts to identify and consider alternatives to avoid, minimize, or mitigate the undertaking's effects on historic properties and cultural resources.

CR-12 – Cultural Resources and CEQA

Several comments raised concerns that the DEIS is inadequate to meet CEQA requirements related to cultural resources.

Chapter 1, "Introduction," of the DEIS states that "This document has also been prepared in accordance with the California Environmental Quality Act (CEQA) and could be used by State of California (State) permitting agencies that would be involved in reviewing and approving the project" (Page 1-1). However, at the time of publishing of the Final EIS, a CEQA Lead Agency has not been identified. The CEQA Guidelines outline the process to determine the appropriate State Lead Agency in Section 15050-15053. In addition, CEQA Section 21067 defines the Lead Agency as the "public agency which has the principal responsibly for carrying out or approving a project which may have a significant effect upon the environment." Reclamation will be carrying out the "project" and at this time, it is not certain if there will be State or local agency approvals or funding involved in implementation.

As discussed in the Master Comment Response CEQA-1, "CEQA Compliance," the DEIS may not be sufficient to serve as a DEIR for CEQA purposes and would require scrutiny by any State CEQA Lead Agency before release to the public as a DEIR. Section 15221 of the CEQA Guidelines states that when a NEPA document is ready before the CEQA document, the State Lead agency shall evaluate the NEPA document for CEQA compliance and augment the CEQA document with CEQA specific analysis if necessary. The State Lead Agency would evaluate the legal sufficiency of all aspects of the document including range of alternatives, impact assessments, mitigation measures, and effects to State protected resources including state-listed endangered and threatened species and cultural resources.

Chapter 14, "Cultural Resources," Section 2.2, "Regulatory Framework," "State" briefly describes how CEQA considers potential effects to cultural resources. In addition to CEQA, this section identifies other State laws regarding protection of Native American burials, skeletal remains, and associated grave goods regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains (California Health and Safety Code Section 7050.5, California Public Resources Code Sections 5097.94 et seq.).

Any CEQA process related to the SLWRI would require a Notice of Preparation and scoping process, consultation with State and local Responsible Agencies and public circulation of a DEIR in accordance with CEQA. Reclamation, as a federal agency, has no standing under California law to be the State CEQA Lead Agency. Reclamation will not make a judgment on the legal adequacy of the DEIS for CEQA compliance. Reclamation will not speculate on whether a State Lead Agency under CEQA will be required for the SLWRI, or what State or local agency might become the State Lead Agency.

Changes have been made to the text in the Final EIS to reflect that the document is not being published as a fully CEQA-compliant document.

CR-13 – Native American Graves Protection and Repatriation Act Process

Several comments reflected concerns regarding the effects to burial sites and related requirements under the Native American Graves Protection and Repatriation Act (NAGPRA).

Chapter 14, "Cultural Resources," Section 14.2.1, "Regulatory Framework," describes the Native American Graves Protection and Repatriation Act (Public Law 101-601; 25 United States Code 3001-3013) that pertains to Native American burial sites and regulates the removal of Native American human remains, funerary objects, sacred objects, and items of cultural patrimony on Federal and tribal lands. The Act requires permits for intentional removal or excavation of Native American human remains on Federal lands, covers cases of inadvertent discoveries, and dictates the ultimate disposition process of Native American human remains and cultural items.

NAGPRA is one of several federal laws that Reclamation will comply with if Congressional authorization is received. Specific NAGPRA compliance may be coordinated with the NHPA Section 106 process. Reclamation complies with NAGPRA concerning the cultural affiliation and disposition of any Native American human remains and cultural items from Federal lands.

CR-15 – National Historic Preservation Act Section 106 Consultations

Additionally, commenters believe there has been inadequate consultation with the Winnemem Wintu through the NHPA Section 106 process.

Reclamation formally initiated NHPA Section 106 consultation in 2007 with Federally-recognized Indian tribes (Grindstone Indian Rancheria of Wintun-Wailaki Indians, Paskenta Band of Nomlaki Indians, Pit River Tribe, and Redding Rancheria) and with other Native American groups (Shasta Nation, Winnemem Wintu, and Wintu Tribe/Toyon-Wintu Center). From August 2007 to March 2008, nine meetings were held with Native American groups whose traditional territories overlap with the SLWRI study area. The purpose of the meetings was to identify cultural resources, including places of traditional and ceremonial use, and other areas of concern related to the SLWRI to the Native American community. These meetings also provided these groups opportunities to comment or raise concerns regarding potential effects on these resources from the undertakings under study for the SLWRI. Five groups participated in these meetings, including the Grindstone Indian

Rancheria (one meeting), Paskenta Band of Nomlaki Indians (one meeting), Pit River Tribe (three meetings), Shasta Nation (one meeting), and Winnemem Wintu (three meetings). Resources of cultural and religious significance discussed at these meetings and identified through ethnographic, ethnohistoric, and archaeological research and other comments from Native American tribes, groups, and individuals were incorporated into the DEIS, Chapter 14, "Cultural Resources," with impact analyses also based on information, comments, and concerns received from these sources. Due to the programmatic nature of this EIS in support of a feasibility report, NHPA Section 106 consultations were used only to identify resources of concern for the SLWRI and not completed, pursuant to 36 CFR 800.1(c) *Timing*, regarding nondestructive project planning activities. If a project to raise Shasta Dam is authorized by Congress, the NHPA Section 106 process would resume early in that planning process providing subsequent consideration and consultations regarding alternatives to avoid, minimize or mitigate that undertaking's adverse effects on historic properties, according to the requirements of 36 CFR Part 800.

Additional opportunities, other than through the NHPA Section 106 process, to comment on cultural resources were also provided through the NEPA process. Chapter 27, "Public Involvement, Consultation, and Coordination," summarizes public outreach involvement efforts related to development of the SLWRI, guided by the *Strategic Agency and Public Involvement Plan* (Reclamation 2003a). These efforts provided the public, stakeholders, Federally recognized tribes, Native American groups and individuals, and public agencies multiple opportunities to review SLWRI documents and to provide comments throughout the SLWRI NEPA process. Documents were distributed in multiple formats and comments were accepted through a variety of venues throughout the NEPA process. Chapter 27, "Public Involvement, Consultation, and Coordination," Section 27.4.2, "Consultation and Coordination with Tribal Governments," and Section 27.4.3, "Coordination with Native American Groups," summarize efforts to specifically involve Federally-recognized and non-federally recognized Native Americans in the NEPA process. Comments received through the EIS review process will be incorporated into the Final EIS and will be available to the decision-maker. Chapter 1, "Introduction," Section 1.6, "Areas of Controversy," of the DEIS acknowledges that Native American concerns and cultural resources remain an area of controversy. Public interests will be included in the decision to select an alternative and in a recommendation to Congress for authorization.

33.3.14 Master Comment Responses for Flood Management

FM-6 – Effects to Downstream Flooding

Several comments raised concerns related to flood management, particularly downstream from Shasta Dam along the Sacramento River. Some comments questioned how an enlargement of Shasta Dam would reduce flood damages downstream on the Sacramento River. Other comments reflect concern over revised reservoir operations, construction activities, and related downstream effects on physical processes, including erosion and sedimentation.

As stated in Chapter 1, "Introduction," Section 1.2.1, "Project Purpose and Objectives," of the Final EIS, reducing flood damage along the Sacramento River is a secondary objective of the project. Reclamation did not formulate alternatives specifically to address secondary objectives, but secondary objectives were considered to the extent possible through pursuit of the primary project objectives. Flood management is thoroughly discussed in Chapter 6, "Hydrology, Hydraulics, and Water Management," of the DEIS and in the Draft Plan Formulation Appendix of the DEIS.

As stated in Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.2, "Criteria for Determining Significance of Effects," of the DEIS, to prevent an increase in flood damages in the study area, the SLWRI must not cause a significant increase in the frequency or magnitude of flood flows on the Sacramento River. The current regulation of Shasta Dam for flood control requires that releases be restricted to quantities that will not cause downstream flows or stages to exceed, insofar as possible, (1) a flow of 79,000 cubic feet per second (cfs) at the tailwater of Keswick Dam, and (2) a stage of 39.2 feet at the Sacramento River Bend Bridge gaging station near Red Bluff (corresponding roughly to a flow of 100,000 cfs). Because of the uncontrolled nature of the inflows between Keswick Dam and Bend Bridge, the 100,000 cfs flow objective at Bend Bridge is the critical objective for minimizing flood damage. It is also important to ensure that the project does not increase potential flood damages by locating any new facilities within the 100-year floodplain or in a location that could impede or redirect flood flows, thereby potentially increasing damage to other property.

As captured in the Executive Summary of the DEIS, all action alternatives increase reservoir capacity for capture of high flood flows, so all action alternatives contribute to reducing flood damage along the Sacramento River (a SLWRI secondary objective). CP4 and CP5 also include augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River, thereby

contributing to conserving, restoring, and enhancing ecosystem resources.

As described in Chapter 6, “Hydrology, Hydraulics, and Water Management,” Sections 6.3.3, “Direct and Indirect Effects,” and 6.3.4, “Mitigation Measures,” of the DEIS, no flood management mitigation measures are proposed for the action alternatives because no adverse flood management impacts have been identified (Impact H&H-2 “place housing or other structures within a 100-year flood hazard area,” and Impact H&H-3 “place within a 100-year flood hazard area structures that would impede or redirect flood flows”). Impact H&H-1 (“change in frequency of flows above 100,000 cfs on the Sacramento River Below Bend Bridge”) could result in beneficial impacts, so no mitigation is needed.

Additional information is available in the Physical Resources Appendix, Draft Hydrology, Hydraulics, and Water Management Technical Report of the DEIS.

As described in DEIS Chapter 2, “Alternatives,” Section 2.3.2, “Environmental Commitments Common to All Action Alternatives,” Reclamation and/or its contractors would incorporate certain environmental commitments and best management practices (BMP) into any plan identified for implementation to avoid or minimize potential impacts. Reclamation would also coordinate planning, engineering, design and construction, operation, and maintenance phases of any authorized project modifications with applicable resource agencies.

Developing and implementing an Erosion and Sediment Control Plan is one of those commitments. Reclamation would prepare and implement an erosion and sediment control plan to control short-term and long-term erosion and sedimentation effects, and to stabilize soils and vegetation in areas affected by construction activities. The plan would include all of the necessary local jurisdiction requirements regarding erosion control, and would implement BMPs for erosion and sediment control, as required. Types of BMPs may include, but would not be limited to, earth dikes and drainage swales, stream bank stabilization, and use of silt fencing, sediment basins, fiber rolls, and sandbag barriers.

DEIS Chapter 4, “Geology, Geomorphology, Minerals, and Soils,” describes the affected environment and Federal, State, and regional and local regulatory framework for geological resources including geology, seismicity, soils erosion, mineral resources, and geomorphology for the dam and reservoir modifications proposed under SLWRI action alternatives. It also describes the project-level impacts of the No-Action Alternative and action alternatives on geological resources, mitigation measures for those impacts, and cumulative effects of all of the

alternatives. As described in Sections 4.3.4 “Direct and Indirect Effects” and 4.3.5 “Mitigation Measures” of the DEIS, in the Upper Sacramento River portion of the primary study area, no mitigation measures are proposed for Impact Geo-11 (“alteration of fluvial geomorphology”) because there are no impacts from CP1-3 and impacts from CP4 and 5 are less than significant, and Impact Geo-12 (“alteration of downstream tributary fluvial geomorphology due to Shasta Dam operations”) because impacts from the action alternatives are less than significant. A mitigation measure is proposed for Impact Geo-9 (“substantial increase in channel erosion and meander migration”) because although impacts from the action alternatives are less than significant, the mitigation measure (“implement channel sensitive water release schedules”) will further reduce the impact. In the Lower Sacramento River and Delta, no mitigation measure is proposed for Impact Geo-13 (“substantial increase in channel erosion and meander migration”) because impacts from the action alternatives are less than significant.

The analyses presented in the DEIS meets the requirements of NEPA, and no modifications are proposed in response to these comments.

33.3.15 Master Comment Responses for Fracking

FRACK-1 – Water Supply Used for Fracking

Several comments raised the topic of fracking. Some commenters expressed that fracking would not be a valid use of additional water supplies to be developed by the project.

Fracking is not a purpose of the project, but is not excluded from potential uses of water to be developed by the project. The purpose of the project is stated in Chapter 1, “Introduction,” of the Final EIS. While increasing water supply reliability is a primary objective of the SLWRI, as stated in Chapter 1, “Introduction,” of the Final EIS, Reclamation does not regulate the specific uses of CVP or SWP water supply. SLWRI alternatives would not increase existing maximum CVP or SWP contract quantities or expand the place of use, but would allow Reclamation to increase water supply reliability of existing CVP and SWP contracts.

Currently, fracking represents a minor use of water in California. The State Department of Conservation estimates that statewide, about 270 acre-feet of water per year is used for hydraulic fracture stimulation activities (BDCP 2013). By comparison, the SLWRI alternatives would increase dry and critical year water supplies for CVP/SWP deliveries between 31,000 acre-feet and 75,900 acre-feet. The SLWRI alternatives would not change the relative allocation among different authorized users, thus approximately 28,000 acre-feet to 88,300 acre-feet would be for south-of-Delta agricultural and M&I deliveries (as described in

Chapter 6, "Hydrology, Hydraulics, and Water Management," of the DEIS). A full assessment of the potential impacts of the alternatives on water resources is provided in Chapters 6, "Hydrology, Hydraulics, and Water Management," and Chapter 7, "Water Quality," of the DEIS.

33.3.16 Master Comment Responses for Road and Bridge Relocations

RBR-1 – Access Across Shasta Dam

Several comments were received concerning access to the west side of Shasta Dam during the period of construction. The area consists of several residences, businesses, and several recreation facilities. The comments expressed concern over the possible economic impacts as a result of the lack of access or the possibility of an inconvenient detour.

As stated in the DEIS Chapter 18, "Recreation and Public Access," Section 18.3.4, "Direct and Indirect Effects," construction activity necessary to raise Shasta Dam and complete related facilities would prevent visitors from crossing the dam. The DEIS also states that the impact of the road closure would be potentially significant. Mitigation for this impact is described in the DEIS and Final EIS in Chapter 18, "Recreation and Public Access," Section 18.3.5, "Mitigation Measures," under the heading "Mitigation Measure Rec-2" for each action alternative. As described, to mitigate the impacts of the road closure, Reclamation would provide an alternate route. This route would use existing river crossings either immediately downstream from Shasta Dam or further south to provide access to the Chappie-Shasta Off-Highway Vehicle (OHV) Area, residences, and businesses on the west side of Shasta Dam. The route would be improved to provide adequate access, security features, and road improvements, as necessary, and made sufficient so that vehicles can safely use the route. Mitigation Measure Rec-2 has been revised to provide further clarification. Mitigation Measure Rec-2 now states:

> *Reclamation will inform recreation users of the Chappie-Shasta OHV Area about an alternative access route. This route will use existing river crossings either immediately downstream from Shasta Dam or further south. The route will be improved to provide adequate access, security features, and road improvements (e.g., by grading unpaved portions), as necessary, and made sufficient so that vehicles can safely use the route. To mitigate the temporary disruption in public tours of Shasta Dam during construction, Reclamation will develop and provide enhanced information about the dam and its operation at the Reclamation Visitor Center at the dam, which would remain open. Mitigation for temporary loss of access to the trailhead at the west end*

of Shasta Dam is not necessary because the trailhead itself would be affected by construction.

With implementation of Mitigation Measure Rec-2, this impact would be considered less than significant for all action alternatives.

As discussed in Chapter 2, "Alternatives," Section 2.3.2, "Environmental Commitments Common to All Action Alternatives," environmental commitments for the proposed action include developing and implementing a construction management plan to avoid or minimize potential impacts on public health and safety during project construction, to the extent feasible. Environmental commitments implemented before construction would also include developing and implementing a comprehensive mitigation strategy to minimize potential impacts to physical, biological, and socioeconomic resources described in this DEIS. As described in Reclamation's NEPA Handbook, Reclamation is obligated to fulfill and appropriately fund all monitoring and mitigation measures that it commits to implementing in its final decision. For NEPA documents, these commitments generally appear in the ROD and other decision documents.

RBR-2 – Reduced Public Access Around Shasta Lake

Several comments received during the public comment period expressed concern over bridges and roads that would be inundated by the new high water level of the proposed alternatives, and how these bridges and roads would be relocated. Commenters also raised concerns over continued and maintained access to Shasta Lake, both during and after construction, and how this would be accomplished. It was also requested that the impacts caused by the road and bridge relocations be addressed in the Final EIS.

All action alternatives include road relocations and bridge modifications to maintain existing levels of access around Shasta Lake. In summary, all action alternatives include five vehicular bridge replacements/ modifications, three railroad bridge modifications, and up to 30 road segment relocations.

As described in the DEIS Engineering Summary Appendix, Chapter 4, "Design Consideration for Reservoir Area Infrastructure Modifications and/or Relocations," as a result of raising Shasta Dam, Charlie Creek, Doney Creek, McCloud River, and Didallas Creek vehicle bridges would need to be replaced with a minimum of four-feet of freeboard above the full pool elevation. Additionally, Fender's Ferry vehicle bridge would require modifications to keep the steel superstructure from inundation. More information regarding vehicle bridge modification and replacement design assumptions and construction activities and quantities can be found in the DEIS Engineering Summary Appendix,

Chapter 4, "Design Consideration for Reservoir Area Infrastructure Modifications and/or Relocations," under the "Bridge Relocations" heading and in Plates 27 through 31.

As stated in the DEIS Engineering Summary Appendix, Chapter 4, "Design Consideration for Reservoir Area Infrastructure Modifications and/or Relocations," as a result of raising Shasta Dam, Union Pacific Railroad bridges at the existing Sacramento River 2nd Crossing and Doney Creek, would need to be modified to accommodate the higher water level. The DEIS also states, that modifications would be required for Pit River Bridge. The Pit River Bridge would remain in place, but a watertight concrete tub would be placed around the existing bearing and lower steel truss to keep the structure dry. More information regarding the construction activities, construction quantities, and details related to railroad bridge relocations and modifications can be found in the DEIS Engineering Summary Appendix Chapter 4, "Design Consideration for Reservoir Area Infrastructure Modifications and/or Relocations," under the "Union Pacific Railroad Bridge Replacements" heading and in Plates 32 through 38.

As stated in DEIS Chapter 20, "Transportation and Traffic," Section 20.3.4, "Direct and Indirect Effects," under Impact Trans-2, access to Shasta Lake during construction would be affected by the proposed bridge and road relocations, and traffic slowdowns may also occur because of actions such as lane closures and heavy equipment accessing relocation areas. It is anticipated that the new roadway and bridge alignments would be constructed and connected to connecting facilities before demolition of existing facilities in the proposed inundation area. The DEIS Chapter 20, "Transportation and Traffic," Section 20.3.5, "Mitigation Measures," has additional information on how lane closures and traffic slowdowns during construction would be mitigated by Reclamation during construction. An example mitigation measure is below:

> *Mitigation Measure Trans-1 – Before construction starts, Reclamation and its primary contractors for engineering and construction will develop a coordinated construction traffic control plan to minimize the simultaneous use of roadways by different construction contractors for worker commute trips, material hauling, and equipment delivery to the extent feasible. The plan will outline phasing of activities and the use of multiple routes to and from off-site locations to minimize the daily amount of traffic on individual roadways. Reclamation will require that the construction contractors implement and enforce the plans throughout the construction periods.*

Road and bridge relocations would allow for continued access to recreation facilities, private residences and businesses around Shasta Lake after construction is completed.

As stated in the DEIS Engineering Summary Appendix, Chapter 4, "Design Considerations for Reservoir Area Infrastructure Modifications and/or Relocations," under the "Road Relocations" heading, approximately 4.1 miles of paved roadway and 2.3 miles of unpaved roadway would require relocation as a result of the 18.5-foot raise. Feasibility-level quantities based on the feasibility-level designs have been estimated for each affected road segment.

The process of developing the cost estimates for both bridge and road relocations is described in the DEIS Engineering Summary Appendix, Chapter 5, "Opinion of Probable Construction Cost." Unit prices were developed using a semi-detailed method and applied to the quantities developed from the feasibility-level designs. Contingencies for all cost estimates are included as described in the above mentioned section in the DEIS. The DEIS Chapter 20, "Transportation and Traffic," Section 20.3.4, "Direct and Indirect Effects," describes the potential effects of road relocations for each SLWRI action alternative. These impacts are described for each alternative and mitigation for each impact is provided in DEIS Chapter 20, "Transportation and Traffic," Section 20.3.5, "Mitigation Measures."

Reclamation is aware that road and bridge relocations and improvements will be required with any of the proposed alternatives. The affected roads and bridges are detailed in the DEIS Engineering Summary Appendix, Chapter 4, "Design Considerations for Reservoir Area Infrastructure Modifications and/or Relocations." As described, affected roads and bridges would be replaced or modified as necessary to maintain existing levels of access around the shoreline. If the SLWRI is authorized by Congress, further refinement of road relocations and bridge modification designs will be completed.

33.3.17 Master Comment Responses for Water Rights

WR-1 – Water Rights

DEIS Chapter 6, "Hydrology, Hydraulics and Water Management," Sections 6.2, "Regulatory Framework," and Section 3.2, "Criteria Determining Significance," and Chapter 7, "Water Quality," Section 7.2.2, "State," regulatory framework of the DEIS describes the relevant State Water Resources Control Board (State Water Board) water rights orders and decisions, water quality control plans, and information on the Joint Point of Diversion temporary petitions and water transfer petitions currently under consideration at the State Water Board. These orders, decisions, plans and petitions will continue to be enforced under both the

No Action Alternative and with any of the action alternatives. The SLWRI does not alter any of these proceedings and they are acknowledged in the DEIS.

Chapter 6, "Hydrology, Hydraulics and Water Management," Section 6.3.3, "Direct and Indirect Effects," provides information on current Shasta Reservoir storage levels and anticipated average end-of-month storage for the No Action and each of the action alternatives under both the 2005 conditions and 2030 future conditions.

The existing rights to store water in Shasta Lake, along with historical storage data, were evaluated to determine if additional storage rights were required to fully use the increase in storage provided by the proposed project. Reclamation holds three permits for storage at Shasta – Permit 12721 allows of storage of up to 3,190,000 acre-feet per annum between October 1 and June 30; Permits 12722 and 12723 are for the storage of 1,303,000 acre-feet per annum between October 1 and June 30.[1] Total combined storage under these permits is 4,493,000 acre-feet per annum.

The maximum amount of water that can be stored under these rights is further limited by the actual amount stored under that right. All water right permits have a period during which the actual maximum beneficial use (or storage) under the right is determined – after this period expires, the permit holder receives a license for the highest amount put to beneficial use (or stored) in any one year. The development period for Permits 12721, 12722 and 12723 ended on December 1, 1990.

Shasta Lake storage data from 1944 through 2013 was reviewed to determine if the present storage rights are adequate to support an expansion of Shasta Lake. Maximum storage under the Shasta permits occurred in the October 1977 to June 1978 storage season, when 3,190,000 acre-feet was stored under Permit 12721 and 716,336 acre-feet was stored under Permits 12722 and 12723 for a total of 3,906,336 acre-feet.[2] The next highest season to date was 1992/1993, when 2,869,335 acre-feet was stored under Permit 12721. The difference between the highest season of storage and second highest season of storage is 1,037,001 acre-feet.

The year of maximum storage started with only 631,700 acre-feet in storage on October 1, 1977.[3] Above normal precipitation resulted in

[1] The purpose of use for Permit 12722 is municipal and industrial; the purpose of use for Permit 12723 is irrigation and other miscellaneous uses. These permits cover the same amount of water; that is, a total 1,303,000 acre-feet per annum can be stored for all purposes covered by these permits.
[2] 1978 is the only year in which storage occurred under Permits 12722 and 12723.
[3] Storage is calculated using a "Water Year", which runs from October 1 to September 30 of the next year.

Shasta storage peaking at 4,447,111 acre-feet on May 31, 1978.[4] This extremely dry year followed by an extremely wet year, with no environmental bypass or release requirements, has occurred only once since storage began at Shasta in 1944. This combination of events (extremely low storage followed by above normal precipitation) is highly unlikely to be repeated – primarily because Biological Opinions for the protection of salmonids in the Sacramento River mandate higher storage levels of approximately 2,000,00 acre-feet in Shasta Lake at the end of the water year. Assuming that Shasta storage is increased by 634,000 acre-feet to 5,134,000 acre-feet, end of year storage will have to be less than 641,000 acre-feet (or 32 percent of the minimum storage target set by the Biological Opinions) in order for the present permitted Shasta storage rights of 4,493,000 acre-feet to be exceeded. End of year storage would have to be less than 1,227,664 acre-feet (or 61 percent of the minimum storage target) in order for the year of highest storage (3,906,336 acre-feet) to be surpassed.

This evaluation shows that the present rights for storage of water in Shasta Lake under Permits 12721, 12722 and 12723 are sufficient to fully use the maximum increase in storage provided by the proposed project. Therefore, there is no need for Reclamation to apply for additional storage rights at Shasta Lake as part of the SLWRI.[5]

Chapter 26, "Other Required Disclosures," Section 26.6.2, "State Requirements," states that none of the action alternatives include any actions that would require acquisition, use or modification of water rights. The action alternatives would comply with all existing water rights in the primary and extended study areas.

33.3.18 Master Comment Responses for Comprehensive Mitigation

CMS-1 – EIS Mitigation Plan

As required by the National Environmental Policy Act (NEPA), Chapter 2, "Alternatives," of the DEIS included a discussion of mitigation measures and environmental commitments that are intended to reduce the environmental consequences of the action alternatives. Several commenters expressed concern that there was insufficient breadth in the mitigation measures or that strategies for implementation were incomplete.

[4] Storage is calculated on a daily basis and incorporates both initial storage volumes and refill storage volumes, which is why the total volume stored can be (and is in this case) higher than the volume represented by the end of season minus the beginning of the season.

[5] If required, an application for an additional or amended water right for an enlarged Shasta Reservoir would be subject to a future action by a State agency. It would be necessary for the State agency to evaluate participation in that action consistent with California Public Resources Code § 5093.542(c).

Mitigation measures must be part of an EIS, but a "fully developed" mitigation plan is not required at this stage of the project. NEPA requires that "mitigation be discussed in sufficient detail to ensure that environmental consequences have been fairly evaluated." (See *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 352, 109 S.Ct. 1835, 1846-47, 104 L.Ed.2d351 (1989)). NEPA does not include "a substantive requirement that a complete mitigation plan be actually formulated and adopted," nor does it "demand the presence of a fully developed plan that will mitigate all environmental harm before an agency can act." Neither does NEPA require that all mitigation measures identified in the mitigation plan be implemented. Mitigation measures become mandatory under NEPA regulations when they are included as a part of the decision to implement a project (40 CFR 1505.3).

The Preliminary Environmental Commitments and Mitigation Plan Appendix of the Final EIS provides a comprehensive summary of the commitments Reclamation has made to be responsive and, in many instances, to reduce impacts; however, final project authorization will determine which mitigation measures will be implemented. On-the-ground projects will be developed in response to the elements of the mitigation plan included in any Congressional authorization. If one of the action alternatives is selected, a monitoring and enforcement program shall be adopted for any mitigation measures that are ultimately included in a decision or, if appropriate, in any recommendation to Congress (40 CFR 1505.2). Regulations for NEPA (40 CFR 1508.28) will allow a subsequent phase of a project, such as environmental mitigation, to "tier" to this EIS to ensure that implementation is consistent with project objectives as planned.

Several commenters referred to requirements for mitigation under the CEQA. At this time, a lead agency for the CEQA has not been identified and discretionary decisions by California public agencies under CEQA are not anticipated without authorization from the state legislature. Should decisions that are subject to CEQA by California public agencies be necessary, it is intended that this EIS could be used by the lead agency, with appropriate scoping and review, for an EIR for those decisions. The definition of "mitigation" under CEQA regulations (CEQA Guidelines 15370) is the same as that used in the federal NEPA regulations (40 CFR 1508.20), although CEQA does require a commitment to mitigation measures within the CEQA document. The Final EIS includes a new appendix to the EIS titled "Preliminary Environmental Commitments and Mitigation Plan Appendix," which may be used by any CEQA lead agency to adopt mitigation measures. Reclamation, however, is not subject to CEQA and will not be making any CEQA decision. Public agencies of the State of California could use this information, supplement it as necessary, decide whether any impact is significant for CEQA purposes, and require appropriate mitigation, as

necessary. Note that decisions required by CEQA would apply only to state and local actions.

In section 2.3.2, "Environmental Commitments Common to All Action Alternatives," the DEIS states that before the publication of the Final EIS, Reclamation would develop a comprehensive mitigation strategy (CMS) intended to minimize or compensate for potential impacts to physical, biological, and socioeconomic resources. The CMS is detailed in a new appendix titled "Preliminary Environmental Commitments and Mitigation Plan Appendix." In addition to summarizing the environmental commitments described in Chapter 2, "Alternatives," the appendix provides a detailed discussion of development, implementation, and monitoring elements for mitigation presented in Chapters 4 through 25 of the EIS.

The systematic approach used to develop, enhance, and/or revise mitigation measures included a comprehensive review of project impacts and applicable mitigation measures by Reclamation and several federal responsible and cooperating agencies (USFWS, Forest Service, U.S. Department of the Interior, Bureau of Land Management (BLM), EPA, and USACE). This process enabled Reclamation to review information in the existing record and either confirm or adjust the need for mitigation specific to each impact. It also provided Reclamation and the responsible and cooperating agencies the opportunity to review the adequacy and feasibility of each mitigation measure identified in the DEIS.

The process included a series of interagency workshops that focused on impacts to physical processes and biological resources. In the workshops, specialists from Reclamation and the cooperating/responsible agencies developed a framework for quantifying some of the impacts in Chapter 11, "Fisheries and Aquatic Ecosystems," Chapter 12, "Botanical Resources and Wetlands," and Chapter 13, "Wildlife Resources," of the EIS and establishing mitigation ratios. A key element of the framework was to consider impacts on specific habitat types and species (e.g., gray pine and associated species) and develop mitigation specific to those habitat types and species. In other words, rather than simply identifying the cumulative number of acres for all habitat types that would be affected by raising Shasta Dam and developing broad mitigation measures for those acres, the mitigation measures would respond to the ecologic diversity of the project area and would be specific to impacts on specific habitat types and species.

In a number of instances, Reclamation identified the need to enhance or revise the mitigation measures in the DEIS. Considerable effort went into determining the amount of mitigation activity that would likely be needed for each impact. For example, the amount of low-gradient stream

reaches in the project area was determined for each of the action alternatives (Impact Aqua-07), and mitigation measures were developed to restore comparable amounts of currently degraded low-gradient streams adjacent to and potentially upstream from Shasta Lake. In another example, potentially adverse impacts to known sites of BLM and Forest Service sensitive plant species were identified (Impact Bot-3). A corresponding mitigation measure was then developed to create a propagation program (including genome sequencing), reestablish plant populations at appropriate locations, and purchase or otherwise secure replacement habitat with conservation easements or other agreements. Other examples are identified in the referenced appendix.

This systematic review:

1. Confirmed that some impacts had no feasible mitigation

2. Identified mitigation measures presented in the DEIS that were deemed adequate by Reclamation and the participating responsible and cooperating agencies;

3. Refined the expected magnitude of an impact, resulting in a revision to the EIS;

4. Clarified mitigation measures with respect to level of specificity (e.g., timing, location, magnitude); and

5. Identified new mitigation measures primarily associated with impacts on biological resources and physical processes and evaluated their feasibility and potential effectiveness.

In addition to the comprehensive discussion of the environmental commitments made by Reclamation in Chapter 2, “Alternatives,” the mitigation measures described in the “Preliminary Environmental Commitments and Mitigation Plan Appendix,” are incorporated into the relevant sections of Chapters 4 through 25 of the EIS.

At this point in Reclamation’s NEPA process, some mitigation measures are more certain than others. Mitigation measures have been sufficiently developed that Reclamation can identify the general amount, type, and location of mitigation actions that will be implemented if and when Congress authorizes an action.

33.3.19 Master Comment Responses for McCloud River Public Resource Code/Fed W&S Eligibility

WASR-1 – Eligibility of the McCloud River as a Federal Wild and Scenic River

Several commenters stated that raising Shasta Dam would conflict with the designation of the McCloud River as a Federal wild and scenic river. This issue is addressed in Chapter 25, "Wild and Scenic River Considerations for the McCloud River."

The McCloud River has not been designated by Congress as a Federal wild and scenic river. Portions of the McCloud River, however, have been evaluated by the USFS and determined eligible for inclusion into the national Wild and Scenic River system.

To afford the river any Federal protection under the Wild and Scenic Rivers Act, it would need to be a designated study river or a designated component of the national system. At this time, the McCloud River has neither been designated a component of the national system nor a study river.

The Wild and Scenic Rivers Act does not prohibit water developments that may affect portions of rivers that are eligible for inclusion in the national system. Section 5(d)(1) of the act does, however, require that in all planning for the use and development of water and related land resources, consideration be given to potential national wild, scenic, and recreational river areas by all Federal agencies involved.

The EIS fully considers and discloses the effects of raising Shasta Dam on the eligibility of the McCloud River for inclusion into the Federal system. Raising Shasta Dam would affect the eligibility of between 1,470 linear feet (CP1) and 3,550 linear feet (CP3, CP4, CP4A, and CP5) of the lower McCloud River because water in those reaches would no longer be "free flowing," a criteria for designation as a Federal Wild and Scenic River. Water quality, another criterion for designation, would also be affected by periodic inundation. The DEIS also discloses the impacts to the river's outstandingly remarkable values (ORV). These impacts include the potential inundation of prehistoric and historic sites from past use by Indian tribes, late 1800 and early 1900 resorts, and logging activities; the potential loss of habitat for "blue ribbon trout species" (USFS 1994); and impacts to geologic features including rock outcrops, cascades, and pools.

The maximum impact on the river's free-flowing condition would be less than 3 percent of the total length of the lower river that is eligible for designation (DEIS Chapter 25, "Wild and Scenic River

Considerations for McCloud River"). This impact was determined to be significant; no feasible mitigation was identified.

WASR-3 – The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River

Some commenters suggested that the raising of Shasta Dam and inundation of part of the McCloud River conflicts with the Shasta-Trinity National Forest (STNF) Land and Resource Management Plan (LRMP). The STNF LRMP details actions of the Forest Service that occur on STNF lands. Raising Shasta Dam is not a Forest Service project; rather, it is a Reclamation proposal for which the Forest Service is a cooperating Federal agency. The STNF LRMP does not extend to private land that is not under the administration of the Forest Service. The portion of the McCloud River that would be affected by raising Shasta Dam is currently private land and not subject to Forest Service administration under the STNF LRMP.

The Federal Wild and Scenic Rivers Act does not prohibit water developments that may affect portions of rivers that are eligible for inclusion in the national system. Section 5(d)(1) of the Act requires that in all planning for the use and development of water and related land resources, consideration be given to potential national wild, scenic, and recreational river areas by all Federal agencies involved.

The EIS fully considers and discloses the effects of raising Shasta Dam on the eligibility of the McCloud River for inclusion into the national system. Raising Shasta Dam would affect the eligibility of between 1,470 linear feet (CP1) and 3,550 linear feet (CP3, CP 4, CP 4A, and CP5) of the lower McCloud River because water in those reaches would no longer be "free flowing," a criterion for designation as a Federal wild and scenic river. Water quality, another criterion for designation, would also be affected by periodic inundation. The EIS also discloses the impacts to the rivers ORVs. These impacts include the potential inundation of prehistoric and historic sites from past use by Indian tribes, late 1800 and early 1900 resorts, and logging activities; the potential loss of habitat for "blue ribbon trout species" (USFS 1994); and impacts to geologic features, including rock outcrops, cascades, and pools.

The maximum impact on the river's free-flowing condition would be less than 3 percent of the total length of the lower river that is eligible for designation (DEIS Chapter 25, "Wild and Scenic River Considerations for McCloud River," Section 25.4.3, "Direct and Indirect Effects").

WASR-4 – CRMP's Responsibilities to Maintain the Outstandingly Remarkable Values of the McCloud River

Some commenters suggested that the Coordinated Resource Management Plan (CRMP) obligates the USFS to seek designation of the McCloud River under the Federal Wild and Scenic Rivers Act. The role of the CRMP is addressed in EIS Chapter 25, "Wild and Scenic River Considerations for the McCloud River," Section 25.1, "Background," which has been revised in response to comments on the DEIS. The CRMP was established to coordinate actions among the signatory landowners and parties with vested interests in the McCloud River so that actions of the signatory landowners on their properties would protect the ORVs of the McCloud River. The CRMP's purpose is to protect the ORVs through coordination of actions by signatory members on their properties. The CRMP does not pertain to the protection of ORVs by nonsignatories or on any land other than that of the signatory landowners. Under the terms of the CRMP, the Forest Service reserves the right to seek Wild and Scenic River designation if, for any reason, the actions of a signatory member of the CRMP on the signatory member's land failed to protect the ORVs, as described in the CRMP Memorandum of Understanding.

Reclamation is not a signatory to the CRMP. Raising Shasta Dam is a Federal proposal for which Reclamation is the lead agency. Raising Shasta Dam is not an action arising out of the CRMP or from actions by a member of the CRMP. As such, the CRMP does not obligate the Forest Service to seek designation of the McCloud River as part of the national system as a result of Reclamation's proposal to raise Shasta Dam. Text has been added to Chapter 25, "Wild and Scenic River Considerations for the McCloud River," to clarify that the responsibilities of the CRMP are limited to the properties of the signatory landowners.

WASR-6 – Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542

Several commenters stated that raising Shasta Dam would conflict with California Public Resources Code Section 5093.542, an amendment to the California Wild and Scenic Rivers Act (California Public Resources Code Section 5093.50 to Section 5093.54), that affords protection to the wild trout fishery and free-flowing condition of the McCloud River. This issue is addressed in Chapter 25, "Wild and Scenic River Considerations for the McCloud River."

The California Resources Agency assessed the suitability of the McCloud River for inclusion in the California Wild and Scenic Rivers System, and it was found eligible. However, the California legislature declined to add the river to the California Wild and Scenic Rivers System and instead amended the California Wild and Scenic Rivers Act,

California Public Resources Code Section 5093.542, to protect the river's wild trout fishery and free-flowing condition from McCloud Dam to Shasta Reservoir.

The Final EIS has been revised to clarify that the action alternatives would affect the wild trout fishery and free-flowing condition of the lower McCloud River, as defined in the California Public Resources Code Section 5093.542. In the Final EIS, Impacts WASR-3 and WASR-4 in Chapter 25, "Wild and Scenic River Considerations for the McCloud River," and analysis were refined to describe how action alternatives would affect the wild trout fishery and free-flowing condition of the lower McCloud River, as identified in the California Public Resources Code Section 5093.542.

The Final EIS has also been revised to enhance the level of detail and commitment to mitigate impacts described under WASR-3 and WASR-4. These include efforts to improve, protect, and restore the wild trout fishery of the lower McCloud River and, to a lesser degree, mitigate impacts on free-flowing conditions. Specifically, Mitigation Measure WASR-3 "Develop and Implement a Comprehensive Multi-scale Fishery Protection, Restoration and Improvement Program for the Lower McCloud River Watershed" has been refined to include acquisition of lands from willing sellers on the lower McCloud River. Additionally, Mitigation Measure WASR-4 "Implement Protection, Restoration, and Improvement Measures to Benefit Hydrologic Functions Within the Lower McCloud River Watershed" has been added to address impacts to free-flowing conditions. Although the Final EIS includes these two mitigation measures, the associated determinations of significance have not been revised.

In addition, Reclamation has revised the Final EIS to clarify that some California state agencies may determine that they are precluded from issuing permits or approvals for the Preferred Alternative or another action alternative and that the State of California will need to determine whether Proposition 1, "Water Bond. Funding for Water Quality, Supply, Treatment, and Storage Project," funds can be used to support the Preferred Alterative or another action alternative. Although the action alternatives would affect the resources identified in the California Public Resources Code Section 5093.542, NEPA obligates the Federal agency to disclose the consequences of the Federal action, which can include consideration of alternatives that may be inconsistent with existing State or Federal law.

Some commenters questioned whether the DEIS comports with NEPA, given the limitation on some State agencies under California Public Resources Code Section 5093.542(c). Section 5093.542(c) states:

> *"Except for participation by the Department of Water Resources in studies involving the technical and economic feasibility of enlargement of Shasta Dam, no department or agency of the state shall assist or cooperate with, whether by loan, grant, license, or otherwise, any agency of the Federal, state, or local government in the planning or construction of any dam, reservoir, diversion, or other water impoundment facility that could have an adverse effect on the free-flowing condition of the McCloud River, or on its wild trout fishery."*

Some State agencies have not participated in developing the SLWRI or the associated EIS, but several California agencies have interpreted the California Public Resources Code as allowing them to participate in technical efforts within their jurisdiction so that Reclamation would have sufficient information available to evaluate the environmental impacts of the action alternatives. Those State agencies include the Natural Resources Agency (CDFW, DWR) and the Central Valley Regional Water Quality Control Board. In addition, DWR has participated in studies involving the technical and economic feasibility of enlargement of Shasta Dam, which is sanctioned by Section 5093.542c of the California Public Resources Code. Generally, Reclamation cannot force any State agency to participate, let alone cooperate, in the development of an EIS for a proposed Reclamation project, including the SLWRI EIS. But that does not mean that Reclamation cannot reasonably analyze a project's potential impacts. In this case, stakeholders and agencies, including some State agencies, participated in the scoping process and discussions with Reclamation. Reclamation used information provided through these means and performed focused studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The tools used to evaluate impacts of the alternatives were selected based on Reclamation's standard practices and input from responsible Federal, State, and local agencies and subject matter experts. To perform the appropriate level of analysis for an EIS, Reclamation used the best available information on State-managed resources and took the requisite hard look at potential impacts of the SLWRI based on the best available technical data.

WASR-8 – Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System

Several commenters stated that the DEIS did not fully disclose the fact that the Sacramento and McCloud rivers were included in the Nationwide Rivers Inventory (NRI) and lacked a discussion of how Reclamation considered the impacts on listed river segments in the DEIS, as required under Section 5(d)(1) of the Federal Wild and Scenic

Rivers Act. They also pointed out that if a river is listed in the NRI, the Federal agency involved with the action must consult with the land managing agency, or the National Park Service if the river is on private lands, to attempt to avoid or mitigate adverse effects. The NRI, first initiated in 1979 and now populated with hundreds of river segments, identified four river segments in the SLWRI study area as eligible for listing in the national system, one segment of the McCloud River and three segments of the Sacramento River. To be eligible, a river segment must possess a free-flowing character and contain one or more natural, cultural, or recreational ORVs. No segments of river in the Sacramento or McCloud River systems have been designated as a Wild and Scenic River under Federal law. However, the eligibility of some segments of the Sacramento and McCloud River systems for inclusion in the national Wild and Scenic River System could be affected by the proposal to raise Shasta Dam. Three NRI segments are on the Sacramento River below the Shasta Dam. These were evaluated and determined to be eligible for the NRI in the BLM's Redding Resource Management Plan (RMP: A-16) and are identified in Chapter 18, "Recreation and Public Access," of the DEIS, The ORVs on these reaches could be adversely affected by changes in flows if the height of Shasta Dam is raised. The fourth reach is on the lower McCloud River above Shasta Dam. A fifth river segment on the mainstem of the Sacramento River above Shasta Dam was not identified in the NRI, but was determined to be eligible by the USFS through the LRMP inventory and planning process for the STNF.

Changes in pool elevation will seasonally affect the free-flowing condition and water quality in those segments of the McCloud and Sacramento rivers where they enter Shasta Lake. The DEIS analyzed impacts to the eligibility of the McCloud River in Chapter 25, "Wild and Scenic River Considerations for the McCloud River," but did not address impacts on affected eligible segments of the Sacramento River above and below the dam. Text has been added to the Final EIS in Chapter 17, "Land Use," to address impacts on potential ORVs on affected reaches of the Sacramento River. The affected segments of rivers listed are shown in Table 33.3-6 below.

Table 33.3-6. Affected Segments of Rivers

River	Potentially Affected Eligible Segment	ORVs	Responsible Federal Agency
Sacramento	Below Shasta Dam, Arnold Bend above Colusa to Red Bluff Diversion Dam.	Recreation and Fishing	Bureau of Land Management; US Fish and Wildlife Service (Corning to Colusa)
Sacramento	Below Shasta Dam, Interstate Highway 5 bridge crossing immediately north of Red Bluff to Interstate Highway 5 bridge crossing at Anderson.	Scenery, Recreation, Fishing, Wildlife and Other Values.	Bureau of Land Management
Sacramento	Below Shasta Dam, Balls Ferry Bridge to gaging station below Sevenmile Creek	Scenery, Recreation, Fishing, Heritage	Bureau of Land Management
Sacramento	Above Shasta Dam at the transition reach where the Sacramento River flows into Shasta Lake	Cultural/Historical, Fisheries, Geology, Visual Quality/Scenery	Shasta-Trinity National Forest
McCloud	Above Shasta Dam at the transition reach where the McCloud River flows into Shasta Lake	Cultural/Historical, Fisheries, Geology, Visual Quality/Scenery	Shasta-Trinity National Forest

The Wild and Scenic Rivers Act does not prohibit water developments that may affect portions of rivers that are eligible for inclusion in the national Wild and Scenic Rivers System, except on rivers designated by Congress under Section 5(a) of the Act. The Sacramento and McCloud rivers have not been designated by Congress under Section 5(a) of the Wild and Scenic Rivers Act. Section 5(d)(1) of the Wild and Scenic Rivers Act requires that, in all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic, and recreational river areas. The EIS fully considers and discloses the effects of raising Shasta Dam on the ORVs and wild and scenic eligibility of the McCloud River in Chapter 25, “Wild and Scenic River Considerations for the McCloud River.” The EIS provides additional information about potential effects to the eligible reaches of the Sacramento River in Chapter 17, “Land Use.”

33.3.20 Master Comment Responses for Relationship to BDCP

BDCP-1 – Relationship of the SLWRI to the Bay Delta Conservation Plan

Several comments reflect concerns regarding potential inter-relationships between the SLWRI and BDCP.

The SLWRI is being studied under a separate authorization that is not predicated on the outcome of the BDCP. SLWRI action alternatives were evaluated independently of the BDCP process. The potential water conveyance facilities and other conservation measures of the BDCP were not incorporated into SLWRI action alternatives or Existing Conditions scenarios. Accordingly, all potential benefits of SLWRI action alternatives, such as estimated increases in fisheries benefits and agricultural and municipal and industrial water supply reliability, were evaluated in the absence of any of the potential BDCP alternative conveyance facilities and other conservation measures.

As stated above, the BDCP is not included as a project under the No-Action Alternative for the SLWRI. As described in Chapter 2, "Alternatives," of the DEIS and Final EIS, Section 2.2, "No-Action Alternative," projects included in the No-Action Alternative include those with current authorization, secured funding for design and construction, and environmental permitting and compliance activities that are substantially complete. Since the BDCP is still in the planning phase and no specific plan has been approved for implementation, it does not meet these criteria and is not included as a project under the No-Action Alternative.

The BDCP is, however, considered in the cumulative effects analysis for the SLWRI, which is described in the DEIS Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.2.9, "Cumulative Effects." As described, the BDCP is considered qualitatively in the assessment of cumulative effects of SLWRI action alternatives for each resource area, as applicable. For more information about the BDCP cumulative effects analysis, please see Master Comment Response EI-7, "Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in the SLWRI EIS."

As stated above, the SLWRI is being studied under a separate authorization from the BDCP and BDCP facilities and measures were not incorporated into SLWRI action alternatives. Furthermore, the BDCP was not incorporated into SLWRI No-Action Alternative or Existing Conditions scenarios because it is still in the planning phase and no specific plan has been approved for implementation, and therefore does not meet the criteria for inclusion. Accordingly, the

SLWRI is separate from the BDCP, and SLWRI action alternatives, including benefits of action alternatives, do not depend on implementation of the BDCP. With SLWRI having five action alternatives and the BDCP having 15 conveyance action alternatives, it is not possible to provide a meaningful quantitative evaluation of all the potential combinations of actions at this time. However, consistent with CEQ Regulations, the BDCP was considered in the assessment of cumulative effects of SLWRI action alternatives for each resource area.

Operation of new conveyance facilities and/or flow patterns proposed under the BDCP would require changes in existing CVP operations, as described in the BDCP DEIR/S. Similarly, operation of additional storage and/or flow patterns proposed under the SLWRI would also require changes in existing CVP operations as detailed in the EIS. Reclamation agrees that the SLWRI and the BDCP will need to be coordinated in terms of operations should both of these projects be implemented, just as the CVP and SWP operations are currently coordinated through the Coordinated Operations Agreement (COA) and operations described in the 2008 Long-Term Operation BA.

33.3.21 Master Comment Responses for Reservoir Area Hydrology

RAH-1 – Available Water to Fill an Enlarged Reservoir

Several commenters raised a concern that because Shasta Reservoir only fills to the top of the dam occasionally, and that enlarging Shasta Dam will not cause inflow to increase, that an even larger reservoir would not fill and is not needed. It is true that enlarging Shasta Dam will not cause inflow to increase; the increased storage will allow more efficient reservoir operations that capture and store water that is currently released downstream as part of flood control operations.

Shasta Dam is currently operated for multiple purposes including water supply, fisheries flows and flood control. Flood control operations are regulated by USACE criteria which include safe releases downstream and the reservation of empty storage capacity during the flood season for capturing runoff events. As the flood season ends, this storage space is gradually reduced and can be filled for other purposes, however, because of uncertainty in weather and inflow forecasts and other operational restrictions the reservoir is not allowed to be completely filled during the wet season when flood control capacity may still be needed and as a consequence the reservoir rarely completely fills. With additional storage capacity available there is additional operational flexibility to allow capture of additional flows during the flood season resulting in additional water in storage even if the reservoir does not completely fill each year. To evaluate the impact of the additional storage available for non-flood control purposes for each alternative over a range of rainfall year types, modeling is used.

Shasta Reservoir and its flood control operations are described in the DEIS in Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.1.5, "Flood Management, Shasta Lake and Vicinity." Additional details on the flood control requirements and operations are included in Section 6.2, "Regulatory Framework," Subsection 6.2.1, "Federal, Flood Management Requirements." Shasta operations for each alternative under these requirements were simulated with the CalSim-II CVP/SWP simulation model, the best available tool for predicting system-wide water operations throughout the Central Valley. Details on the CalSim-II model and the assumptions included in all simulations can be found in Chapter 6, "Hydrology, Hydraulics and Water Management," Section 6.3, "Environmental Consequences and Mitigation Measures," and Section 6.3.1, "Methods and Assumptions," and in the Modeling Appendix, Chapter 2, "CalSim-II." Flood operations at Shasta Lake are simulated based on regulatory requirements to maintain specific volumes of available, or empty, storage over the course of a year for protection against future flood events. During a flood event the high inflows are first captured in Shasta Lake up to the regulatory storage limits. When the flood control storage limits are met, releases are increased up to the safe downstream channel capacity. If the inflows are greater than the safe downstream channel capacity the regulatory storage limits can be exceeded and the excess inflow stored in Shasta Lake. When the high inflows reduce, the stored flood water is released from Shasta Lake until the storage reaches the regulatory limits to provide protection for future flood events. These flood control releases occur before Shasta Lake is physically full; they are driven by the flood control storage regulatory limitations.

The following Table 33.3-7 shows the number of months and years that Shasta Reservoir reaches the regulatory flood control storage limit in both the Existing Condition and Future No-Action Alternative in the CalSim-II simulations. During these months there is the possibility that Shasta Reservoir may need to make flood control releases to maintain the regulatory flood control limit. The enlarged Shasta Lake allows capture of a portion of these releases due to the larger available usable storage under the flood control storage limits.

Table 33.3-7. Number of Months and Years Shasta Reservoir Reaches Regulatory Flood Control Storage Limit for Existing and Future No-Action Alternative

Year Type	Total Months and Years in Category		Existing Condition		Future No-Action Alternative	
	#Months	#Years	#Months	#Years	#Months	#Years
Wet	312	26	153	26	139	26
Above Normal	144	12	36	12	30	11
Below Normal	168	14	14	7	15	8
Dry	216	18	8	4	7	4
Critical	144	12	1	1	0	0
Total	984	82	212	50	191	49

RAH-2 – Reservoir Surface Area with Reservoir Enlargement

Several comments were received that requested data on the surface area of Shasta Lake be provided under the various reservoir enlargements.

The operations of Shasta Reservoir, including surface area were simulated with the CalSim-II CVP/SWP simulation model, the best available tool for predicting system-wide water operations throughout the Central Valley. Details on the CalSim-II model and the assumptions included in all simulations can be found in in the DEIS in Chapter 6, "Hydrology, Hydraulics and Water Management," Section 6.3, "Environmental Consequences and Mitigation Measures," and Section 6.3.1, "Methods and Assumptions," and in the Modeling Appendix, Chapter 2, "CalSim-II." The CalSim-II simulation includes simulation of the surface area of Shasta Lake for each time period.

The following Table 33.3-8 is a summary of the simulated mean annual Shasta Lake surface area in acres for each alternative for all years and by water year type. Full output tables of the monthly Shasta Lake surface area are included in the Final EIS.

Table 33.3-8. Mean Annual Shasta Lake Surface Area in Acres

Year Type	Existing Conditions						
	Baseline	**CP1**	**CP2**	**CP3**	**CP4[1]**	**CP4A[1]**	**CP5**
All Years	23,247	24,063	24,753	25,296	25,886	25,657	25,235
Wet	25,733	26,834	27,611	28,345	28,448	28,399	28,326
Above Normal	24,679	25,611	26,223	26,860	27,331	27,073	26,844
Below Normal	23,593	24,285	25,070	25,617	26,137	25,988	25,489
Dry	22,539	23,245	23,811	24,368	25,154	24,771	24,280
Critical	17,087	17,477	18,132	18,145	19,699	19,245	18,068
Year Type	**Future Conditions**						
	No Action	**CP1**	**CP2**	**CP3**	**CP4[1]**	**CP4A[1]**	**CP5**
All Years	23,310	24,098	24,626	25,200	25,920	25,535	25,129
Wet	25,704	26,776	27,532	28,264	28,396	28,324	28,254
Above Normal	24,618	25,540	26,137	26,792	27,258	26,985	26,738
Below Normal	23,691	24,479	24,997	25,513	26,318	25,916	25,534
Dry	22,565	23,136	23,578	24,077	25,048	24,543	24,040
Critical	17,486	17,854	17,958	18,287	20,057	19,084	17,909

Note:
[1] Results for CP4 and CP4A are postprocessed based on operations modeling results from CP1 and CP2 respectively.

RAH-3 – Dry Year Effects to Reservoir Storage

This comment concerns the reservoir not refilling in dry years when the water supply is low. The purpose of any water supply reservoir is to capture and store excess flows during periods of high inflow and store them for release and use during periods of low inflow. With this operation the reservoir is expected to get lower in dry years to supplement the natural runoff and then refill in wetter years to store water for use in future dry years.

This operation was simulated with the CalSim-II CVP/SWP simulation model, the best available tool for predicting system-wide water operations throughout the Central Valley. Details on the CalSim-II model and the assumptions included in all simulations can be found in the DEIS in Chapter 6, "Hydrology, Hydraulics and Water Management," Section 6.3, "Environmental Consequences and Mitigation Measures," and Section 6.3.1, "Methods and Assumptions," and Modeling Appendix, Chapter 2, "CalSim-II." Water supply operations simulated in the model attempt to capture excess flood flows during periods of high runoff and store them for use during periods of low runoff.

The following Table 33.3-9 shows the average maximum annual storage for each year type from the CalSim-II simulation modeling. The table shows, in thousands of acre-feet, that the reservoir tends to fill more in wet years than in dry years as explained above. The table also shows that with the project the reservoir also contains more water in dry and critical years meaning that additional stored water is being carried over from wetter years to supplement water supply during the drier years.

Table 33.3-9. Average Maximum Annual Storage for Each Year Type

Year Type	Existing Conditions						
	Baseline	**CP1**	**CP2**	**CP3**	**CP4[1]**	**CP4A[1]**	**CP5**
All Years	4032	4217	4371	4501	4595	4562	4497
Wet	4485	4731	4916	5106	5109	5107	5106
Above Normal	4484	4711	4872	5030	5089	5063	5035
Below Normal	4123	4304	4462	4605	4682	4653	4586
Dry	3880	4031	4153	4269	4409	4344	4262
Critical	2723	2788	2907	2891	3166	3098	2888
Year Type	**Future Conditions**						
	No Action	**CP1**	**CP2**	**CP3**	**CP4[1]**	**CP4A[1]**	**CP5**
All Years	4044	4228	4357	4495	4606	4548	4483
Wet	4483	4730	4915	5105	5108	5106	5105
Above Normal	4481	4707	4868	5036	5085	5059	5028
Below Normal	4152	4334	4463	4598	4712	4654	4588
Dry	3884	4012	4112	4215	4390	4303	4221
Critical	2770	2859	2878	2933	3237	3069	2863

Note:
[1]Results for CP4 and CP4A are postprocessed based on operations modeling results from CP1 and CP2 respectively.

RAH-4 – Historic Operations vs. Simulated Operations Used for Alternatives Evaluations

Several commenters expressed concerns over differences in observed historical conditions and operations modeling results presented in the EIS.

The potential operations and impacts of the SLWRI were not evaluated using direct statistical analysis, they were estimated by simulation of the existing operations and anticipated future operations of Shasta Lake under each of the alternative assumptions using historically-based precipitation patterns. Operations modeling is commonly used to develop information on the anticipated operations and impacts of a wide range of water resource projects during project planning, design, and to aid in development of operational rules.

For the SLWRI operations modeling was performed using the CalSim-II CVP/SWP simulation model, the best available tool for predicting system-wide water operations throughout the Central Valley. Details on the CalSim-II model and the assumptions included in all simulations can be found in the DEIS in Chapter 6, "Hydrology, Hydraulics and Water Management," Section 6.3, "Environmental Consequences and Mitigation Measures," and Section 6.3.1, "Methods and Assumptions," and in the Modeling Appendix, Chapter 2, "CalSim-II." As described in the documentation the CalSim-II model is not based on, and does not use, statistical data or methods, it is a level of demand simulation model that simulates the response of the CVP/SWP systems to a specifically developed set of hydrologic conditions. These simulations represent a way to compare the performance of alternatives under future landuse conditions. They do not provide absolute measurements of future operations given unknown precipitation and climate change. For climate change scenarios, please refer to Climate Change Modeling Attachment.

33.3.22 Master Comment Responses for Reservoir Evaporation

RE-1 – Reservoir Evaporation

Commenters were concerned that the increase in evaporation with the increasing surface area of the project action alternatives would result in a net reduction in yield from the SLWRI. The potential evaporation from the increased Lake Shasta water surface area was estimated and used in the simulation of the operations of the action alternatives. All increases in water supplies documented in the DEIS represent the net increases after additional evaporation from increased Shasta Lake surface area.

Operations modeling for the SLWRI was performed using the CalSim-II CVP/SWP simulation model, the best available tool for predicting system-wide water operations throughout the Central Valley. Details on the CalSim-II model and the assumptions included in all simulations can be found in the DEIS in Chapter 6, "Hydrology, Hydraulics and Water Management," Section 6.3, "Environmental Consequences and Mitigation Measures," and Section 6.3.1, "Methods and Assumptions," and in the Modeling Appendix, Chapter 2, "CalSim-II." The simulation includes estimates of reservoir evaporation based on storage and surface area at all reservoirs including Shasta Lake. All final storages, releases, and deliveries are simulated with consideration of changes in evaporation due to changes in reservoir surface area.

The following table is a summary of the simulated mean annual Shasta Lake evaporation in thousands of acre-feet for each alternative for all years and by water year type. Full output tables of the monthly Shasta Lake evaporation are included in the Final EIS.

Table 33.3-10. Mean Annual Shasta Lake Evaporation in TAF

Year Type	Existing Conditions						
	Baseline	**CP1**	**CP2**	**CP3**	**CP4[1]**	**CP4A[1]**	**CP5**
All Years	129	134	137	140	143	142	140
Wet	144	149	153	157	158	157	157
Above Normal	142	147	151	154	156	155	154
Below Normal	131	135	139	142	145	144	142
Dry	124	128	131	134	138	136	133
Critical	91	93	97	97	105	103	96
Year Type	**Future Conditions**						
	No Action	**CP1**	**CP2**	**CP3**	**CP4[1]**	**CP4A[1]**	**CP5**
All Years	130	134	137	140	144	142	139
Wet	143	149	153	157	157	157	157
Above Normal	142	147	150	154	156	155	154
Below Normal	132	136	139	142	146	144	142
Dry	124	127	130	132	137	135	132
Critical	94	95	96	98	108	102	95

Note:
[1]Results for CP4 and CP4A are postprocessed based on operations modeling results from CP1 and CP2 respectively.

33.3.23 Master Comment Responses for Water Supply Reliability Benefits & Beneficiaries

WSR-1 – Water Supply Demands, Supplies, and Project Benefits
During the public comment period, comments were received regarding the purpose and objectives of the project, particularly the objective related to increased water supply reliability. Some comments raised concerns regarding the potential beneficiaries of improved water supply reliability (e.g., existing CVP and SWP water contractors), while other commenters identified the need for improved water conservation and related practices.

Purpose, Need, and Objectives
Project Purpose The Project Purpose was revised for clarification in the Final EIS (Chapter 1, "Introduction," Section 1.2.1, "Project Purpose and Objectives") as follows:

> *…to improve operational flexibility of the Sacramento-San Joaquin Delta (Delta) watershed system to meet specified primary and secondary project objectives.*

The Project Purpose statement in the Final EIS was revised to reflect the fact that many measures/alternatives were considered in the plan formulation process other than measures that would modify or raise Shasta Dam. As explained in ALTR-1, "Range of Alternatives – General", the Final EIS was also revised to clarify that Reclamation not

only considered the CALFED Final PEIS/R in analyzing the environmental impacts of the SLWRI, but that this EIS tiers to the CALFED Final PEIS/R. These revisions were primarily made in EIS Chapters 1, "Introduction," Chapter 2, "Alternatives," and Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," and in Plan Formulation Appendix Chapter 2, "Management Measures."

The CALFED development process is also fully explained in ALTR-1, "Range of Alternatives – General." In developing the CALFED Final PEIS/R, the CALFED agencies, including Reclamation, evaluated a broad range of water management options (with and without storage) to be implemented to achieve the CALFED goals. Numerous alternatives were considered for improving ecosystem quality and water supply reliability, as well as water quality and levee system integrity. Many of those alternatives were rejected through the CALFED process. The CALFED Programmatic ROD (page 6) specifically states that "documents tiering from the CALFED [Final PEIS/R] will not revisit the alternatives that were rejected during CALFED's alternative development process." Additionally, as explained in ALTR-1, "Range of Alternatives - General," Reclamation undertook a derivative, similar process for identifying reasonable alternatives in developing the action alternatives (i.e., comprehensive plans) for the SLWRI. Reclamation evaluated many alternatives, or management measures, beyond simply modifying or raising Shasta Dam. To reflect the much broader range of alternatives considered through the CALFED development process and in the SLWRI plan formulation process, the SLWRI Purpose statement has been revised as described above. Reclamation's purpose and need statement is reasonable and did not foreclose a reasonable range of alternatives.

Objectives On the basis of needs described below, the study authorities, and other pertinent direction, including the August 2000 CALFED Programmatic ROD, primary and secondary planning objectives were developed. The two primary project objectives (also referred to as planning objectives) and five secondary project objectives were developed for the SLWRI are:

- **Primary Project Objectives**

  - Increase the survival of anadromous fish populations in the Sacramento River, primarily upstream from the Red Bluff Pumping Plant (RBPP)

  - Increase water supply and water supply reliability for agricultural, M&I, and environmental purposes, to help

meet current and future water demands, with a focus on enlarging Shasta Dam and Reservoir

- **Secondary Project Objectives**

  - Conserve, restore, and enhance ecosystem resources in the Shasta Lake area and along the upper Sacramento River

  - Reduce flood damage along the Sacramento River

  - Develop additional hydropower generation capabilities at Shasta Dam

  - Maintain and increase recreation opportunities at Shasta Lake

  - Maintain or improve water quality conditions in the Sacramento River downstream from Shasta Dam and in the Delta

Primary project objectives are those which specific alternatives are formulated to address. The two primary project objectives are considered to have coequal priority, with each pursued to the maximum practicable extent without adversely affecting the other. Secondary project objectives are considered to the extent possible through pursuit of the primary project objectives.

Some commenters suggest that the Primary Objectives are too narrowly drawn because "the water supply goal includes a 'focus on enlarging Shasta Dam and Reservoir.'" The objective, however, merely recognizes that studying the feasibility of raising Shasta Dam and Reservoir was not only an approved project in the CALFED Programmatic ROD, but authorized by two Federal statutes. If Reclamation did not provide some focus on raising Shasta Dam and Reservoir in the SLWRI plan formulation process, including the Final EIS, one could question Reclamation's authority to conduct the study in the first place. The objective does not state that Reclamation would not consider non-Shasta Dam enlargement alternatives, and nothing in the objective precludes Reclamation from doing so. The objective's focus on Shasta Dam and Reservoir did not preclude Reclamation from considering other alternatives in the SLWRI plan formulation and alternative development process. As noted above, Reclamation considered numerous alternatives through the CALFED and SLWRI alternatives development processes. The Project's primary objectives are reasonable and did not preclude Reclamation from considering a reasonable range of alternatives.

Project Need As summarized in the Executive Summary and further described in Chapter 1 "Introduction," of the DEIS, the need for the SLWRI is for:

- **Anadromous Fish Survival** – The Sacramento River system supports four separate runs of Chinook salmon: fall-, late fall-, winter-, and spring-run. The adult populations of the four runs of salmon and other important fish species that spawn in the upper Sacramento River have considerably declined over the last 40 years. Several fish species in the upper Sacramento River have been listed under the Federal Endangered Species Act: Sacramento River winter-run Chinook salmon (endangered), Central Valley spring-run Chinook salmon (threatened), Central Valley steelhead (threatened), and the Southern Distinct Population Segment of North American green sturgeon (threatened). Two of these species are also listed under the California Endangered Species Act: Sacramento River winter-run Chinook salmon (endangered) and Central Valley spring-run Chinook salmon (threatened).

  Unsuitable water temperatures in the upper Sacramento River, especially in dry and critical years is a critical factor affecting the abundance of Chinook salmon and steelhead in the river. Water temperatures that are too high or, less commonly, too low, can be detrimental to the various life stages of Chinook salmon. Elevated water temperatures can negatively impact holding and spawning adults, egg viability and incubation, preemergent fry, and rearing juveniles and smolts, significantly diminishing the next generation of returning spawners. Stress caused by high water temperatures also may reduce the resistance of fish to parasites, disease, and pollutants. Releases of cold water from Shasta Reservoir can improve seasonal water temperatures in the Sacramento River downstream from Shasta Dam for anadromous fish during critical periods.

  Various Federal, State, and local projects are addressing factors contributing to declines in anadromous fish populations. Recovery actions range from changing the timing and magnitude of reservoir releases to structural changes at Shasta Dam. Despite these steps, additional actions are needed to address anadromous fish survival in the upper Sacramento River.

- **Water Supply Reliability** – Demands for water in California exceed available supplies. Reclamation's 2008 Water Supply and Yield Study describes dramatic increases in statewide population, land use changes, regulatory requirements, and

limitations on storage and conveyance facilities that have resulted in unmet water demands and subsequent increases in competition for water supplies among urban, agricultural, and environmental uses. The California Department of Water Resources (DWR) California Water Plan Update 2013 concludes that California is facing one of the most significant water crises in its history; drought impacts are growing, and climate change is affecting statewide hydrology. Challenges are greatest during drought years, when water supplies are less available.

As the population of California grows, and the demand for adequate water supplies becomes more acute, the ability to maintain a healthy and viable industrial and agricultural economy while protecting aquatic species will be increasingly difficult. Compounding these issues, potential effects of climate change, such as changed precipitation patterns, less snowfall, and earlier snowmelt, may considerably increase the demands on available water supplies in the future. As owner and operator of the CVP, one of the largest water storage and conveyance systems in the world, Reclamation has identified the need to increase the reliability of CVP water deliveries to its water contractors, particularly during dry and critical water years. Similar needs and challenges are faced by the SWP and other water projects throughout the State. As one of many efforts to improve the reliability of California's water supply, the SLWRI was established to evaluate the potential to improve water supply reliability, primarily by modifying Shasta Dam and enlarging Shasta Lake.

- **Ecosystem Resources** – The quantity, quality, diversity, and connectivity of riparian, wetland, floodplain, and shaded riverine habitat in the Sacramento River ecosystem have been severely limited through confinement of the river system by levees, reclamation of adjacent lands for farming, bank protection, construction of dams and reservoirs, channel stabilization, and land development. This has contributed to a decline in habitat and native species populations. Ecosystem restoration along the Sacramento River has been the focus of several ongoing programs, including the Senate Bill 1086 Program, CVPIA, CALFED, Central Valley Habitat Joint Venture (CVHJV), and numerous local programs within the Central Valley. Despite these efforts, a significant need remains to conserve and restore ecosystem resources along the Sacramento River.

- **Flood Management** – Communities and agricultural lands in the Central Valley are subject to flooding along the Sacramento River that poses risks to human life, health, safety, and property. Physical impacts from flooding include damage to buildings, contents, automobiles, agricultural crops, and equipment. Threats from flooding are caused by many factors, including overtopping or sudden failures of levees, which can result in deep and rapid flooding with little warning. In addition, urban development in flood-prone areas has exposed the public to the risk of flooding.

- **Hydropower** – Although California is the most energy-efficient state per capita in the Nation, demands for electricity are growing at a rapid pace. Over the next 10 years, California's peak demand for electricity is expected to increase 30 percent, from about 50,000 megawatts (MW) to about 65,000 MW. In addition, Executive Orders S-14-08 and S-21-09, issued in 2008 and 2009, respectively, established a goal of using renewable energy sources, including hydropower, for 33 percent of the State's energy consumption by 2020. To meet renewable energy goals, significant increases in non-dispatchable intermittent renewable resources, such as wind and solar generation, will need to be added to California's power system. This means that other significant flexible generation resources, such as hydropower, will be needed to support and integrate renewable generation.

- **Recreation** – As California's population continues to grow, demands will increase substantially for water-oriented recreation at and near the lakes, reservoirs, streams, and rivers of the Central Valley. Further increases in demand, accompanied by relatively static recreation resources, will cause issues at existing recreation areas. These challenges will be especially pronounced at Shasta Lake, which is one of the most visited recreation destinations in the state and in the region. Even under current levels of demand, USFS, which manages recreation at Shasta Lake, has expressed concern about seasonal capacity problems at existing marinas and USFS facilities. A substantial and increasing need exists to improve recreation-related facilities and conditions at Shasta Lake.

Water Quality – The Sacramento River and the Delta support fish and wildlife while providing water supplies for urban, agricultural, and environmental uses across the state. Saltwater intrusion, municipal discharges, agricultural drainage, and water project flows and diversions have led to water quality issues within the Delta, particularly related to salinity. In the Sacramento River, urban and agricultural runoff, and

runoff and seepage from abandoned mining operations, have resulted in elevated levels of pesticides, phosphorous, mercury, and other metals. Additional operational flexibility could provide opportunities to improve Sacramento River and Delta water quality conditions.

Planning Constraints and Considerations As described in Chapter 2, "Alternatives," Section 2.1.1, "Plan Formulation Process," of the DEIS, consistent with NEPA, the plan formulation process for Federal water resources studies and projects identified in the P&G begins with identifying existing and projected future resources conditions likely to occur in a study area. This is followed by defining water resources problems, needs, and opportunities to be addressed, and developing planning objectives, constraints, and criteria. For the SLWRI, this process was separated into five phases, all of which have been completed and are described in Section 2.1, "Alternatives Development Process," of the DEIS. The SLWRI-specific planning constraints and considerations are summarized in Chapter 2, "Alternatives," Section 2.1.3 "Planning Constraints and Other Considerations," of the DEIS and described in more detail in the Draft Plan Formulation Appendix of the DEIS. Planning constraints help guide the plan formulation process.

Some planning constraints are more rigid than others. Examples of more rigid constraints include congressional direction in study authorizations; other current applicable laws, regulations, and policies; and physical conditions (e.g., topography, hydrology). Other planning constraints are less restrictive but are still influential in guiding the process. Planning considerations were specifically identified to help formulate, evaluate, and compare initial plans and, later, detailed alternatives.

Basis of Analysis and Assumptions Reclamation as the lead agency has determined the appropriate base line assumptions and tools for analysis and has consulted other agencies, tribal members, and the public through the scoping process. Detailed discussions of the methods and assumptions for each resource area are included in Section 3.1, "Methods and Assumptions," of Chapters 4 through 25 of the DEIS.

Potential Benefits of Action Alternatives As described in Chapter 6, "Hydrology, Hydraulics, and Water Management," of the DEIS, at a base level, each action alternative would store some additional flows behind Shasta Dam during periods when the flows would have otherwise been released downstream. The resulting increase in storage would then be used to both create an expanded cold-water pool, thus benefiting fisheries, and for subsequent release downstream when there are opportunities to put the water to beneficial use. Each of the action alternatives would contribute in varying degrees to all of the primary and secondary project objectives, and provide benefits both north and south of the Delta.

A summary of major potential benefits of the action alternatives is included in the Executive Summary, Section S.6.7, "Summary of Comprehensive Plan Physical Features and Benefits," of the EIS.

Potential Beneficiaries of Action Alternatives Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.2, "Environmental Consequences and Mitigation Measures," of the DEIS addresses benefits of the action alternatives on deliveries to CVP water service contractors and refuges, and SWP contractors, as well as changes in allocations to municipal and industrial (M&I), and agricultural water service contractors, and refuges. As discussed in Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.1.4, "Surface Water Supply," of the DEIS, the CVP provides water to settlement contractors in the Sacramento Valley, exchange contractors in the San Joaquin Valley, agricultural and M&I water service contractors in both the Sacramento and San Joaquin valleys, and wildlife refuges both north and south of the Delta. The SWP operates under long-term contracts with public water agencies throughout California. These agencies, in turn, deliver water to wholesalers or retailers, or deliver it directly to agricultural and M&I water users.

The SLWRI No-Action Alternative and action alternatives would not include changes to any rules and regulations that govern operations at Shasta Dam in the form of flood control requirements, flow requirements, water quality requirements, and water supply and hydropower commitments. SLWRI alternatives would not supersede existing laws or regulations and does not exempt any actions from compliance with applicable laws, including NEPA or Federal Endangered Species Act (ESA). SLWRI alternatives would not increase existing maximum CVP or SWP contract quantities or expand the place of use. Similarly, SLWRI action alternatives would not modify existing priorities for water supply deliveries. The power generated by the CVP is marketed through contracts with the Western Area Power Administration (Western). Changes in Western's priorities are not anticipated to change under SLWRI action alternatives.

A summary of major potential benefits of the action alternatives is included in the Executive Summary, Section S.6.7, "Summary of Comprehensive Plan Physical Features and Benefits," of the EIS.

Water Conservation, Water Use Efficiency, and Water Recycling As described in Chapter 2, "Alternatives," of the DEIS, all action alternatives include a water conservation program to augment current water use efficiency practices. The proposed program would consist of a 10-year initial program to which Reclamation would allocate approximately $1.6 million to $3.8 million to fund water conservation efforts. Funding would be proportional to additional water supplies

delivered and would focus on assisting project beneficiaries (agencies receiving increased water supplies because of the project), with developing new or expanded agricultural and M&I water conservation and water recycling programs. Program actions would be a combination of technical assistance, grants, and loans to support a variety of water conservation projects, such as recycled wastewater projects, irrigation system retrofits, and urban utilities retrofit and replacement programs. The program could be established as an extension of existing Reclamation programs, or as a new program through teaming with cost-sharing partners. Combinations and types of water use efficiency actions funded would be tailored to meet the needs of identified cost-sharing partners, including consideration of cost-effectiveness at a regional scale for agencies receiving funding.

Compliance with Existing Contract Terms, Laws, and Regulations
The No-Action Alternative and action alternatives do not include changes to existing CVP or SWP contract terms. SLWRI does not supersede existing laws or regulations and does not exempt any actions from compliance with applicable laws, including NEPA or ESA. The Federal, State, and local regulatory framework for the SLWRI is generally described in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.4, "Regulatory Framework," of the DEIS. Chapters 4 through 25 contain more detailed discussions of the "Regulatory Framework" by resource area. In addition, Chapter 26, "Other Required Disclosures," further describes the Federal and State laws, rules and regulations, Executive Orders, and compliance requirements that may be required if an alternative is selected for implementation.

WSR-8 – Action Alternatives Don't Meet All Water Demands
Several comments reflect concerns regarding the ability of any of the action alternatives to meet all future water demands (CVP, SWP, and other demands statewide).

As stated in Chapter 1, "Introduction," Section 1.2.1, "Project Purpose and Objectives," of the Final EIS, one of the primary project objectives relates to increasing "…water supply and water supply reliability…to help meet current and future water demands…". However, meeting all water needs in the State of California is not within the purpose or objectives of the project. As described in Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.3, "Direct and Indirect Effects," of the DEIS, all of the action alternatives include enlarging the total storage capacity in the Shasta Reservoir to increase water supply reliability to agricultural and M&I users both north and south of the Delta. CP1, CP2, CP4/4A, and CP5 would also include changing Shasta Dam operational guidelines during dry years and critical years to focus on increasing M&I deliveries.

The No-Action Alternative and action alternatives do not include changes to existing CVP or SWP contract terms, existing contract amounts, or new contracts for water service. SLWRI does not supersede existing laws or regulations and does not exempt any actions from compliance with applicable laws, including NEPA or ESA. The Federal, State, and local regulatory framework for the SLWRI is generally described in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.4, "Regulatory Framework," of the DEIS. Chapters 4 through 25 contain more detailed discussions of the "Regulatory Framework" by resource area. In addition, Chapter 26, "Other Required Disclosures," further describes the Federal and State laws, rules and regulations, Executive Orders, and compliance requirements that may be required if an alternative is selected for implementation.

WSR-12 – Increasing Water Supply Reliability under Action Alternatives

Several comments reflect concerns regarding the ability of the action alternatives to increase water supply reliability, particularly for CVP water contractors.

Development and Refinement of Comprehensive Plans As described in Chapter 2, "Alternatives," Section 2.1.6, "Development and Refinement of Comprehensive Plans," of the DEIS, to improve the balance between agricultural and M&I water supply benefits, a portion of the increased storage capacity in Shasta Reservoir was reserved to specifically focus on increasing M&I deliveries during dry and critical years under Comprehensive Plans 1, 2, 4, and 5. Operations targeting increased M&I deliveries were based on existing and anticipated future demands, operational priorities, and facilities of the SWP, which provides M&I water to major regions of the State's population.

In addition, to provide a greater range of focus and operations within the set of comprehensive plans, water supply operations for Comprehensive Plan 3 were focused on agricultural water supply reliability and anadromous fish survival. Accordingly, for Comprehensive Plan 3, none of the increased storage capacity in Shasta Reservoir was reserved for increasing M&I deliveries.

Potential Benefits of Action Alternatives As described in Chapter 6, "Hydrology, Hydraulics, and Water Management," of the DEIS, at a base level, each action alternative would store some additional flows behind Shasta Dam during periods when the flows would have otherwise been released downstream. The resulting increase in storage would then be used to both create an expanded cold-water pool, thus benefiting fisheries, and for subsequent release downstream when there are opportunities to put the water to beneficial use. Each of the action

alternatives would contribute in varying degrees to all of the primary and secondary project objectives, and provide benefits both north and south of the Delta.

A summary of major potential benefits of the action alternatives is included in the Executive Summary, Section S.6.7, "Summary of Comprehensive Plan Physical Features and Benefits," of the DEIS. Under each of the action alternatives, firm water supplies would increase both north and south of the Delta, water use efficiency funding would increase, and emergency water supply response capability would increase.

Each of the SWLRI alternatives would have similar impacts on CVP and SWP operations compared to the No-Action Alternative. However, the magnitude of the impacts would vary according to the alternative. Detailed tables of the estimated monthly flows and storages associated with each alternative, in addition to changes from the basis of comparison, are included in Attachment 1, "CalSim-II Output," of the Modeling Appendix and results are summarized in Chapter 6, "Hydrology, Hydraulics, and Water Management," of the DEIS.

33.3.24 Master Comment Responses for Recreation

REC-1 – Effects to Recreation at Shasta Lake

During the public comment period, comments were received that questioned the determination that recreation would be increased as a result of the project. Several comments expressed concern that a reduction in the number of marinas serving the lake could hurt the recreation business around the lake. Commenters were also concerned about losses of business surrounding Lake Shasta, and the possible loss of residents in the surrounding communities.

Recreation visitation is expected to increase under all action alternatives. The increase in overall recreation visitation is attributed to the anticipated improved lake conditions (surface area, water levels), in conjunction with modernized recreation facilities. All action alternatives would maintain the existing recreation capacity and distribution around Shasta Lake. As summarized in Executive Summary, Table S-2, action alternatives are expected to increase visitation between 89,000 to 370,000 user days a year. Considerations related to increased recreation visitation, and maintain recreation capacity on Shasta Lake include the following.

Increased Recreation Visitation and Access

Recreation User-Day Analysis The Modeling Appendix, Chapter 10, "Recreation Visitation," presents the two methodologies applied and corresponding recreation visitation estimates. These methodologies both

used a combination of the parameters to estimate visitation. The parameters included: positively related to elevation of Shasta Lake in May which is the beginning of the peak visitation season (e.g., distance to water in May), negatively related to the change in reservoir water elevation between May and September (the end of the peak visitation season), and positively related to reservoir surface area. These analyses support the conclusion that an increase in recreation visitation to Shasta Lake would occur under all of the action alternatives.

Public Boat Ramp Access Exceedance Analysis The DEIS Chapter 18, "Recreation and Public Access," Section 18.3.4, "Direct and Indirect Effects," Table 18-5 shows the percent exceedance of the Shasta Lake public boat ramp availability that were simulated using CalSim-II. The results show that with the dam raise the current minimum ramp elevations will be exceeded for a longer period during the recreational season of May-September. Therefore, the boat ramps would be accessible for a longer period of time during the recreational season. Similar trends would be expected for boat ramps at marinas.

Maintaining Recreation Capacity and Facilities Design

Recreation Facility Design Standards As stated in the DEIS Chapter 2, "Alternatives," Section 2.3.1, "Management Measures Common to All Action Alternatives," specifies that all of the action alternatives include features to, at a minimum, maintain the overall recreation capacity of the existing facilities. All action alternatives also provide for modernization of relocated recreation facilities, including, at a minimum, modifications to comply with current standards of health and safety. The DEIS Chapter 18, "Recreation and Public Access," Section 18.3.4, "Direct and Indirect Effects," states the affected recreational facilities to be replaced would comply with current Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) guidelines.

Recreation Relocation Plans Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," describes that relocation plans were developed to verify that with any dam raise that existing recreational capacity could be maintained. Reclamation and USFS will continue to work together to develop and finalize plans for relocation of recreational facilities that are suitable for the National Recreation Area (NRA). At a minimum the current available capacities would be maintained and inundated and affected facilities would be relocated on-site to the extent practical. Chapter 2, "Alternatives", Section 2.3.8, "Comprehensive Plan Construction Activities," text has been revised to clarify that the preference is to maintain the marinas in the immediate vicinity of the existing facility, but due to unforeseen circumstances preventing this, the recreation capacity may be relocated or consolidated to other marinas. Recreation facility relocation would occur to coincide with the filling of the enlarged lake to minimize recreation facilities

outages. While there may be short periods of outages at a particular facility, these outages would be planned such that at least one or more of each type of facility would remain open at any one time. Mitigation Measure Rec-2 "Provide Information About and Improve Alternate Recreation Access and Opportunities to Mitigate the Temporary Loss of Recreation Access and Opportunities During Construction at Shasta Dam" would allow for notification to the public of outages during construction. Overall, short –term construction impacts are balanced against the long-term improvement in recreation opportunities to provide an increase in recreation opportunities at a cost of some disruption during constructing and filling of an enlarged Shasta Lake.

Recreation Facility Quality The DEIS Engineering Summary Appendix, Chapter 4, "Design Consideration for Reservoir Area Infrastructure Modifications and/or Relocations," states that Reclamation would seek to maintain the quality of the visitor experience by replacing affected facilities with similar visual elements, amenities and access to Shasta Lake. Facilities like trails would be relocated upslope out of the inundation pool.

Whiskeytown-Shasta Trinity National Recreation Area

Whiskeytown-Shasta-Trinity NRA Mitigation The action alternatives would result in a reduction of total land area in the Whiskeytown-Shasta-Trinity NRA. Mitigation for these adverse impacts are described in Chapter 19, "Land Use and Planning," Section 17.3.5, "Mitigation Measures." Mitigation Measure LU-2 "Minimize and/or Avoid Conflicts with Land Use Goals and Policies" addresses Impact LU-2 "Conflict with Existing Land Use Goals and Policies of Affected Jurisdictions." This mitigation measure focuses on relocating recreation facilities consistent with the STNF LRMP and NRA Management Guide, implementation of measures to minimize loss of use of USFS lands (including open space and Riparian Reserve allocations), and consideration of STNF LRMP, NRA Management Guide and pertinent county guidance. This could include the purchase of private lands within the Whiskeytown-Shasta-Trinity NRA.

REC-2 – Ground Surveys for Recreation Facilities

During the public comment period, several comments were received regarding the ground surveys that were performed in 2012 for privately owned structures that were potentially affected by the project. Commenters expressed their desire to have this same opportunity afforded to recreation structures located around Lake Shasta that may be affected. Comments received included requests to extrapolate surveys from completed parcels to adjoining and/or nearby parcels, to conduct additional ground surveys to structures on private property and land leased by permit issued by the USFS, and to provide clarity to why USFS permit holders were not included in the original surveys.

As described in the DEIS Real Estate Appendix under the "Structure Surveys" heading, the 2012 structure surveys were performed on 170 parcels for willing owners. Reclamation performed the surveys to evaluate and compare sensitivities of partial and full acquisitions to the estimated real estate impacts included in the Real Estate Appendix. This sensitivity analysis served to determine if the real estate impacts applied for the purposes of the DEIS are consistent among all structures. Survey results show that original determinations were generally within ± 5 percent. For cabins permitted on Federal lands by the USFS, please refer to Master Comment Response FSCABINS-9, "Structure Surveys for USFS Cabins."

REC-3 – Effects to Tourism at Shasta Lake

During the public comment period comments were received regarding the potential loss of tourism as a result of the Shasta Dam raise. Several commenters expressed concern that many of the recreation businesses would not be able to afford the cost of relocation. Commenters expressed concern of the temporary loss in tourist activities such as the Shasta Dam tours.

The DEIS states in Chapter 1, "Introduction," Section 1.5.3, "USFS Use of EIS," that USFS operated recreation facilities impacted by the increased inundation would be replaced or relocated by Reclamation. Chapter 2, "Alternatives," Section 2.3.1, "Management Measures Common to All Action Alternatives," specifies that all of the action alternatives include features to, at a minimum, maintain the overall recreation capacity of the existing facilities. As stated in the DEIS Engineering Summary Appendix, Chapter 4, "Design Consideration for Reservoir Area Infrastructure Modifications and/or Relocations," Reclamation would protect recreation facilities from inundation, modify existing facilities to replace affected areas, or abandon existing facilities and replace them at other suitable sites. Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," also clarifies that affected recreation facilities would be relocated before any existing site is demolished to the extent practicable so that access for recreation can be maintained during construction and scheduling/sequencing of recreation facility relocation will strive to minimize or avoid interruption to public recreation activities and access to recreation sites. Chapter 18, "Recreation and Public Access," Section 18.3.4, "Direct and Indirect Effects," details the short-term and long-term effects of the no action and action alternatives on recreation and public access to lake recreation amenities, detailing which facilities would be difficult to reach during the construction period due to closure of access across the dam. The purpose of the EIS is to provide the information to the decision-makers and the public in order for an informed decision to be made concerning the overall benefits versus effects of the proposed action and alternatives.

In DEIS Chapter 18, "Recreation and Public Access," Section 18.3.5, "Mitigation Measures," describes Mitigation Measure Rec-2, "Provide Information About and Improve Alternate Recreation Access and Opportunities to Mitigate the Temporary Loss of Recreation Access and Opportunities During Construction at Shasta Dam," which states that to mitigate for the temporary disruption of the Shasta Dam tours Reclamation will provide enhanced information about the dam and operations at the visitors center. Reclamation plans to provide access to the visitor center throughout the construction period.

Also see Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity."

REC-4 – Relocation of Recreation Facilities

During the public comment period several comments were received that were concerned over the specifics of recreation facility relocations. Some concerns included who would pay for the engineering and construction of facility relocation, and what standards would be used for the design. As stated in the DEIS Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," relocation plans were developed to verify for each action alternative, could the existing recreational capacity be maintained. Reclamation and USFS will continue to work together to develop and finalize plans for relocation of recreational facilities that is suitable for the NRA, should an alternative be authorized by Congress. At a minimum the current available capacities would be maintained, inundated and affected facilities would be relocated to the extent practicable. Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," text has been revised to clarify that the preference is to maintain the marinas in the immediate vicinity, but due to unforeseen circumstances preventing this, the capacity may be relocated or consolidated to other marinas.

The DEIS states in Chapter 1, "Introduction," Section 1.5.3, "USFS Use of EIS," that USFS operated recreation facilities impacted by the increased inundation would be replaced or relocated by Reclamation. As stated in the DEIS Engineering Summary Appendix, Chapter 4, "Design Consideration for Reservoir Area Infrastructure Modifications and/or Relocations," Reclamation would protect recreation facilities from inundation, modify existing facilities to replace affected areas, or abandon existing facilities and replace them at other suitable sites. The DEIS Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," also clarifies that affected recreation facilities would be relocated before any existing site is demolished to the extent practicable so that access for recreation can be maintained during construction. As stated in the DEIS Engineering Summary Appendix Chapter 4, "Design Considerations for Reservoir Area Infrastructure Modifications and/or Relocations," section on "Marians/Boat Ramps

Modifications," all seven affected public boat ramps would be modified to maintain lake access during the times the lake is at full pool.

The DEIS Chapter 18, "Recreation and Public Access," Section 18.3.4, "Direct and Indirect Effects," Impact Rec-1 (CP1 through CP5) describes that the affected recreational facilities to be replaced would be modernized and would comply with current ADA and ABA guidelines.

REC-5 – Relocation of Private Recreation Facilities onto Federal Lands

During the public comment period, comments were received concerning the lack of details regarding affected cabins located on private lands. These comments ask specific questions about why these cabins are not identified to be relocated, and afforded some of the same rights and opportunities available to the USFS permit holders.

Neither the USFS nor Reclamation has the authority to gift, or transfer lands held by the federal government to private owners. As stated in Chapter 2, "Alternatives," Section 2.3.2, "Environmental Commitments Common to All Action Alternatives," the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (49 CFR 24), will be followed in property acquisition. For further information please refer to Master Comment Response PLAR-1, "Effects on Private Residences and Businesses."

The USFS is responsible for the Whiskeytown-Shasta Trinity NRA, and manages the NRA according to the Shasta-Trinity National Recreation Area Management Guide (1996). This guide addresses key management concerns related to recreation and other resource management, such as type and amounts of commercial and USFS recreation facilities to be provided on National Forest System lands.

REC-9 – Relationship Between Recreation and Shasta Lake Water Levels

During the public comment period, comments were received that expressed concern that currently the lake level is not managed effectively for recreation.

As stated in the DEIS Chapter 1, "Introduction," Shasta Dam was built to provide floodwater management, irrigation water supply, municipal and industrial water, hydropower generation, maintenance of navigable flows, and was amended by CVPIA to include fish and wildlife mitigation, protection and restoration as well as fish and wildlife enhancement. Recreation was not an authorized public purpose of the Shasta Division of the CVP and no recreation facilities were established as part of the original project.

As stated in the DEIS Chapter 18, "Recreation and Public Access," Section 18.1.1, "Recreation," that the dam is primarily operated for water supply, while meeting environmental and regulatory requirements, which results in annual cycles of the water level which varies by hydrologic year type. The reservoir reaches its highest level in the late spring and will be gradually drawn down through the summer peak recreation period.

The DEIS Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.3, "Direct and Indirect Effects," Table 6-5 shows the end of month average storage for the existing and future conditions, the table also displays the change in that average modeled for each alternative. The results show an increase in storage for each action alternative in both the existing and future conditions.

The DEIS Chapter 18, "Recreation and Public Access," Section 18.3.4, "Direct and Indirect Effects," Table 18-5 shows the percent exceedance of the of Shasta Lake public boat ramp availability that were simulated using CalSim-II modeling results. The results show that with the dam raise the current minimum ramp elevations will be exceeded for a longer period during the recreational season of May through September. These results support the conclusion that an increase in recreation access to Shasta Lake would occur under all action alternatives. Similar improvements for boat ramps at marinas would also be expected.

33.3.25 Master Comment Responses for Private Land Acquisition/Relocation

PLAR-1 – Effects to Private Residences and Businesses

Several comments were received associated with effects on businesses and homes if Shasta Reservoir is enlarged. Common topics among these comments are the loss of private property, relocation of private property, acquisition with willing sellers, acquisition through eminent domain, property appraisals, capital gains taxes, and real property disclosure.

Each of these topics are associated and addressed by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act) (49 CFR 24), as stated in DEIS Chapter 2, "Alternatives," Section 2.3.2, "Environmental Commitments Common to All Action Alternatives." Application of the Uniform Act would occur following Congressional authorization of the project. Special acquisition rules can be supplemented to the Uniform Act specific to the project as part of Congressional authorization of the project. Although including property acquisition information is not required under NEPA, this Master Comment Response provides background on provisions of the Uniform Act and is provided for informational purposes only to respond to comments on this subject.

Property Appraisals and Related Processes To provide an independent and unbiased valuation of businesses and homes, Reclamation contracts its appraisal services to the U.S. Department of the Interior, Office of Valuation Service (OVS), an entity codified by Departmental Manual Chapter 112 DM 33 effective June 1, 2011. The OVS supports the overall mission of the Department of the Interior as the independent body to evaluate whether land acquisitions and dispositions are at market values, as required by law and regulation. It is responsible for all real property valuation functions, including contributory values for minerals, timber, water, and other property rights as appropriate for the Department of the Interior's four main bureaus: BLM, Reclamation, USFWS, and National Park Service. The OVS predominantly subcontracts appraisal services to a certified real property appraiser, whose work is reviewed by the OVS to ensure compliance with the Uniform Standards of Professional Appraisal Practice as well as the Uniform Appraisal Standards for Federal Land Acquisition.

This appraiser provides her or his professional opinion of a property's current market value following an inspection of the property and preparation of a report. Landowners have the right to accompany the appraiser during her or his inspection of the property and provide additional relevant information. Market value is typically defined as that amount of money which would probably be paid for a property in a sale between a willing seller and a willing buyer. The market value does not take into account intangible elements such as sentimental value, good will, or any special value the property may have to the owner/tenant or the buyer. In accordance with the Uniform Appraisal Standards for Federal Land Acquisitions, no enhancement or decrease in value attributable to the project is to be considered in estimating market value. Each parcel of real property is independently assessed then value is estimated based on many factors that can include:

- How it compares to similar properties in the area that have been sold recently.

- If it is a business, the income and expenses will be evaluated. How much it would cost to reproduce the buildings and other structures, less any depreciation.

This appraisal is reviewed for consistency with established industry standards by OVS and becomes the basis for the "just compensation" offered for the property. "Just compensation" for your property does not take into account your relocation needs. Relocation is a separate issue from property acquisition and will be addressed in accordance with the Uniform Act.

Owners of real property are not obligated to accept the agency's offer. The owner is entitled to present evidence, in the form of an independent appraisal obtained by the seller that conforms to the Uniform Appraisal Standards for Federal Land Acquisitions. At that point, negotiations will begin. Although Reclamation has some flexibility regarding purchase price, if an agreement cannot be reached, Reclamation reserves its right to begin eminent domain proceedings. The first step in eminent domain procedure is for Reclamation to file a Declaration of Taking, in which the OVS appraised value is deposited with the federal court and the property becomes titled in the United States. The subsequent court proceedings involve a review by a federal judge to determine if the appraised value was proper or if additional monies should be paid to the seller. In the event of eminent domain, all rights of the seller under the Relocation Act remain intact.

Capital Gains Internal Revenue Service (IRS) Publication 544 explains how the Federal income tax would apply to a gain or loss resulting from the sale or condemnation of a real property, or its sale under the threat of condemnation, for public purposes. Specific questions about IRS rules should be discussed for your particular circumstances with your personal tax advisor or your local IRS office.

Relocation The Uniform Act provides Reclamation the guidance for relocation rules, including replacement property that is functionally equivalent to the seller's current property. Functional equivalency is explained in 49 CFR 24, Subpart A. The exchange of private property for lands held by the Federal government can only be made through Congressional action during project authorization.

Real Property Disclosure California rules for disclosures in real property transactions are published by the State of California Department of Real Estate in California Civil Code (commencing at Section 1102). These Real Estate Transfer Disclosure Statements obligate real estate agents and sellers to make disclosures necessary to avoid fraud, misrepresentation or deceit. Under State disclosure rules, real estate agents or sellers are not required to disclose the conduct of a Federal feasibility study because, in part, it is an activity that may or may not lead to actual implementation. If, however, the project is authorized by Congress, Reclamation will coordinate with local jurisdictions to compile a list of parcels that are in an inundation area and post at offices of the county recorder, county assessor, and county planning agency consistent with California Government Code Section 8589.4.

PLAR-9 – Maps and Additional Surveys of Private Parcels/Structures

Comments were received relating to foundation surveys performed on private property as part of a sensitivity analysis of real estate effects estimated for the project. Comment requests included availability to repeat the surveys or extrapolate survey data to other parcels.

As described in the DEIS Real Estate Appendix, Reclamation performed structural surveys on 170 parcels for willing landowners in the Lakehead community. No properties with permanent structures were surveyed without written permission by the landowner. Due to the sensitivity of the information, a customized map displaying parcel-specific elevation data was provided to each landowner who authorized the surveys. These surveys were used to compare sensitivities of partial and full acquisitions of property to estimate real estate impacts. Data collected from these surveys are not applicable to other parcels in the area without subsequent foundation surveys by a qualified surveyor. This sensitivity analysis served to determine if the real estate impacts applied for the purposes of the DEIS are consistent among all structures. Survey results show that original determinations were generally within ± 5 percent. As the sensitivity analysis demonstrated an acceptable range applicable to structures potentially inundated by the project, Reclamation does not intend to perform additional structure surveys on private property before Congressional authorization. Should Congress authorize a project, and a ROD be developed and issued, additional field surveys would be performed throughout the project area to define site-specific effects.

PLAR-11 – Inundation Zone/Reservoir Buffer

Several comments were received relating to reservoir pool elevations applied to the project and its associated buffer area.

The DEIS Real Estate Appendix, identified Reservoir pool elevations of 1,082, 1,088 and 1,093 feet North American Vertical Datum (NAVD) to correspond to alternative dam raises of 6.5 feet, 12.5 feet, and 18.5 feet, respectively. These figures and datum serve as the basis for the DEIS and replace figures provided during earlier planning phases. These estimates are included in a variety of sections and tables in the Real Estate Appendix, including “Background and Approach,” “Methods for Cost Estimate of Real Estate Acquisition Administration,” and “Privately Owned Cabins on U.S. Forest Service Lands” (See Table 1. Range of Impacted Cabins on U.S. Forest Service Lands). As described in the “Background and Approach” section, these pool elevations approximate a 3-foot vertical buffer area above the inundation level or a 5-foot horizontal buffer area extending from the inundation level, whichever buffer is greater. For the purposes of estimating physical effects of inundation and associated project costs for this EIS, this buffer area represents an extent by which lands would be acquired via the

project consistent with the policy for the Department of Interior and USACE and is published in 43 CFR Part 8, "Joint Policies of the Departments of the Interior and of the Army Relative to Reservoir Project Lands." This joint policy provides, among other things, guidance for fee title acquisition of lands necessary for permanent structures, lands below a selected freeboard, and to provide public access to the maximum flowage line or for operation and maintenance of the project. Additional clarifying text was incorporated into the Real Estate Appendix to clarify that the buffer area estimates potential wave action and related freeboard considerations.

33.3.26 Master Comment Responses for USFS Cabins

FSCABINS-1 – USFS Recreational Residence Tract Cabins in Preliminary Draft EIS and Draft EIS

Several individuals provided comments relating to Recreational Residence Tract cabins located on parcels permitted by the USFS. Commenters questioned the level of detail/clarity and associated outreach related to these structures as contained in the Preliminary Draft EIS (February 2012) and the DEIS.

As cited in the November 2011 Summary of the Preliminary Draft EIS (page S-2), the Preliminary Draft EIS presented findings to date and was released to the public to provide additional opportunity for public and stakeholder input. The Preliminary Draft EIS is inherently less complete than the July 2013 DEIS. Content provided in the DEIS is sufficient for evaluation under NEPA guidelines and to provide informed decision-making. Specific relocation requirements would be determined if and when a project is authorized by Congress for implementation.

Consistent with prior public outreach activities, Recreational Residential Tract Cabin Owners will be included with other public and stakeholder entities for future notifications and outreach associated with the Final EIS. This process was described in DEIS Chapter 27, "Public Involvement, Consultation, and Coordination," Section 27.6, "DEIS Outreach."

FSCABINS-2 – USFS's Authority over Privately Owned Cabins on USFS Lands

Comments were received concerning the role and decision-making process of the USFS in the DEIS and USFS's authority over privately owned cabins on USFS permitted lands.

DEIS Chapter 1, "Introduction," Section1.5.3, "USFS Use of EIS," describes the USFS purpose and need, proposed USFS permitting actions, and related actions that may be required if a project is authorized for construction. Specifically, the USFS would have a

connected action to amend the affected permits for privately operated recreation facilities, including permitted private cabins on USFS lands.

As referenced in Chapter 18, "Recreation and Public Access," USFS has reviewed the preliminary assessments of impacts on public and commercial recreation facilities. As managers of land adjacent to Shasta Lake, the USFS has been involved as a cooperating agency throughout the EIS process and has provided comments during the public comment period. As the federal lead agency, Reclamation will continue to work with USFS if and when a project is authorized by Congress for implementation.

Regarding residential cabins permitted on USFS land, as quoted in page 5 of the Real Estate Appendix (June 2013) of the DEIS, special use permit terms apply to permit holders:

> *"If during the term of this permit the authorized officer determines that specific and compelling reasons in the public interest require revocation of this permit, this permit shall be revoked after 180 days written notice to the holder, provided that the authorized officer may prescribe a shorter notice period if justified by the public interest. The USFS shall then have the right to relocate the holder's improvements to another lot, to remove them, or to require the holder to relocate or remove them, and the USFS shall be obligated to pay an equitable amount for the improvements or for their relocation and damages resulting from their relocation that are caused by the USFS."*

Reclamation is not involved in the terms of the USFS special use permits for the privately owned cabins on USFS lands. Actions taken by the USFS with regards to special use permit is described in DEIS Chapter 1, "Introduction," Section1.5.3, "USFS Use of EIS." Such USFS decisions would occur following authorization by Congress to proceed with implementation of one of the action alternatives.

FSCABINS-3 – Relocation of Privately Owned Cabins on USFS Lands

Comments were received regarding the potential for owners of privately owned cabins subject to USFS permit conditions to receive another lot on USFS land in the event a private cabin is removed if enlargement of Shasta Reservoir is authorized.

As stated in DEIS Chapter 2, "Alternatives," Section 2.3.2, "Environmental Commitments Common to All Action Alternatives," Reclamation will comply with the policies and provisions for the

acquisition of real property set forth in the Uniform Relocation Assistance and Real Property Act of 1970, as amended. However, specific to privately owned cabins on USFS lands, permit holders are also subject to USFS availability for permitted lots and USFS decisions. As stated on page 5 of the Real Estate Appendix (June 2013) of the DEIS, USFS is guided by the following special permit terms:

> *"If during the term of this permit the authorized officer determines that specific and compelling reasons in the public interest require revocation of this permit, this permit shall be revoked after 180 days written notice to the holder, provided that the authorized officer may prescribe a shorter notice period if justified by the public interest. The USFS shall then have the right to relocate the holder's improvements to another lot, to remove them, or to require the holder to relocate or remove them, and the USFS shall be obligated to pay an equitable amount for the improvements or for their relocation and damages resulting from their relocation that are caused by the USFS."*

FSCABINS-5 – Comment and Objection Process for Draft USFS Decisions

Several individuals stating ownership of a private cabin on lots permitted by the USFS provided comments related to establishment of their eligibility to file an objection to draft USFS decisions as they relate to the SLWRI.

These comments are consistent with the "Comment and Objection Process for Draft Forest Service Decisions," a one page letter provided to Reclamation by USFS staff and attached by Reclamation to its June 25, 2013, letter announcing the Public Review and Comment on the DEIS for SLWRI. The USFS requested inclusion of this letter (contained below) as an element to Chapter 1, "Introduction," Section 1.5.3, "USFS Use of EIS." This section, among other elements, describes USFS jurisdiction over National Forest System lands within the NRA and their permit obligations under the Federal Land Policy and Management Act (43 U.S. Code Section 1761 (a)(1)). These comments have been made available to USFS. The comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

> *COMMENT AND OBJECTION PROCESS FOR DRAFT FOREST SERVICE DECISIONS*
>
> *The Forest Service is required to provide for a predecisional comment and objection process, and to*

notify concerned persons of the requirement to comment on the Draft EIS related to Forest Service actions in order to object to future draft Forest Service decisions.

Only those who submit timely project-specific, written comments no later than 90 days after the Notice of Availability appears in the Federal Register are eligible to file an objection to draft Forest Service decisions. Individuals or representatives of an entity submitting comments must sign the comments or verify their identity upon request.

To establish eligibility to object, comments must include the following:

Name and postal address. E-mail address in addition is recommended but not required.

Title of the proposed project or activity.

Specific written comments regarding the Forest Service proposed project or activity along with supporting reasons.

Signature or other verification of identity upon request, and identification of the individual or entity who authored the comment(s). Comments received on behalf of an entity are considered as those of the entity only.

The responsible Federal officials will consider all written comments submitted. It is the responsibility of the commenter to ensure their written comments to establish eligibility to object to Forest Service decisions are received in a timely manner and include the required information.

For more information on the Forest Service Project-Level Pre-decisional Administrative Review Process, please go to http://www.fs.fed.us/emc/applit/includes/20130327_218FinalRuleFedReg.pdf. For additional information on Forest Service actions associated with the Bureau of Reclamation Draft EIS, contact Mr. Nathan Rezeau at 530-275-1587 or nrezeau@fs.fed.us.

FSCABINS-8 – Inundation Zone/Reservoir Buffer

Several comments were received relating to reservoir pool elevations applied to the project and its associated buffer area.

The DEIS Real Estate Appendix, Reservoir identified pool elevations of 1,082, 1,088 and 1,093 feet NAVD to correspond to alternative dam raises of 6.5 feet, 12.5 feet, and 18.5 feet, respectively. These figures and datum serve as the basis for the DEIS and replace figures provided during earlier planning phases. These estimates are included in a variety of sections and tables in the Real Estate Appendix, including "Background and Approach" (Page 1), "Methods for Cost Estimate of Real Estate Acquisition Administration" (Page 4), and "Privately Owned Cabins on U.S. Forest Service Lands" (See Table 1. Range of Impacted Cabins on U.S. Forest Service Lands). As described in the "Background and Approach" section, these pool elevations approximate a 3-foot vertical buffer area above the inundation level or a 5-foot horizontal buffer area extending from the inundation level, whichever buffer is greater. For the purposes of estimating physical effects of inundation and associated project costs for this EIS, this buffer area represents an extent by which lands would be acquired via the project consistent with the policy for the Department of Interior and USACE and is published in 43 CFR Part 8, "Joint Policies of the Departments of the Interior and of the Army Relative to Reservoir Project Lands." This joint policy provides, among other things, guidance for fee title acquisition of lands necessary for permanent structures, lands below a selected freeboard, and to provide public access to the maximum flowage line or for operation and maintenance of the project. Additional clarifying text was incorporated into the Real Estate Appendix to clarify that the buffer area estimates potential wave action and related freeboard considerations.

FSCABINS-9 – Structure Surveys for USFS Cabins

Several comments were received relating to reservoir pool elevations applied to the project and its associated buffer area and whether additional surveys will be conducted. Several individuals, and a representative of the USFS, requested Reclamation conduct structure surveys of potentially effected Recreational Residence Tract cabins located on USFS land via special use permit. These requests seek to have Reclamation perform structure surveys to a level similar to those conducted in 2012 on 170 private property parcels in the Lakehead community.

As described in the Real Estate Appendix (June 2013, Page 7), Reclamation performed structural surveys on 170 parcels for willing landowners in the Lakehead community. The primary intent of these surveys was to verify the accuracy of Geographic Information System (GIS) analyses used to estimate the number of structures potentially affected by the project. The surveys showed that the GIS estimates of the number of structures potentially affected by the project, and disclosed in the Real Estate Appendix, were generally accurate within ±5 percent. As the surveys confirmed an acceptable range of accuracy, Reclamation does not intend to perform additional structure surveys on

private property at this time. Should Congress authorize a project and a ROD be developed and issued, a more in-depth analysis would be performed.

33.3.27 Master Comment Responses for Land Use

LANDUSE-1 – Relocation of Septic Systems and Leach Fields

As stated in the DEIS, Chapter 21, "Utilities and Service Systems," Section 21.3.4, "Direct and Indirect Effects," septic systems in the project area are governed by Shasta County Development Standards, including intermittent inundation of septic systems and requirements to protect water quality in surface and subsurface water supplies from contamination by septic systems. Consistent with these standards, all septic system within 200 feet of the new full pool waterline or 100 feet downslope of the new full pool waterline would be demolished. Wastewater pipes, septic tanks, vaults/pits, and leach fields would be abandoned in place consistent with requirements of the County of Shasta Environmental Health Division. New septic systems may be constructed on the same property if they would meet Shasta County requirements for separating septic systems from the lake. Relocation of septic systems on private property would be done in one of two ways: (1) construct new septic systems on the property of the affected home or facility, where feasible; or (2) define a possible localized waste water treatment plant (WWTP) alternative for homes that do not meet Shasta County requirements for septic system separation from the lake. The general WWTP would include a pressurized sewer collection system to transport wastewater flows to several centralized package WWTPs. The DEIS Chapter 2, "Alternatives," identifies the likely construction of localized WWTPs for the areas of Salt Creek, Sugarloaf/Tsasdi Resort, Lakeshore (possibly several plants), Antlers Campground, Campbell Creek Cove, Bridge Bay Marina, Silverthorn Resort, and Jones Valley. Additional localized WWTPs for cabins on land held in USFS Special Use Permit will be evaluated following Congressional authorization of an action alternative, ROD and subject to USFS permit terms and conditions. Chapter 21, "Utilities and Service Systems," Section 21.3.4, "Direct and Indirect Effects," also states that Reclamation is committed to funding these activities and coordinating the transfer of any new WWTPs to the districts, which would be responsible for long-term operation and management.

33.3.28 Master Comment Responses for Utility Relocations

UR-1 – Effects to Water and Wastewater Infrastructure around Shasta Lake

Comments received during the public comment period expressed concern over some of the local water companies and some of the effects caused by the loss of their customer base, inundation of their

infrastructure, and some of the possible costs they could incur because of relocations. Considerations for the local utilities and water service providers include the following.

Relocation of Affected Infrastructure The DEIS Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," states that gas/petroleum, potable water, power and communication, and wastewater facilities would be relocated to comply with current standards if affected by inundation. This also includes water supply intakes located around the lake and wells that serve existing and/or relocated structures. During relocation, commitments have been made to minimize impacts on water quality from construction activities. As stated in Chapter 2, "Alternatives," Section 2.3.2, "Environmental Commitments Common to All Action Alternatives," all action alternatives include development and implementation of an Erosion Control and Sediment Plan and Stormwater Pollution Prevention Plan. Text in the Final EIS has been revised to clarify the impacts to water quality in Chapter 7, "Water Quality," Section 7.3.4, "Direct and Indirect Effects," including Impact WQ-1, "Temporary Construction-Related Sediment Effects on Shasta Lake and its Tributaries that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Uses," and Impact WQ-4, "Long-Term Sediment Effects that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Uses in Shasta Lake or Its Tributaries." There is no anticipated affect to the water quality or infrastructure of utilities downstream from Shasta Dam as a result of the project.

Cost of Relocations DEIS Chapter 21, "Utilities and Service Systems," Section 21.3.4, "Direct and Indirect Effects," states that "Reclamation is committed to funding and relocation of existing infrastructure and construction of replacement infrastructure, including localized WWTPs that might replace some individual septic systems." The costs for relocations of utilities and the proposed waste water collection systems have been included in the cost estimates for all action alternatives and can be found in Attachments 2,3, and 4 of the Engineering Summary Appendix of the Final EIS for each action alternative. As stated in DEIS Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," that inundated recreation facilities and associated facilities will be relocated before demolition to the extent practicable. Further development of specific planning, design and construction methods for the relocated infrastructure will occur after congressional authorization of any action alternative, and will follow all guidelines, requirements, and standards for similar facilities.

Local Water Service Providers The number of landowners within each water service area that would be affected varies by the action alternative. Reclamation has not performed an evaluation to determine

whether changes due to the implementation of the action alternatives would make a substantial change in local water service provider's budgets to the extent of potential insolvency. As discussed above Reclamation will relocate affected water services to maintain service to non-inundated structures at no cost to landowners as Reclamation will fund these relocation actions. These actions will prevent loss of customers that remain after lake enlargement, however, a net loss of water service area landowners may occur due to inundation which could affect the financial ability of water service providers to repay loans without raising rates for their customers.

33.3.29 Master Comment Responses for Downstream Fisheries

DSFISH-1 – SALMOD Model for Sacramento River Chinook Salmon

Comments were received related to SALMOD not being considered the most appropriate available tool, and the need to more fully disclose in the Final EIS the inherent uncertainties in the use of the SALMOD tool.

Analyses and impact assessment presented in the DEIS were completed using the best modeling tools and information available at the time of development. The modeling tools used in the DEIS analyses were selected because they are publicly available, have a knowledgeable user community, and are widely accepted for use in similar system wide analysis of resources in the California Central Valley and the Trinity River. Similarly, SALMOD has been one of the primary tools used to evaluate salmonid responses to revised water operations in the upper Sacramento River, including the most recent 2008 Long-Term Operation BA and resulting 2008 USFWS BO and 2009 NMFS BO.

SALMOD uses as its base data the real empirical data on Chinook salmon distribution and habitat use collected by the USFWS and CDFW in the Sacramento River. SALMOD was set up based on USFWS Instream Flow Incremental Methodology (IFIM) data, with direct input from both USFWS and CDFW (i.e., Mark Gard, Doug Killam), as well as incorporating comments from CDFW, USFWS, and Reclamation fisheries experts before completing the model structure. The model has been peer reviewed, including by Lisa Thompson and Chris Mosser of U.C. Davis (2011).

SALMOD is not used as a population dynamics model or a predictive tool for explicit population estimation, rather it is used as an operations and alternatives screening tool, or a comparative tool to evaluate relative change between alternatives. It is being used on a year-by-year basis, which allows Reclamation, under each year, to evaluate what would happen under the water operations, to each run of Chinook salmon (NMFS used late fall-run Chinook salmon as a surrogate for steelhead in the 2009 NMFS BO). By using the same annual number of spawners,

Reclamation is able to make a true comparison using each alternative against the base condition (existing or future condition). The described limitations do not preclude the ability of SALMOD to identify potential effects to Chinook salmon caused by changes in Shasta operations.

SALMOD, like any model of a natural system, is based on simplified rules and assumptions used to represent and approximate the complex factors that drive real-world conditions; while these assumptions can form a reasonably accurate and useful simulation of natural conditions, they cannot exactly replicate or predict actual conditions. Similarly, because it is not possible to fully understand or quantify all of the variability found in natural systems, and the complex interactions between different components of those systems, there are inherent uncertainties associated with the assumptions in all fisheries model including SALMOD. These required simplifications and inherent uncertainties in model inputs naturally lead to uncertainties in the accuracy of model outputs for any individual model run relative to actual, real-world conditions.

Some of the factors outside of the area of influence of the SLWRI (for instance, ocean conditions) are poorly understood and are themselves subject of both environmental and anthropogenic forces, making them highly uncertain and thus difficult to quantify or even fully anticipate. Ultimately, because SLWRI is only able to improve specific portions of the life cycle of anadromous fish, within a specific section of the Sacramento River, which have been demonstrated to be likely limiting factors to anadromous fish survival, any other portions of the life cycle that may also be limiting factors for anadromous fish survival will have to be addressed by other actions/projects that are outside the purview of the SLWRI. Inclusion of those factors outside of the areas and life stages influenced by this project could obscure the modeling effort and as such, the influence of the project, by introducing significant uncertainty from factors (and life stages) that are not directly influenced by the project. Therefore, the model has been formulated to isolate the effect of the project on anadromous fish survival.

In addition, SALMOD relies on output from a sequence of other models (CalSim-II and Sacramento River Water Quality Model (SRWQM)) for its flow and water temperature inputs. These models contain similar simplifications and uncertainties, which further influence the overall accuracy of a single SALMOD model run (as would occur with any ecological model using the same tools for input). For instance, CalSim-II, the best available tool for predicting system-wide water operations throughout the Central Valley, simplifies the system by assessing flows on a monthly basis and at a relatively coarse geographic scale, while fish populations are affected by changes on much finer temporal and

geographic scales, so flows must be downscaled using an additional set of assumptions to approximate natural processes.

For purposes of evaluating the potential effect of changes in Sacramento River flow and temperature on Chinook Salmon populations between Keswick Dam and Red Bluff Pumping Plant, it was assumed that simulated changes in average annual production that were less than 5 percent (plus or minus) relative to the basis-of-comparison (No-Action Alternative and Existing Conditions) would not be expected to result in a significant (detectable) effect on long term Chinook Salmon production potential. The 5 percent significance threshold accounts for the inherent limitations and uncertainties associated with SALMOD, as well as the limitations and uncertainties in the hydrologic model (CalSim-II) and temperature model (Sacramento River water temperature model) used to develop inputs to SALMOD. This is further described in both Chapter 11, "Fisheries and Aquatic Ecosystems," of the DEIS and Chapter 5, "SALMOD," of the Modeling Appendix.

However, with sufficient data, models like SALMOD are invaluable tools for understanding the operation of a complex system and predicting its response to certain types of change. If the modeling assumptions and parameters form reasonably accurate representations of the relationships between input variables and outputs, and the nature of those relationships do not change between scenarios, then the model is valid to use for comparing between alternatives despite its inherent uncertainty (identical assumptions will influence all scenarios and lead to similar uncertainties/ inaccuracies that cancel out in the process of comparison). The simulated production from SALMOD should therefore be interpreted as an index of production which can be used to make comparisons between alternatives, and should not be treated as a prediction of absolute numbers of fish production under any single alternative.

SALMOD is currently the best available tool for predicting project-related outcomes (on a relative, not absolute, basis) for all four Chinook salmon runs in the upper Sacramento River, and Reclamation believes that the assumptions applied in the SALMOD model are sound and defensible. Therefore, despite its acknowledged inherent limitations, Reclamation continues to believe that, when correctly interpreted, the use of SALMOD is a valid and valuable method for assessing project alternatives. Mortality calculations in SALMOD may be underestimated due to the difficulty in quantifying resource competition, predation and other natural factors, but may also be overestimated for some life stages. Please keep in mind that SALMOD was used for the purpose of comparing the proposed action alternatives, and was not intended to produce exact numbers, or to estimate survival of successful outmigrants

through the Delta or returning adults. SALMOD underestimates mortality both under the No-Action and action alternatives.

The Final EIS Executive Summary Chapter 11, "Fisheries and Aquatic Ecosystems," and the Modeling Appendix Chapter 5, "Anadromous Fish Production Simulation (SALMOD)," have been modified to clarify uncertainties of SALMOD.

DSFISH-2 – Fisheries Models and Tools

Comments suggest that there are other more appropriate modeling tools that could be used other than SALMOD, although not all commenters agreed upon the appropriate tools, nor did commenters supply evidence that other tools are widely accepted by regulatory agencies and the public.

Reclamation fully recognizes that there are many factors in addition to upper Sacramento River flow and temperature conditions that influence anadromous fish survival – including conditions in the lower Sacramento River, the Bay-Delta, and the Pacific Ocean – such as disease, predation, entrainment, habitat loss, and changes in flow and temperature regimes. However, no single action can simultaneously address the full range of limiting factors in all locations. As such, the SLWRI and its associated restoration actions should be viewed as only one among several required steps needed to address anadromous fish survival across all life stages.

Some of the factors outside of the area of influence of the SLWRI (for instance, ocean conditions) are poorly understood and are themselves subject of both environmental and anthropogenic forces, making them highly uncertain and thus difficult to quantify or even fully anticipate. Ultimately, because SLWRI is only able to improve specific portions of the life cycle of anadromous fish, within a specific section of the Sacramento River, which have been demonstrated to be likely limiting factors to anadromous fish survival, any other portions of the life cycle that may also be limiting factors for anadromous fish survival will have to be addressed by other actions/projects that are outside the purview of the SLWRI. Inclusion of those factors outside of the areas and life stages influenced by this project could obscure the modeling effort and as such, the influence of the project, by introducing significant uncertainty from factors (and life stages) that are not directly influenced by the project. Therefore, the model has been formulated to isolate the effect of the project on anadromous fish survival, by excluding factors outside of the area of influence of the project.

No fully vetted and accepted Chinook salmon life cycle model was available for use at the time the NEPA evaluation for the DEIS was conducted. While the Interactive Object-oriented Salmon (IOS) model

for winter-run Chinook salmon was used in the 2008 Long-Term Operation BA, it was considered an unacceptable and flawed tool by NMFS. The tool has since been updated and revised for BDCP, but there is no proof, as of yet, that it is considered by NMFS or other fisheries experts to be a reliable and acceptable model. Reclamation is currently funding NMFS to develop a Chinook salmon life cycle model, focusing initially on winter-run Chinook salmon, but it is still a work in progress. Therefore, Reclamation used SALMOD as an accepted tool in its evaluation of the SLWRI. It is unknown whether NMFS may request the use of a life cycle model for Section 7 consultation. In addition, tools such as IOS and the Oncorhynchus Bayesian Analysis model (OBAN), while publicly available, do not necessarily have a large user-base with access to, or working knowledge of, the required software and tools. Therefore, they are not considered 'available', and therefore Reclamation is not required to use these models in the NEPA analysis.

Several groups, including The Nature Conservancy and the USFWS, have suggested using the Sacramento River Ecological Flows Tool (SacEFT) to evaluate the effects of the project on riparian species. However, SacEFT is not a commonly applied and readily available tool for water resources planning studies in California. Unlike other commonly applied models and tools (for example CalSim-II, DSM2, and SALMOD), the full suite of tools needed to apply SacEFT (including supporting sub-models, such as the Meander Migration Model) are not readily available to the public, and do not have a large and diverse user-base with access to — and working technical knowledge of — the required software and tools. The Meander Migration Model does not appear to be a publicly available model, and Reclamation has been unable to obtain a conclusive answer about the availability of the complete suite of tools needed to apply SacEFT. Reclamation is not required by NEPA or CEQ Regulations to use tools which are not publicly available when conducting a NEPA evaluation.

Additionally, USFWS indicates that CalSim-II is not suitable for use in a fisheries analysis because it is a monthly model. However, no other tool is available that can simulate CVP/SWP operations on a daily basis. Both USFWS and NMFS used CalSim-II to generate the hydrology and operations data that was input to all fisheries models used in analyses for the 2008 USFWS BO and 2009 NMFS BO. The courts did not consider CalSim-II to be an inappropriate or invalid tool for those analyses, and found that there are no other widely accepted and verified tools currently available to simulate systemwide water operations. CalSim-II is the best tool currently available.

DSFISH-3 – Fish Habitat Restoration

Chapter 2, "Alternatives," Section 2.3, "Action Alternatives," describes the environmental commitments common to all actions alternatives as

well as measures specific to each of the action alternatives. Different components/measures were incorporated into each action alternative based on the focus of the action alternative. CP4 and CP4A focus primarily on anadromous fish survival, and CP5 focuses more broadly on both the primary and secondary objectives. Accordingly, based on the focus of these alternatives, augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River were included only in CP4 and CP5.

The proposed spawning gravel augmentation program for the SLWRI would consist of gravel placement at one to three locations every year in the upper Sacramento River, for a period of 10 years. Fifteen potential locations have been identified in the Sacramento River between Keswick Dam and Shea Island for spawning gravel augmentation, and each site would be eligible for gravel placement one or more times during the 10-year program.

The proposed spawning gravel augmentation program is not a mitigation program, but is a restoration action that is not intended to be implemented in perpetuity. This program is intended to provide additional benefits to anadromous fish and is expected to 'kick-start' the process towards recovery in conjunction with flow and water temperature benefits in the spawning reach above Red Bluff Pumping Plant. Consistent with NEPA and other Federal water resources plan guidance (e.g., P&G), potential project impacts are evaluated in comparison to the No-Action Alternative, which is based on existing conditions and reasonably foreseeable future projects. The existing condition for the SLWRI includes the presence of Shasta Dam and action alternatives would not result in any additional blockage of spawning gravel.

The CVPIA program provides funding and water supplies for fish and wildlife protection, restoration, and mitigation for the CVP and includes a spawning and rearing habitat restoration program that implements gravel augmentation and juvenile salmonid rearing habitat improvements to compensate for the blockage of spawning gravel and other actions that have reduced the availability of spawning gravel and rearing habitat. Currently the program is in the environmental analysis process for eight spawning and rearing habitat improvement sites in the 14-mile reach below Keswick Dam. Three of the sites focus solely on gravel placement, four sites include both side channel habitat improvements and gravel placement, and one site focuses on side channel habitat development. The CVPIA will continue with or without the implementation of a SLWRI action alternative.

As with the gravel augmentation program, the riparian, floodplain and side channel habitat restoration is an environmental commitment. Six sites were identified (see Figure 2-3 in Chapter 2, "Alternatives"). Restoration would occur at one or a combination of these six sites to provide rearing and/or spawning habitat for anadromous fish in the upper Sacramento River as far downstream as river mile 275. This restoration component was added to the alternatives working in coordination with USFWS and CDFW.

DSFISH-4 – Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements

Comments were received relating to the importance of downstream flows for fish reproduction and survival.

CVP and SWP operational assumptions in the CalSim-II modeling were based on operational requirements in the 2009 NMFS BO and 2008 USFWS BO and associated reasonable and prudent alternatives (RPA). The operations in the BOs that were directly modeled in CalSim-II are described in the EIS Modeling Appendix, Chapter 2, "CalSim-II". The 2008 USFWS BO and 2009 NMFS BO include requirements for Sacramento River flows and temperature at various locations, Shasta Reservoir carryover storage, operational restrictions at Red Bluff Diversion Dam, and Delta X2 flow requirements. The minimum flow requirement below Keswick Dam is based on a combination of State Water Board Water Rights Order 90-5 requirements, CVPIA 3406(b)(2) flows, and Action I.2.2 in the 2009 NMFS BO. From May through September, the minimum flow is always 3,250 cfs. In other months, the minimum flow requirement varies from 3,250 to 4,500 cfs. These requirements are intended to benefit listed fish species based on evaluations conducted by both NMFS and USFWS.

Early studies in the SLWRI alternatives development were conducted to determine if adjusting flows to meet those identified in the AFRP goals would provide greater value to fisheries (i.e., result in larger increases in juvenile production) than reductions in water temperature. Results showed that reduced water temperatures resulted in significantly greater increases in juvenile production than increased flows. As a result, the flows were maintained at the current standards to provide the longest duration of temperature benefits.

The SLWRI operations are tailored to meet the current BOs which do not require pulse flow releases from Shasta Dam. New scenarios that included pulse flows were not included in the discussions with the resource agencies during the plan formulation process, and were therefore not included in the Comprehensive Plans. If pulse flows will be required, they will be included in the project-specific BO or any new operations BO resulting from reconsultation actions.

Whether or not the SLWRI is implemented, the operations of Shasta Dam will follow the requirements established under the RPAs established under both the 2008 USFWS BO and 2009 NMFS BO, including any future BOs resulting from reconsultation actions, as well as any SLWRI-specific BO. As part of a multi-agency agreement, the Water Operations Management Team (WOMT), a management-level group of representatives of Reclamation, DWR, CDFW, NMFS, and USFWS, has been established, and meets weekly for review of CVP/SWP operations. Based on these meetings, the WOMT makes recommendations to state and regional directors for final action. Technical teams, including the Sacramento River Temperature Task Group (SRTTG) and the WOMT work within those implementation procedures to meet discretionary water contract obligations to the greatest extent consistent with survival and recovery of listed species to avoid jeopardizing the species. The responsibilities of and interaction between the WOMT and the technical teams are thoroughly described in Chapter 11, "Fisheries and Aquatics Resources," Section 11.2.1, "Regulatory Framework – Federal."

NMFS is the Federal resource agency with jurisdiction over, and therefore responsible for, the protection of Chinook salmon. Winter-run Chinook salmon are listed as endangered under the ESA and exist in a single population in the Sacramento River, whereas spring-run, while also listed (as a threatened species), have their core populations in other tributaries and fall-run Chinook salmon are not currently listed and are widely distributed throughout the Central Valley. NMFS direction to focus more on winter-run Chinook salmon is due to the single core population status of winter-run being more at risk to mortality factors in the upper Sacramento River in comparison with the other runs. In 2013, for example, several federally protected winter run salmon spawned later than normal in August. NMFS determined that high water must be maintained into early November to protect the incubating winter-run Chinook salmon eggs. However, to protect carry-over storage in the face of a potentially long-term drought, flows were immediately dropped thereafter, at the risk of dewatering fall-run Chinook salmon redds.

DSFISH-5 – Fish and Wildlife Coordination Act Report

Commenters cite the Draft Fish and Wildlife Coordination Act Report (CAR), prepared by the USFWS in 2007, as a basis of comparison for the DEIS SALMOD results and as being documentation for SLWRI not showing benefits to Chinook salmon. Reclamation feels that the CAR is misleading in the use of the Draft CAR as a citation for several reasons: (1) the Draft CAR is based on the 2007 Plan Formulation Report, and has not been updated based comments provided by Reclamation, or on the public release versions of the DEIS, (2) the CAR results do not evaluate the production in critical and dry years separate from other water year types, and (3) water operations described in the CAR are

based on the 2004/2005 BOs. The public release DEIS was updated to include the operational requirements in the 2009 NMFS BO and 2008 USFWS BO and associated RPAs.

According to NMFS in their Final Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring Run Chinook Salmon and the Distinct Population Segment of Central Valley Steelhead (NMFS 2014), Chinook salmon populations, especially winter-run Chinook, are highly vulnerable to global and localized climate changes, including prolonged drought conditions. This is caused by reduced volumes of cold water that can be released from the reservoirs, including Shasta Lake, thus affecting the spawning and rearing habitat conditions. On page 21 of the Final Recovery Plan, NMFS states:

> *The fact that this ESU is comprised of a single population with very limited spawning and rearing habitat increases its risk of extinction due to local catastrophe or poor environmental conditions. There are no other natural populations in the ESU to buffer it from natural fluctuations. A single catastrophe with effects persisting for four or more years could result in extinction of the Sacramento River winter-run Chinook salmon ESU (Lindley et al. 2007). Such potential catastrophes include volcanic eruption of Lassen Peak,* ***prolonged drought which depletes the cold water pool in Shasta Reservoir*** *or some related failure to manage cold water storage, a spill of toxic materials with effects that persist for four years, or a disease outbreak.* [emphasis added]

Additionally, the Recovery Plan states:

> *Water temperatures in the upper Sacramento River are the result of interaction among: (1) ambient air temperature; (2) volume of water; (3) water temperature at release from Shasta and Trinity dams; (4) total reservoir storage; (5) location of reservoir thermocline; (6) ratio of Spring Creek Power Plant release to Shasta Dam release; (7) operation of Temperature Control Device (TCD) on Shasta Dam; and (8) tributary inflows (NMFS 1997). Water temperature varies with location and distance downstream of Keswick Dam, and depends upon the annual hydrologic conditions and annual operation of the Shasta-Trinity Division of the CVP (NMFS 1997). In general, water released from Keswick Dam warms as it moves downstream during the summer*

> *and early fall months at a critical time for the successful development and survival of juvenile winter-run Chinook salmon (NMFS 1997).*
>
> *After two years of drought, Shasta Reservoir storage would be insufficient to provide cold water throughout the winter-run Chinook salmon spawning and embryo incubation season, resulting in partial or complete year class failure. A severe drought lasting more than 3 years would likely result in the extinction of winter-run Chinook salmon. The probability of extended droughts is increasing as the effects of climate change continue (see Chapter 6).*

The 2009 NMFS BO RPA Action Suite I.2 indicate that the Shasta Lake cold water pool must be managed to maintain suitable water temperatures and habitat for winter-run Chinook salmon downstream from Shasta Dam, particularly in critical water years, extended drought years, and under future conditions, which will be affected by increased downstream water demands and climate change.

Moreover, an evolutionarily significant unit (ESU) that is represented by a single population is vulnerable to the limitation in life history and genetic diversity that would otherwise increase the ability of individuals in the population to withstand environmental variation. Although the status of winter-run Chinook salmon is improving, there is only one population, and it depends on cold water releases from Shasta Dam, which would be vulnerable to a prolonged drought. SLWRI benefits to anadromous salmonids are focused on dry and critically dry years, because this is when they are believed to be the most vulnerable.

The USFWS believes that all water year types should be treated equally with respect to the SALMOD results, and so combine all results together into a single average. This implies that Chinook salmon survival is equal in all water year types. However, historic conditions have proven this not to be the case, and that Chinook salmon survival is, indeed, lower in critical and dry water year. Therefore, the SLWRI is formulated to provide the greatest benefits to anadromous fish in dry and critical water years when storage has been so low that water released from Shasta has been unable to meet minimum flow and/or water temperature requirements. This is when the anadromous fish are believed to be the most vulnerable.

While there are, overall, fewer critically dry water years, critically dry water years are the most important years for increasing the survival (or reducing the risk of extirpation) of the anadromous fishes in the Sacramento River, particularly when there is a series of critical and dry

water years. The low storage levels caused by multiple dry years result in an inadequate supply of cold water available to maintain high survival of anadromous fish in the river below Keswick Dam. This results in warmer, above-survival threshold temperatures which increases temperature-related mortality and results in lower production (i.e., the number of juvenile fish that survive to pass the Red Bluff Pumping Plant). Therefore, increasing storage, and in particular, the cold water pool, targeting the release of the cold water for critical and dry water years, increases the benefits to Chinook salmon and steelhead during the critical and dry years. The SLWRI is not expected to significantly increase fish production during wet, above normal or below normal water year types because the cold water pool benefits of the additional storage are optimized to provide water temperature benefits during critical and dry water years when populations are most at risk. In the simulated 83 years modeled in CalSim-II, 13 years (15.6 percent) were identified as critical water years, and 17 (20 percent) were identified as dry water years. As described in the DEIS Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects," the number of years with significant increases (greater than 5 percent) in the production index for each run under CP4 compared to the No-Action Alternative for all years combined, and then for critical and dry years combined respectively are:

- Winter-run Chinook salmon – 7 years and 6 years
- Spring-run Chinook salmon – 16 years and 12 years
- Fall-run Chinook salmon – 9 years and 8 years
- Late fall-run Chinook salmon –11 years for both

One must consider that of these 30 combined critical and dry years, there were 4 occasions in which a series of dry and critical years occurred. The first period was three years, from 1924 through 1926,with one critical water year, the second was 6 years, 1929 through 1934, with 2 of those years being critical water years, water years 77 and 78, both critical water years, and the final period, between 1987 and 1992, 4 years of which were critical water years. Drought periods lasting 3 years or longer severely deplete the reservoir and the cold water pool, regardless of storage capacity. However, by increasing the storage capacity, the impact to the fishery is delayed, providing available water for a longer period of time than would occur under the No-Action alternative condition. Additionally, the largest increase, in production for each run occurs during each of these drought periods.

In the majority of the years (primarily wet, above normal, and below normal) there were minimal changes in the production index (less than 5 percent). As described in Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," production indices that were within ±5 percent were considered to have no detectable difference from the production indices of the basis-of-comparison (Existing Condition or No-Action Alternative).

Other comments indicate that while decreasing water temperatures are important, improving other factors such as access to juvenile rearing habitat, fish screens, and flow management to reduce redd dewatering would likely have more substantial effects on the long-term survival of anadromous fish in the Sacramento River. Reclamation agrees that these components are extremely important to the survival of anadromous salmonids. However, to meet both primary objectives of the SLWRI, the most effective way to easily and successfully increase anadromous fish survival is to reduce water temperatures as well as improve access to rearing habitat (through the proposed restoration actions). Reclamation is currently working on flow management actions to reduce redd dewatering, and is also actively identifying and screening top priority diversions to reduce fish entrainment. By reducing water temperatures, Reclamation gets closer towards goals identified in the Recovery Plan (2014) and by increasing juvenile production there is a greater chance of getting closer to the doubling goals defined in the AFRP.

DSFISH-6 – Historic Dam Effects on Fisheries

Comments were received related to the harm done to fish by the construction of Shasta Dam and the need to remedy that harm. The original construction of Shasta Dam which occurred between 1938 and 1945 resulted in blocking fish from their historic habitat. Because the SLWRI involves raising the existing dam, this project does not mitigate for blocking fish from the upstream migration. CVPIA has programs in place to mitigate for the original structure, including adding spawning gravel downstream from Shasta Dam and providing a supply of water that is released on a schedule to specifically benefit downstream fish populations. Additionally, the USFWS and NMFS BOs for the CVP/SWP operations provide RPAs that establish measures to help 'mitigate' for fisheries losses resulting from the presence of Shasta Dam as well as Shasta operations. The 2009 NMFS BO RPA Action V covers fish passage past Shasta Dam (see also Master Common Response FISHPASS-1, "Fish Passage Above Shasta Dam").

DSFISH-8 – National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions

Comments were received related to the relationship between the SLWRI and the Draft Sacramento River winter-run Chinook salmon, Central

Valley Spring-run Chinook salmon and Central Valley steelhead Recovery Plan (Recovery Plan) (NMFS 2009) and/or the Anadromous Fish Restoration Plan (ARFP) doubling goals. In July 2014, following the end of the public comment period for the DEIS, NMFS released the Final Recovery Plan. The Draft Recovery Plan was used in the development of the action alternatives, particularly with respect to achieving winter-run Chinook salmon recovery by improving water temperature conditions in the Sacramento River. The SLWRI is also in alignment with the requirements identified in the Final Recovery Plan. Further discussion in this MCR references the requirements established in the Final Recovery Plan.

The SLWRI, on its own, cannot achieve the AFRP doubling goal (3406(b)(1) of the CVPIA) or fully meet the NMFS Recovery goals for the listed anadromous fish species, but will work towards achieving these goals in conjunction with other programs. The Recovery Plan does not include SLWRI, but does include a recommendation for increasing the Shasta Lake cold water pool. To maintain current operations, and increase the cold water pool, the most viable way to achieve both and have increased water during dry and critical water years is to increase the elevation of the lake, thus increasing the volume and providing the ability to manage a larger cold water pool. As well, by increasing the overall production of juveniles, the SLWRI provides the potential for an increase in returning adults provided the juveniles survive downstream stressors (e.g., habitat conditions, water temperatures, predation, entrainment issues, ocean conditions etc.) not caused by the project.

Moreover, an ESU that is represented by a single population is vulnerable to the limitation in life history and genetic diversity that would otherwise increase the ability of the population to withstand environmental variation. Although the status of Sacramento River winter-run Chinook salmon may be improving, there is only one population existing in only one river, and it depends on cold water releases from Shasta Dam, which would be vulnerable to a prolonged drought. The project would be managed to provide benefits to anadromous salmonids focused on dry and critically dry years, because monitoring has shown this is when these populations are the most vulnerable.

All alternatives provide increases, often substantial, in salmonid populations during drought periods. Many sources identify that Upper Sacramento River water temperatures, particularly during dry and critical water years, are highly important to anadromous fisheries and are considered a limiting factor to these species. Increasing the cold water pool in Shasta Lake to benefit anadromous fish was specifically identified in the Recovery Plan. Per the Recovery Plan, water temperatures and flow, particularly during dry and critically dry years

(e.g., drought periods) are stressors of "very high" importance. According to Recovery Plan, Chinook salmon populations, especially winter-run Chinook, are highly vulnerable to global and localized climate changes, including prolonged drought conditions (NMFS 2014). This is caused by reduced volumes of cold water that can be released from the reservoirs, including Shasta Lake, thus affecting the spawning and rearing habitat conditions.

Implementation of the Recovery Plan is not the intent of the SLWRI, but implementation of the SLWRI and the resulting increase in juvenile production during critical and dry water years does work towards achieving the goal of recovery by improving habitat conditions for anadromous fish in the Sacramento River between Keswick Dam and Red Bluff, as shown throughout Chapter 11, "Fisheries and Aquatic Ecosystems." This is accomplished by providing improved water conditions during critical water years, as described above, as well as including restoration actions under CP4, CP4A and CP5, as described in Chapter 2, "Alternatives."

Reclamation chose to focus the riparian, side channel and floodplain restoration along the Sacramento between Keswick Dam and Red Bluff, partially because of the natural topography and hydrology of the region. The restoration actions are to promote the health and vitality of the river ecosystem, and would not conflict with other known programs or projects on the upper Sacramento River. The restoration would support the goals of the Sacramento River Conservation Area Forum, CALFED (as currently managed by the Delta Stewardship Council and other entities), and other programs associated with riparian restoration along the Sacramento River.

See also Master Comment Response DSFISH-3, "Fish Habitat Restoration," and Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

DSFISH-9 – Flow-Related Effects on Fish Species of Concern

Comments were received related to effects to downstream flows and fish species of concern. Chapter 11, "Fisheries and Aquatic Ecosystems," describes the effects of the project alternatives on fish species of concern in the study area, and makes commitments to mitigate for adverse effects to the extent feasible. Chapter 12, "Botanical Resources and Wetlands," describes the effects of the project on downstream riparian and riverine habitat and makes commitments to mitigate for adverse effects to the extent feasible. As described in Chapter 12, "Botanical Resources and Wetlands," Section 12.3.5, "Mitigation Measures," and Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.4 "Mitigation Measures," under Mitigation Measure Bot-7 and Aqua-14, Reclamation

will implement a riverine ecosystem mitigation and adaptive management plan to mitigate to the extent feasible any identified potentially significant or significant impacts to federally and state-protected fish species as a result of possible reductions in the magnitude, duration, or frequency of intermediate to large flows both in the upper Sacramento River and in the lowermost (confluence) areas of tributaries (Impact Aqua-14- *Reduction in Ecologically Important Geomorphic Processes in the Upper Sacramento River Resulting from Reduced Frequency and Magnitude of Intermediate to High Flows*). The plan will be consistent with and will support implementation of the Senate Bill 1086 program, and will be developed in coordination with USFWS, NMFS, CDFW, and the Sacramento River Conservation Area Forum. The Plan will be developed before project construction.

Implementation of this mitigation measure would be aimed at reducing potential impacts to federally and state-protected fish species resulting from potential reduced habitat inundation and reduced high water periods. Additionally, CP4, CP4A and CP5 include a 10-year gravel augmentation program as an environmental commitment and the restoration of riparian, floodplain, and side-channel habitat. These additional efforts will offset potential effects to federally and state-protected fish species from Impact Aqua-14.

Under all alternatives, there would be no change to access to rearing habitat in the Feather, American, and Trinity Rivers. Implementation of Mitigation Measure Aqua-15 would maintain flows in the Feather, American, and Trinity Rivers pursuant to existing operational agreements, Biological Opinions, and standards that are protective of fisheries resources. Sacramento River salmonids use the Feather and American rivers as juvenile rearing areas.

DSFISH-10 – Methodology for Evaluating Fisheries Impacts

Comments were received related to the methodology for evaluating downstream fisheries impacts. NEPA requires that Federal Agencies shall ensure the professional integrity, including scientific integrity, of the discussions and analyses in EISs. They shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement. An agency may place discussion of methodology in an appendix (CFR 1502.24). Reclamation, through the scoping process and discussions with agencies and stakeholders, has performed information gathering and focused studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The tools used to evaluate impacts of the alternatives were selected based upon Reclamation's standard practices and input from agencies and subject matter experts. The models used in

the fisheries analyses included CalSim-II, SALMOD, and the Sacramento River water temperature model.

CalSim-II is the hydrologic and CVP/SWP systems operations model that was used for this EIS as it is the standard model used for CVP/SWP systems analysis, including in EISs prepared by Reclamation. CalSim-II is able to simulate the operation of the complete CVP-SWP system in all areas that contribute flow to the Delta in monthly time-steps. No other tool is available that can simulate CVP/SWP operations on a daily basis. Both USFWS and NMFS used CalSim-II to generate the hydrology and operations data that was input to all fisheries models used in analyses for the 2008 USFWS BO and 2009 NMFS BO. The courts did not consider CalSim-II to be an inappropriate or invalid tool for those analyses, and found that there are no other widely accepted and verified tools currently available to simulate systemwide water operations. CalSim-II is the best tool currently available. As described in Chapter 3, "Temporal Downsizing of CalSim-II Flows for Use in Temperature Modeling," for each alternative, temporal downscaling was performed on the CalSim-II monthly average tributary flows to convert them to daily average flows for HEC-5Q input. Monthly average flows were converted to daily tributary inflows based on the 1921 through 2003 daily historical record for aggregated inflows. As described in Chapter 4, "Sacramento River Water Quality Model," a HEC-5Q model was developed and calibrated for simulating water temperature in the upper Sacramento River system. Using system flows computed by HEC-5, HEC-5Q computes the distribution of temperature in the reservoirs and in stream reaches. HEC-5Q is designed for long-term simulations of flow and temperature using daily average hydrology and 6-hour meteorology. A 6-hour time step approximates diurnal variations in temperature.

SALMOD is a computer model used on the SLWRI to simulate population dynamics for all four runs of Chinook salmon between Keswick Dam and RBPP. SALMOD was applied to this project because the model has been used on the upper Sacramento River (from Keswick Dam to Battle Creek), and has been updated using model parameters and techniques developed for use on the Klamath River and from Sacramento River-specific Chinook salmon information obtained from USFWS and CDFW fisheries biologists (Bartholow 2003; Modeling Appendix, Chapter 5). Also, resource agency personnel were presented with the capabilities of the model by John Bartholow (formerly with the U.S. Geological Survey (USGS)) under contract by Reclamation, and agreed that using SALMOD was the appropriate means of evaluating potential conditions. John Bartholow and John Heasley (contractor to USGS) were instrumental in extending SALMOD to assess fish production and mortality between Keswick Dam and RBPP. They also assisted in preparation of the SALMOD description included in the Modeling Appendix, Chapter 5, which contains a detailed discussion of

the SALMOD model. The USGS completed a thorough review and update of model parameters and techniques on the Klamath River that enabled a smooth transfer of relevant model parameters to the Sacramento River (Bartholow and Henriksen 2006). SALMOD was peer reviewed by Lisa Thompson and Chris Mosser of the University of California (UC) Davis (Thompson and Mosser 2011), and has been approved for use in several other Federal level studies, including Reclamation's 2008 Biological Assessment on the Continued Long-Term Operations of the CVP and SWP for compliance with Section 7 of the ESA (Reclamation 2008) and resulting NMFS 2009 BO (NMFS 2009a).

Information pertaining to the Sacramento River water temperature model can be found in Chapter 11, "Fisheries and Aquatic Ecosystems," and in Chapter 5, "Anadromous Fish Production Simulation (SALMOD)," of the Modeling Appendix.

33.3.30 Master Comment Responses for Endangered Species Act

ESA-1 – Compliance with the Endangered Species Act

Comments were received related to the ESA compliance for SLWRI. Some comments referenced the Draft Feasibility Report which used the NMFS 2004 B*iological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan* (NMFS 2004) and USFWS 2005 *Biological Opinion on the Coordinated Operations of the Central Valley Project and State Water Project in California* (USFWS 2004). Analysis for the DEIS relied on the updated 2008 USFWS BO and the 2009 NMFS BO.

Reclamation has coordinated with and received technical assistance from NMFS and USFWS for the SLWRI. Reclamation will comply with the Section 7 of the ESA by selecting a preferred alternative (ESA proposed action) and preparing a BA and conducting formal consultation. The Final EIS includes an update of the ESA consultation process, and the resultant BOs will be considered in the ROD. If any dam enlargement was authorized for construction and operation, Reclamation would also evaluate its obligations under other biological opinions.

CESA does not apply to Federal agencies and their actions. However, if or when a CEQA lead agency has been identified, the CEQA lead will need to determine if State laws and regulations are applicable for any state or local actions. This would include compliance with the provisions of CESA.

33.3.31 Master Comment Responses for Fish Passage

FISHPASS-1 – Fish Passage Above Shasta Dam

Several comments reflect concerns regarding potential of fish passage into the streams above Shasta Lake. Some comments raised concerns that the DEIS is incomplete because it did not include an evaluation of passing Chinook salmon into the streams above Shasta Dam. As discussed below, multiple management measures for fish migration above Shasta Dam were evaluated and eliminated during the plan formulation process. Additionally, Reclamation is currently studying the feasibility of volitional and non-volitional fish passage above Shasta Dam under a separate Federal program as the result of the 2009 NMFS BO. The original construction of Shasta Dam, which occurred between 1938 and 1945, blocked fish from their historic habitat upstream from Keswick Dam. Reclamation understands the importance of evaluating opportunities for reestablishing viable populations of listed Chinook salmon runs upstream from Shasta Dam. The SLWRI does not include a fish passage component into any of the action alternatives, and would not mitigate, nor is required to mitigate, for past actions that blocked fish from continuing the upstream migration.

Below is a summary of the management measures considered to improve fish migration that were evaluated, and deleted, during the plan formulation process. For more information, please see Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival" and the Plan Formulation Appendix, Chapter 2, "Management Measures," Section "Increase Anadromous Fish Survival," within Section "Measures to Address Primary Planning Objectives."

Construct a Migration Corridor from the Sacramento River to the Pit River This measure consisted of providing passage to spawning areas upstream from Shasta Dam for anadromous fish from the Sacramento River. This measure and similar measures were initially deleted from further consideration during earlier phases of the SLWRI primarily because of (1) the high cost for complex infrastructure, (2) major impacts to other facilities and extensive long-term operation and maintenance requirements, and (3) high uncertainty for the potential to achieve and maintain successful fish passage and spawning. However, Reclamation is currently studying volitional fish passage above Shasta Dam under a separate Federal program as the result of the 2009 NMFS BO.

Construct a Fish Ladder on Shasta Dam This measure primarily included constructing a fish ladder on Shasta Dam to allow anadromous fish to access Shasta Lake and approximately 40 miles of the upper Sacramento River, about 24 miles of the lower McCloud River, and

various small creeks and streams tributary to Shasta Reservoir. This measure was initially deleted from further consideration during earlier phases of the SLWRI primarily because of the estimated high cost to construct and operate the fish ladder and potential inability for fish to successfully ascend the ladder. However, Reclamation is currently studying volitional fish passage above Shasta Dam under a separate Federal program as the result of the 2009 NMFS BO.

Reintroduce Anadromous Fish to Areas Upstream from Shasta Dam
This measure, which was requested as part of the environmental scoping process, primarily included non-volitional fish passage above Shasta Dam, involving trapping anadromous fish along the upper Sacramento River likely just downstream from Keswick Dam, transporting the fish by tanker truck, and releasing the fish in the Sacramento River upstream from Shasta Lake or the McCloud River to spawn. It also included some method of trapping potential out-migrating fish and transporting them to the Sacramento River near Keswick for release into the lower river. This measure was deleted from further consideration in the SLWRI primarily because non-volitional fish passage above Shasta Dam to the upper Sacramento and McCloud rivers is being studied under a separate Federal program as the result of the 2009 NMFS BO.

Furthermore, the SLWRI describes the Shasta Dam fish passage evaluation in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.2.9, "Cumulative Effects." Additionally, Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.5, "Cumulative Impacts" has been updated to include a qualitative discussion of the potential effects to reintroduced Chinook salmon upstream from Shasta Dam resulting from the implementation of the SLWRI. NMFS identified the necessity of reintroducing Chinook salmon upstream from Shasta Dam in both the 2009 Draft Recovery Plan and 2014 Final Recovery Plan, and in the 2009 NMFS BO. In the 2009 NMFS BO, NMFS included an action in the RPA to pass fish upstream from Shasta Dam. As a requirement of the RPA, Reclamation is currently working collaboratively with NMFS, USFWS, CDFW, DWR, USFS, the State Water Board, and a consultant team on developing a Pilot Implementation Plan through the Shasta Dam Fish Passage Evaluation to study the feasibility of successfully reintroducing Sacramento River winter-run Chinook salmon (and potentially later Central Valley spring-run Chinook salmon and Central Valley steelhead) into the Sacramento River and/or McCloud River upstream from Shasta Dam.

The Shasta Dam Fish Passage Evaluation was not included in the No Action or action alternatives in the SLWRI DEIS because it did not meet the criteria established for inclusion as a reasonably foreseeable project and was considered too speculative at the time the SLWRI DEIS was

developed. However, since the DEIS was completed, the Shasta Fish Passage Evaluation has proceeded to the point where a pilot plan is being developed, with the intent of implementing a pilot fish passage program to test the feasibility of fish reintroduction upstream from Shasta. The pilot fish passage program is scheduled to begin in 2015, before any SLWRI authorization would occur. As this pilot plan has not been finalized, valuating potential enhancements to this program is too speculative at this time.

Inundating the lower reaches of the McCloud and/or Sacramento rivers will not impact potential spawning habitat for reintroduced Chinook salmon. The suitable habitat for winter-run spawning is upstream in the cooler reaches of the rivers, well above the inundation area of any of the dam raise scenarios. Water temperatures in the lower reaches of the Sacramento and McCloud rivers are too warm to support winter-run egg incubation with or without a higher dam. Spring-run Chinook could potentially use spawning habitat near the lake and within the inundation area but spring-run spawning would occur in the September timeframe when the lake would be in a drawn down state and these areas would not be inundated. Spawning and egg incubation could still successfully occur in these stream reaches. The increased inundation may reduce a maximum of less than 2 percent of juvenile rearing and migrating habitat as measured by the proportion of the length of the mainstems of these streams inundated.

Increasing the cold water pool in Shasta will improve conditions for the downstream populations of listed Chinook salmon. This, in conjunction with a reintroduction of Chinook salmon upstream from Shasta will result in improving the likelihood of ESU survival, particularly in view of climate change. No changes were being made to the Final EIS in response to these comments.

33.3.32 Master Comment Responses for Environmental Impacts

EI-1 – Intent of NEPA Process is to Provide Fair and Full Discussion of Significant Environmental Impacts

Comments were received relating to the general impacts of the SLWRI on the environment and people of California. An EIS describes the beneficial and adverse effects on the human environment of a proposed action and a reasonable range of alternatives, and is intended to inform decision making on the proposed action. Although a "Preferred Alternative" is identified, an EIS does not approve or reject a project. The SLWRI EIS does not make a decision but may provide the basis for an informed and reasonable decision. Chapter 1, “Introduction,” of the SLWRI DEIS and Final EIS, Section 1.5, describes the “Intended Use of EIS.” The SLWRI DEIS provides a full and fair discussion of significant environmental impacts (as required by 40 CFR 1502.1) through the

evaluation of reasonable range of alternatives which could feasibly achieve the purpose and need of the proposed action. The DEIS has been enhanced through the responses to public comments and through additions to the Final EIS. The evaluation of environmental impacts in an EIS is intended to aid the public and decision makers in the decision-making process. The ranges of alternatives evaluated are those which would avoid or minimize adverse environmental impacts, or enhance the quality of the human environment.

The Final EIS examines the potential environmental effects of proposed alternatives for the SLWRI where beneficial or adverse impacts are identified, and discusses measures to mitigate adverse effects. The Final EIS incorporates comments received on the DEIS and responses to those comments. The Final EIS will be published along with the Final Feasibility Report, and together the documents will be used to determine the type and extent of Federal interest in enlarging Shasta Dam and Reservoir. The Final EIS and Final Feasibility Report will be presented together for the purposes of making a Federal decision. If a Federal decision is made regarding enlargement of Shasta Dam, it will be documented in the ROD.

Following finalization of the NEPA process, the administrative record will be submitted by the Commissioner of Reclamation to the Secretary of the Interior. After review by the Office of Management and Budget, in accordance with Executive Order 12322, Water Resources Projects, the Secretary will transmit the administrative record and a recommendation on the Federal interest in enlarging Shasta Dam to Congress. The proposed project would be considered for authorization by Congress.

EI-2 – Potential Impacts to Bank Swallow and Bank Swallow Habitat

Comments received related to the potential impacts to riparian species, particularly bank swallows, a State protected species. Chapter 13, “Wildlife Resources,” contains the analysis of effects of the No Action and the action alternatives on riparian habitat and wildlife. All impact analyses for bank swallow conclude that impacts would be “less than significant” and not "no impact." Impact conclusions for the No-Action Alternative (Impacts Wild-18 and Wild-24) are supported by an analysis that states “...future conditions for bank swallows are not expected to differ substantially from existing conditions” because “only very small changes in flows would occur along the … Sacramento River…[which] would result in no change to the ongoing geomorphic processes in the Sacramento River.” The conclusions for the CP1 through CP4 alternatives on bank swallow are outlined in the corresponding discussions under Impacts Wild-18 and Wild-24. As stated in Chapter 13, “Wildlife Resources,” Section 13.3.1, “Methods and Assumptions,”

the impact analyses were “based on review of the output from the SLWRI 2012 Version CalSim-II model. Monthly averages by water year type were reviewed for substantial trends in stage or flow that could alter habitat used by sensitive species or affect species directly. Trend data generated by CalSim-II were considered representative of the potential changes resulting from the project alternatives. A change of less than 2 percent (plus or minus) was considered essentially equivalent to baseline operations and therefore not a substantial change. When monthly average values were changed more than 2 percent, the alternative was considered to result in a substantial change in a species habitat or directly affect the species. The use of averages in the evaluation was considered more representative of potential long-term changes in flows than values from the individual months.” This modeling supports the conclusions in the DEIS.

The analysis in the DEIS was informed by the CalSim-II modeling study; the CALFED Ecosystem Restoration Program study from March 2008 (TNC et al. 2008) was also consulted for this analysis. The modeling indicates that there would not be a substantial increase in flow and river stage during the nesting season; therefore, the implementation of the action alternatives would avoid nest failure. The modeling also indicated that although there would be a decrease in winter flows in some water year types (specifically, above normal and dry), the flow level would not be substantially changed in other years. In addition, the bank swallow analysis for CP1 has been expanded to include additional text from the hydrology and botanical analyses.

Reclamation also used the “Linkages Report” (Stillwater 2007) and the "Sacramento River Ecological Flows Study" (TNC et al. 2008) to augment its own analysis based primarily on CalSim-II modeling. As noted in the CP1 impact analysis for bank swallow, although much of the bank swallow analysis does rely upon mean monthly flow data, daily flow data were analyzed and used to assess impacts on this species.

EI-3 – Botanical Resources Effects Related to Flow Regimes

Comments were received related to the importance of geomorphic processes to downstream habitat. Chapter 12, “Botanical Resources and Wetlands,” of the DEIS describes potential impact of the alternatives on habitat and ecosystem functions. The DEIS acknowledges the potential adverse effects of altered flow regimes on the structure and species composition of riparian communities and concludes that this impact would be significant. The importance of channel migration and other geomorphic processes to riparian vegetation is discussed at length under Impact Bot-7 for each alternative. For example, in Chapter 12, “Botanical Resources and Wetlands,” Section 12.3.4, “Direct and Indirect Effects,” CP1 impact Bot-7 states, “River flows not only affect the survival and growth of established riparian vegetation, but also

create sites for establishment of early-successional vegetation. The geomorphic processes of channel meander migration, avulsion, and deposition of sediment on floodplains, which result primarily from intermediate and large flows, bury and uproot herbaceous vegetation and uproot or undercut trees and shrubs. These disturbances also create opportunities for early-successional vegetation to establish, including willow and cottonwood seedlings that grow to form willow scrub and Great Valley cottonwood riparian forest. Early successional riparian communities change rapidly in structure and species composition (Tu 2000, Fremier 2003, Vaghti and Greco 2007). Over several decades, early-successional vegetation develops into mid- and late-successional vegetation with less willow and cottonwood and a greater abundance of other trees, including box-elder, Oregon ash, black walnut, and valley oak (e.g., Great Valley mixed riparian forest) (Fremier 2003)." As described under Mitigation Measure Bot-7 in the DEIS, a riverine ecosystem mitigation and adaptive management plan will be implemented to avoid and compensate for the effects of altered flow regimes on riparian and wetland communities. Specific adaptive management actions that could be implemented in response to observed adverse changes in riparian and wetland plant communities in response to altered hydrology include modification of dam operations and funding restoration actions to avoid and compensate for impacts on riparian and wetland communities. The mitigation and adaptive management plan incorporates no-net-loss performance standards for riparian habitat functions. The DEIS also identifies implementation of a comprehensive revegetation plan and a comprehensive mitigation strategy to minimize potential effects on biological resources in its environmental commitments on pages ES-32 and ES-33. With implementation of Mitigation Measure Bot-7, the impact of altered flow regimes on instream, riparian, and wetland communities would be reduced to a less-than-significant level and there would be no net loss of these communities in the long term.

EI-4 – Socioeconomic and Associated Indirect Environmental Effects

Comments were received on the DEIS related to various existing water supply shortage issues and the associated socio-economic and indirect effects to the environment. Chapter 16, "Socioeconomic, Population, and Housing," of the DEIS describes socioeconomics, population, and housing characteristics in the primary and extended study areas, including CVP/SWP Service Areas. Chapter 16, "Socioeconomic, Population, and Housing," Section 16.3, "Environmental Consequences and Mitigation Measures," describes the potential socio-economic consequences resulting from each of the proposed alternatives including the No Action Alternative. Direct, indirect, and cumulative effects of the alternatives are discussed within this section. When potential environmental consequences are identified, specific mitigation measures

to offset the potential effects of the alternatives are presented. Potential effects and mitigation measures address topics related to population, demographics, and housing, employment and labor force, business and industry, and government and finance. For a more detailed discussion of the information presented in Chapter 16, "Socioeconomic, Population, and Housing," see the *Socioeconomics, Population, and Housing Technical Report*.

As described in Chapter 16, "Socioeconomic, Population, and Housing," Section 16.2, "Regulatory Framework," the analysis of socioeconomic resources is guided primarily by Federal laws and policies. State and local laws and policies typically promote economic development and diversity, environmental justice, public health and safety, housing, and address the concerns of the residents within their jurisdictions.

During previous decades, the CVP was able to provide a more reliable water supply, and communities and viable local economies developed. But, reduced CVP water supplies due to regulatory constraints have and continue to cause CVP contractors to make water supply decisions that may have physical effects related to the reliance on groundwater to substitute for lost CVP supplies. These include reduced groundwater levels from overdraft, surface subsidence, adverse impacts to crops and soil from reliance on poor quality groundwater, increased energy use, and impacts to air quality. Shortages of CVP supplies have also caused changes in land use patterns, loss and destruction of permanent crops, and/or decreased production of existing crops. In response to reduced water supplies, farmers will fallow fields, reducing agricultural productivity directly results in layoffs, reduced hours for agricultural employees, and increased unemployment in agricultural communities. Reduced agricultural productivity also has indirect socioeconomic impacts for agriculture-dependent businesses and industries. In addition, unavailability of stable and sufficient water supplies reduces farmers' ability to obtain financing, which results in employment losses, due to the reduced acreage of crops that can be planted and the corresponding reduction in the amount of farm labor needed for that reduced acreage.

Reduced water supplies and the resulting employment losses also cause cascading socioeconomic impacts in affected communities, including increased poverty, hunger, and crime, along with dislocation of families and reduced tax-based revenues for local government services and schools. In the urban sector, reduced supplies or increased supply uncertainty can cause water rates to increase as agencies seek to remedy supply shortfalls by implementing measures to reduce demand and/or augment supplies. Connection fees and other one-time costs for new developments may also increase and further retard economic development. All these impacts were explained and found in recent federal court cases regarding NEPA impacts from reduced CVP

deliveries. (See e.g., The Consolidated Delta Smelt Cases, 717 F.Supp.2d 1021 (E.D. Cal. 2010), The Consolidated Salmonid Cases, 713 F.Supp.2d 1116 (E.D. Cal. 2010).)

None of these effects are associated with any SLWRI action alternatives, which would improve water supply reliability. Therefore, SLWRI action alternatives do not cause a cumulatively considerable adverse effect on CVP contractor service areas.

The DEIS impact analysis discloses both the positive effects of improving the quantity or reliability of water to agricultural, municipal and industrial water users, as well as the on-going adverse effects of the no action alternative on CVP service areas. No changes to the Final EIS are necessary related to socioeconomic impacts in CVP service areas where more water may be delivered.

EI-7 – Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS

During the preparation of the cumulative impact assessment of the SLWRI DEIS, Reclamation carefully considered how to treat various potential future actions and programs consistent with 40 CFR 1508.7. Projects which are included in the SLWRI cumulative effects analysis quantitatively are those that are reasonably foreseeable projects defined as including those with current authorization, secured funding for design and construction, and environmental permitting and compliance activities that are substantially complete (Chapter 2, "Alternatives," Section 2.2, "No Action"). The comments received on the SLWRI cumulative impact analysis correctly identify that the BDCP cumulative effects were evaluated on a qualitative analysis basis rather than a quantitative basis. This response details why Reclamation correctly identified a qualitative methodology for evaluating the BDCP cumulative effects.

The SLWRI DEIS was released in June 2013, before the release of the DEIR/S for the BDCP in December 2013. While a BDCP Administrative DEIR/S was released before the SLWRI DEIS release, Reclamation does not use quantitative information from an Administrative DEIR/S for a cumulative impact analysis due to the very nature of these analyses being in flux at that stage. The December 2013 BDCP DEIR/S evaluates 15 action alternatives, including a No-Action alternative, and a range of 20 potential conservation measures. For the purposes of NEPA, a BDCP preferred alternative was not identified in the December 2013 draft (BDCP DEIR/S Chapter 3 Description of Alternatives page 3-3). In August 2014, it was announced that a partially Recirculated Draft BDCP, EIR/S, and Implementing Agreement will be published in early 2015. Reclamation considers that a selection of any one alternative is speculative at this point in time, as the document will

be recirculated, the analyses may be in flux, and it is unknown if a preferred alternative will be identified for the purposes of NEPA in the 2015 BDCP DEIR/S.

For the purposes of CEQA, DWR's "Preferred Alternative" is Alternative 4 (the proposed BDCP). The December 2013 BDCP DEIR/S acknowledges that, "the preferred CEQA alternative is tentative, and is subject to change as DWR and its partner lead and responsible agencies receive and consider public and agency input on the EIR/S. It is therefore possible that the final version of the BDCP may differ from Alternative 4 as described herein, either because Alternative 4 itself was further refined, because another alternative was determined to be preferable, or because the Lead Agencies, in response to input, developed a new alternative with some features from some existing alternatives and other features from other existing alternatives" (BDCP DEIR/S Executive Summary page 21)."

Commenters state that with the release of the December 2013 DEIR/S for the BDCP, an accurate quantitative evaluation of cumulative effects with regard to the BDCP could feasibly be produced for the SLWRI Final EIS. A NEPA cumulative impacts analysis does not require the consideration of every alternative under consideration for a future action or program. Reclamation agrees that once a BDCP preferred alternative is identified in a ROD, it would be appropriate to consider the cumulative effects of the BDCP and the SLWRI along with other past, present and reasonably foreseeable future projects in either a quantitative analysis if information is available to support such an analysis, or a more detailed qualitative analysis. However, the SLWRI Final EIS is being published in advance of a BDCP ROD.

Additionally, the wide range of BDCP alternatives identified for conveyance alone would be prohibitive of a meaningful quantitative cumulative analysis for the purposes of the SLWRI EIS in the interim. The December 2013 BDCP DEIR/S Executive Summary Section 5.2.2 Operational Components/Scenarios summarizes the complex scenarios that were derived for evaluation of the effects of the physical components of the BDCP's 9 conveyance alternatives. To overlay each of the five SLWRI alternatives on top of each of the 9 conveyance scenarios would yield 45 separate analyses of cumulative effects. This is far beyond the requirements of NEPA.

The Final EIS provides further detail on the qualitative cumulative effects analysis with regard to the BDCP DEIR/S.

33.3.33 Master Comment Responses for Environmental Justice

EJ-1 – Potential Effects to Disadvantaged Communities

Executive Order 12898 on environmental justice requires federal agencies to define the minority and low income environmental justice communities to be analyzed. As discussed in DEIS Chapter 24, "Environmental Justice," Section 24.3.1, “Methods and Assumptions,” for the purposes of the analysis presented in the EIS, a county is considered to have a minority population if its nonwhite population is greater than 50 percent or is meaningfully larger than the general (statewide) nonwhite population. Low-income areas are defined as counties in which the percentage of the population below poverty status exceeds 50 percent, or is meaningfully greater than the general population (average statewide poverty level). Chapter 24, "Environmental Justice," Section 24.3.2, “Criteria for Determining Disproportionately High and Adverse Effects,” also states that data are presented at the county level given the large size of the project impact area comprised largely of rural areas and the fact that localized areas within the counties are not likely to differ appreciably in their minority and low-income population makeup. Although the City of Shasta Lake meets the criteria for a “disadvantaged community,” defined by the State of California, the EIS provides an analysis of environmental justice communities based on the Council of Environmental Quality’s Environmental Justice Guidance under the National Environmental Policy Act, which defines minority and low income populations as those meeting the criteria described above. The City of Shasta Lake’s percentage of minority (nonwhite) residents in 2010 was 13.9 percent, compared to 16.6 percent for the Shasta County as a whole, and the percentage of low-income residents in the City of Shasta Lake was 20.5 percent compared to 15.5 percent for the county as a whole. Thus, the minority and low-income population percentages for the City are similar to the county as a whole, and are well below the 50 percent threshold for percentage of minority and low-income residents and are not meaningfully greater than the comparison population used in the analysis (state of California).

In addition, Chapter 24, "Environmental Justice," Section 24.3.1, “Methods and Assumptions,” has been revised to summarize which areas in the study area are considered to be minority and low income environmental justice communities. Chapter 24, "Environmental Justice," of the DEIS also describes potential impacts that would occur to any of these environmental justice populations. It describes more broadly the economic conditions in the study area, as does Chapter 16, "Socioeconomics, Population, and Housing," in the DEIS. Reclamation has complied with Executive Order 12898 in preparing this DEIS as described in Chapter 24, “Environmental Justice.” Impacts to tribes and their cultural resources are identified in Chapter 24, “Environmental

Justice," as well as in Chapter 14, "Cultural Resources," and the process for defining mitigation measures for any identified adverse impacts is discussed.

Chapter 24, "Environmental Justice," of the DEIS states that the proposed action will have disproportionately high and adverse effects on Native American populations in the vicinity of Shasta Lake and would result in a cumulatively considerable incremental contribution to a significant and unavoidable cumulative impact on Native American populations. See also Master Comment Response CR-1, "Potential Effects to Cultural Resources," Master Comment Response CR-5, "Environmental Justice," and Master Comment Response CR-15, "National Historic Preservation Act Section 106 Consultations."

33.3.34 Master Comment Responses for Regional Economic Impacts

SOCIOECON-1 – Socioeconomic Effects to Shasta Lake Vicinity

Comments were received that relate to potential social and economic impacts to local communities around Lake Shasta from the potential raising of Shasta Dam. As discussed in Chapter 16, "Socioeconomics, Population, and Housing," all alternatives are expected to have an overall short-term beneficial effect on the local economy during construction, including increases in local tax revenues. Long-term recreational visits are also expected to increase following construction, as discussed in Chapter 18, "Recreation and Public Access." In addition, all action alternatives would maintain the existing recreation capacity and distribution around Shasta Lake. Replacement facilities would be of equivalent overall capacity and quality to affected facilities and would provide comparable shoreline access, where applicable. Potential impacts to businesses and residents are also discussed in the Real Estate Appendix. As stated in Chapter 2, "Alternatives," Reclamation will implement commitments to avoid, reduce, mitigate, and/or compensate for adverse socioeconomic and related environmental impacts to the extent practicable, including –but not limited to– compliance with the policies and provisions set forth in the Uniform Relocation Assistance and Real Property Acquisition Policies Act for all relocations. See also Master Comment Response UR-1, "Effects to Water and Wastewater Infrastructure around Shasta Lake," Master Comment Response PLAR-1, "Effects to Private Residences and Businesses," and Master Comment Response REC-1, "Effects to Recreation at Shasta Lake."

SOCIOECON-2 – Effects on Short-term and Long-term Employment

Comments were received relating to the potential short-term and long-term regional employment supported by the potential raising of Shasta Dam. Estimated potential employment and personal income effects supported by the proposed action/project modification, as described in

the DEIS in Chapter 16, “Socioeconomics, Population, and Housing,” include short-term employment related to construction activities and long-term employment related to increased average annual agricultural production.

Direct construction employment estimates range from 300 to 360 annual jobs over the anticipated construction period (4.5 to 5 years) for the action alternatives. Indirect and induced jobs related to construction activities were estimated through Impact Analysis for Planning (IMPLAN) modeling. IMPLAN is a commercially-available system of software and data commonly used to perform economic impact analysis and was selected based upon Reclamation standard practices, and input from subject matter experts. Potential indirect jobs in various construction-related support industries range from 390 to 470 annual jobs, and potential induced jobs, because of increased household spending, range from 600 to 710 annual jobs for project alternatives. Individuals to fill these jobs are expected to be drawn predominantly from the local community and region. These jobs are expected to provide important but temporary employment opportunities to many unemployed construction workers in the primary study area.

The Statewide Agricultural Production (SWAP) model was used to determine the potential effects of the action alternatives on CVP and SWP agricultural users. The SWAP model is a regional economic model of irrigated agricultural production that simulates the crop-related decisions of agricultural producers (farmers) in the Central Valley of California. SWAP is the most current version of a series of California agriculture production models developed by researchers at the University of California at Davis in collaboration with DWR, and is being used in several ongoing studies of California water projects and operations. SWAP does not estimate the number of additional agricultural positions that would be supported as a result of improved irrigation, but the resulting increase in water reliability and availability from action alternatives would have the potential to strengthen and extend the existing growing season in the CVP and SWP service areas. Although the model’s income-related projections were generally used to determine effects on business and industrial activity, the overall change in business net income (or profits) is a good indicator for potential changes in employment opportunities in affected sectors. Estimated increases in net average annual agricultural income, documented in Modeling Appendix, range from $1.5 million to $6.1 million for the Alternatives.

33.3.35 Master Comment Responses for Technical Analyses

TA-1 – Interrelationship Between Shasta Dam Operations, San Joaquin River Flows, and Delta Exports

Comments were received on the relationship of San Joaquin River flows, Delta exports, and Shasta Reservoir operations.

Operations modeling was performed using the CalSim-II CVP/SWP simulation model, the best available tool for predicting system-wide water operations throughout the Central Valley. Details on the CalSim-II model and the assumptions included in all simulations can be found in the Modeling Appendix, Chapter 2, "CalSim-II." As described in the Modeling Appendix, Chapter 2, "CalSim-II," the CalSim-II model includes an Artificial Neural Network (ANN) that is based on the DSM2 simulation model, the best available model of the hydrodynamic and salinity conditions in the Delta. DSM2 is also described in the Modeling Appendix Chapter 7, "Delta Hydrodynamic Model." In the ANN, as in DSM2, inflows from the Sacramento River, San Joaquin River, East Side Streams and ocean tides and the CVP/SWP exports from the South Delta affect flows and salinities throughout the Delta.

Tracking the fate of individual water molecules is not possible using these modeling tools, so delineating the exact relative contribution of Sacramento and San Joaquin River water to exports and meeting Delta standards is also not possible. However, mass balance analysis of CalSim-II results shows that Sacramento River water is frequently exported, particularly in July-December when exports are relatively high and San Joaquin River flows are relatively low. The citation provided ("Using Particle Tracking to Indicate Delta Residence Time") also shows that Sacramento River water passing by Freeport is exported.

The flow and salinity standards do not specify the source of the water molecules at any specific location only that the molecules that are at that location meet the standards and provide the desired level of protection to the ecosystem. All of this means that additional Sacramento River inflow from Shasta Reservoir enlargement allows for increases in exports while still meeting all applicable flow, salinity, and stage requirements at various locations throughout the Delta, maintaining the level of protection implicit in the formulation of the standards.

33.3.36 Master Comment Responses for Transportation

TRANS-1 – Potential Construction-Related Effects to Roadways and Traffic Congestion

Several comments reflect concerns regarding potential construction-related impacts to roadways and traffic congestion.

As discussed in Chapter 2, "Alternatives," environmental commitments for the action alternatives include developing and implementing a construction management plan to avoid or minimize potential impacts on public health and safety during project construction. The DEIS Chapter 20, “Transportation and Traffic,” Section 20.3, “Environmental Consequences and Mitigation Measures,” discusses the effects of the action alternatives on local roads and bridges. As described in the DEIS, there are potentially significant impacts from each of the action alternatives on traffic, roadway integrity, local access and emergency access (Impacts Trans-1, Trans-2, Trans-4 and Trans-5). Mitigation is proposed for these impacts and is listed in Table 20-3, “Summary of Mitigation Measures for Transportation and Traffic” under Chapter 20, “Transportation and Traffic,” Section 20.3.5, “Mitigation Measures.”

Mitigation for these impacts (Impacts Trans-1, Trans-2, Trans-4 and Trans-5) are summarized as follows:

- Mitigation Measure Trans-1 – Prepare and Implement a Traffic Control and Safety Assurance Plan
- Mitigation Measure Trans-2 – To Reduce Effects on Local Access, Implement Mitigation Measure Trans-1
- Mitigation Measure Trans-4 – To Reduce Effects on Emergency Access Implement Mitigation Measure Trans-1
- Mitigation Measure Trans-5 –Identify and Repair Roadway Segments Damaged by the Project

Implementation of these mitigation measures would reduce the associated impacts to a less-than-significant level. Mitigation measures were not needed and thus not proposed for identified impacts: Trans-3, Trans-6, Trans-7, Trans-8, Trans-9 and Trans-10.

As described in Reclamation’s NEPA Handbook, Reclamation is obligated to fulfill and appropriately fund all monitoring and mitigation measures that it commits to implementing in its final decision. For NEPA documents, these commitments generally appear in the ROD and other decision documents.

33.3.37 Master Comment Responses for Water Quality

WQ-1 – Remediation of Abandoned Mines in the Shasta Lake Area

Comments were received related to impacts and mitigation for potential effects of inundating abandoned mines in the Shasta Lake area, including Golinsky, Mammoth, Greenhorn, Willow Creek, and the Bully Hill complex.

One suggested abandoned mine, the Golinsky mine complex, was determined by Reclamation to be outside of the surface erosion analysis area, and is documented in the Geologic Technical Report, Chapter 1, "Affected Environment," Section 1.1.4, "Mineral Resources," "has been subject to extensive remediation to reduce the discharge of toxic mine waste and acidic waters to Shasta Lake." Mammoth, Greenhorn and Willow Creek abandoned mines were noted to lack any notable abandoned mine features and no evidence of acid drainage.

The Bully Hill mine complex (Bully Hill, Copper and Rising Star mines) was found to be within the analysis area. A waste pile of approximately 7,300 cubic yards was the abandoned mine feature identified at the Bully Hill mine complex that would be subject to inundation for longer durations annually. This was documented by Reclamation in Chapter 7, "Water Quality," Section 7.1.4, "Metals," lines 3 through 15 "...these areas are a documented source of metals and continue to be subject to an abatement order issued by the CVRWQCB..." For information on proposed remediation activities at the Bully Hill mine complex, please see DEIS Chapter 7, "Water Quality," Section 7.3.5, "Mitigation Measures," Mitigation Measure WQ-6, "Prepare and Implement a Site-Specific Remediation Plan for Historic Mine Features Subject to Inundation in the Vicinity of the Bully Hill and Rising Star Mines." The erosion has been accounted for in the surface erosion analysis and documented in the "other" category under dominant erosion type in Table 2-6 on page 2-6 of the Geological Technical Report.

33.3.38 Master Comment Responses for Climate Change

CC-1 – Climate Change Uncertainty and Related Evaluations

Comments were received related to the uncertainty of the effects of the alternatives on climate change (e.g., GHG) and how climate change may affect the alternatives, including how climate change may impact reservoir storage in the future with and without enlarging Shasta Dam.

The effects of the action alternatives on climate change are described in Chapter 5, "Air Quality and Climate." This chapter describes both the GHG emission effects of the action alternatives, and the effects of the action alternatives when considering past, present and future GHG emissions in the region and globally.

As described in DEIS Chapter 3, "Environment and Environmental Consequences," Section 3.2.9, "Cumulative Effects," each resource area qualitatively evaluates the cumulative effects of SLWRI action alternatives combined with predicted effects of climate change. The Climate Change Modeling Appendix provides a summary of global climate forecasts and a discussion of the implications of climate change for California water resources. This can be found in the Climate Change

Modeling Appendix in Chapter 1, "Introduction," Chapter 2, "Summary of Previous Climate Change in the Study Area," and the first part of Chapter 3, "Potential to Achieve Water Supply Reliability Objective Under Climate Change." These discussions provide the basis for the qualitative cumulative effects evaluations in each resource area chapter.

The latter portion of the Climate Change Modeling Appendix, including the second part of Chapter 3, "Potential to Achieve Water Supply Reliability Objective Under Climate Change," and Chapter 4, "Potential to Achieve Anadromous Fish Survival Objective Under Climate Change," documents a sensitivity analysis of the potential for action alternatives to address primary project objectives of increasing water supply reliability and anadromous fish survival under climate change. This includes quantitative analyses of climate change for selected comprehensive plans on resource areas. The climate change sensitivity analyses are based on different analytical techniques than are used to develop the impacts documented in the main body of the DEIS. Accordingly, quantitative results presented in the appendix cannot be directly compared to results presented in the direct and indirect effects sections for each resource area chapter (DEIS Chapters 4 through 25).

The quantitative climate change evaluations included in the Climate Change Modeling Appendix were conducted for sensitivity analysis purposes only, and were not the basis for qualitative cumulative effects analyses in each resource area chapter. Further, results from the climate change sensitivity analysis were not used in the quantitative or qualitative direct and indirect evaluations in each resource area chapter. The SLWRI action alternatives described in the DEIS propose various magnitudes of the same basic physical features, increased storage at Shasta Lake, and all would be expected to react similarly to future climate changes. Based on the assumption that if an alternative showed a positive or negative trend compared to without-project conditions, all alternatives would show similar trends with slightly different magnitudes. Because this analysis was intended for sensitivity purposes only and due to the uncertainty inherent in climate change scenarios, evaluation of all alternatives was not deemed justified.

CC-2 – Climate Change Projections

Comments were received related to the specifics of the climate change analysis. The most recent climate change projections include uncertainty in both future global socioeconomic conditions effecting atmospheric greenhouse gases and limitations in the current global climate models (GCM) and downscaling methods. As documented in the Climate Change Modeling Appendix these uncertainties were simulated by 112 different climate change scenarios assumed to be reasonably representative of the potential range of 21st century climate conditions. To allow reasonable evaluation of climate change impacts these

projections were statistically combined into five ensemble-informed projections representative of a wide range of potential future climatic conditions. This approach offers the advantage of reducing uncertainties associated with individual GCM results while capturing most of the range of potential future climatic conditions in only five projections. This also has the advantage of reducing the computational effort necessary to characterize uncertainty to a level reasonable for a robust sensitivity analysis. Although the climate change sensitivity analyses did not include re-operation or optimization of system operations of the project, any climate change adaptation measures would only improve conditions further. Such measures would be expected to provide additional benefit to the anadromous fishery and further reduce any potential increase in jeopardy to threatened and endangered species that might occur due to climate change.

33.3.39 Master Comment Responses for CVPIA

CVPIA-1 – Central Valley Project Improvement Act Firm Level 2 and Incremental Level 4 Refuge Water Supplies

Comments were received related to addressing Incremental Level 4 (IL4) water in the EIS. The commenters are correct that (IL4) water should be addressed in the EIS. The Final EIS has been revised to further describe both the relevant provisions in CVPIA (portions of Section 3406(d)) and actions taken to implement those provisions.

Annual acquisitions of IL4 water will continue to vary from year to year, depending on annual hydrology, water availability, water market pricing, and funding[6]. Therefore, it would be speculative to predict or assume quantities and locations of annual IL4 acquisitions from willing sellers. Without that information, it could not be incorporated into the CalSim-II modeling assumptions or other analyses. It would not be possible to quantitatively assess effects of the action alternatives on deliveries of IL4 water. Effects would instead need to be discussed qualitatively.

As all of the action alternatives would increase water supply reliability in comparison to the No-Action Alternative, it could be argued that the effect would be either "no impact" (no change in Reclamation's ability to find willing sellers) or "beneficial" (the increased water supply reliability could provide more opportunity for Reclamation to find willing sellers), thereby requiring no mitigation for any of the action

[6] Each year, Reclamation strives to provide as much IL4 water as possible. Section 3406 (d)(2) of the CVPIA specifies that Reclamation must acquire this IL4 water "…through voluntary measures such as water conservation, conjunctive use, purchase, lease, donations, or similar activities, or a combination of such activities which do not require involuntary reallocations of project yield." CVPIA Section 3406 (d) in its entirety is available at https://www.usbr.gov/mp/cvpia/title_34/3406.html.

alternatives. The Final EIS has been revised to describe the potential qualitative effects of the action alternatives on deliveries of IL4 water.

Refuge Water Supply Information and Analyses in DEIS DEIS Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.2.1, "Regulatory Framework, Federal," describes "…firm water supplies for Central Valley wildlife refuges…" as one of the changes mandated by CVPIA.

As described in Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.2, "Criteria for Determining Significance of Effects," of the DEIS, refuges are subject to shortages according to water availability and their geographic location; because of conveyance constraints, south-of-Delta refuges have a lower degree of reliability than north-of-Delta refuges.

As described in Chapter 6, "Hydrology, Hydraulics, and Water Management," Sections 6.3.3, "Direct and Indirect Effects," and 6.3.4 "Mitigation Measures," of the DEIS, no mitigation measures are proposed for the action alternatives because no potentially significant impacts have been identified (Impact H&H-9 "change in deliveries to north-of-Delta CVP water service contractors and refuges"). Impact H&H-10 ("change in deliveries to south-of-Delta CVP water service contractors and refuges") could result in beneficial impacts, so no mitigation is needed.

Detailed descriptions of the CalSim-II model, the modeling methodology used in evaluations, and key assumptions are provided in the DEIS Modeling Appendix, Chapter 2, "CalSim-II." Additional information on the analysis and modeling results is provided in the Physical Resources Appendix, "Hydrology, Hydraulics, and Water Management Technical Report" of the DEIS.

CVP Contracts SLWRI does not include the consideration or evaluation of new water service contracts or agreements; it reflects existing water service contracts and agreements.

Compliance with Existing Laws and Regulations SLWRI action alternatives do not supersede existing laws or regulations and does not exempt any actions from compliance with applicable laws, including NEPA or ESA. The Federal, State, and local regulatory framework is generally described in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.4, "Regulatory Framework," of the DEIS. Chapters 4 through 25 contain more detailed discussions of the "Regulatory Framework" by resource area. In addition, Chapter 26, "Other Required Disclosures," further describes the Federal and State laws, rules and regulations, Executive

Orders, and compliance requirements that may be required if an alternative is selected for implementation.

Revisions to the Final EIS The Final EIS has been revised to clarify CVPIA Section 3406 and the Refuge Water Supply Program. Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.2.9, "Cumulative Effects," has been revised to incorporate the following under the "Qualitative" heading.

CVPIA Section 3406. Fish, Wildlife, Improved Water Management & Conservation CVPIA Section 3406 (d) states that "…the Secretary [of the Interior] shall provide, either directly or through contractual agreements with other appropriate parties, firm water supplies of suitable quality to maintain and improve wetland habitat areas on units of the National Wildlife Refuge System in the Central Valley of California; on the Gray Lodge, Los Banos, Volta, North Grasslands, and Mendota state wildlife management areas; and on the Grasslands Resources Conservation District in the Central Valley of California" (CVPIA 2013).

Refuge Water Supply Program The goal of the Refuge Water Supply Program (RWSP), which consists of three important components – water acquisitions, conveyance, and facilities' construction, is to ensure that all CVPIA-identified wetland habitat areas (refuges), annually receive water of specified quantity, of suitable flow rate and timing, and suitable quality to support their wetland and aquatic environments. The RWSP serves 19 refuges in the Central Valley.

The RWSP is administered and implemented by Reclamation in close collaboration with the USFWS, Region 8. Reclamation and the USFWS also work cooperatively with the CDFW, Grassland Water District, and CVHJV in implementing the RWSP.

The RWSP delivers two water types defined as Level 2 (L2) water and Incremental Level 4 (IL4) water.

- L2 is the amount of water required for minimum wetlands and wildlife habitat management based on historic average annual deliveries before 1989. Reclamation is required to provide full L2 water supplies annually. The L2 annual water delivery target is 422,251 acre-feet, including 26,007 acre-feet of replacement water. Replacement water was originally provided by tailwater and groundwater but is now included in L2 water supplies due to water quality concerns.

- IL4 water is the difference between L2 and Full Level 4 (L4) water supplies; it equals 133,264 acre-feet.

Full L4 is the total annual amount of water identified for each refuge in CVPIA as required for optimum wetlands and wildlife habitat development and management. The Full L4 water delivery target for the 19 refuges is 555,515 acre-feet and is met when L2 and IL4 water targets are met in full.

Each year, Reclamation strives to provide as much IL4 water as possible. The CVPIA specifies that Reclamation must acquire this IL4 water "…through voluntary measures such as water conservation, conjunctive use, purchase, lease, donations, or similar activities, or a combination of such activities which do not require involuntary reallocations of project yield" (CVPIA 2013). The amount of IL4 water acquired varies from year to year, depending on annual hydrology, water availability, water market pricing, and funding.

To ensure reliability for refuge managers, Reclamation entered into long-term water supply contracts with the three refuge managing agencies: CDFW, USFWS, and GWD. These contracts have performance periods of 25 years and are renewable, representing Reclamation's obligation under CVPIA to provide identified quantities of water to certain refuges in the Central Valley.

From Fiscal Year 2002 – 2013, the RWSP has delivered an annual average of 383,603 acre-feet of L2 water (91 percent of the 422,251 acre-feet target) and 66,588 acre-feet of IL4 water (50 percent of the 133,264 acre-feet target) (CVPIA 2013). (Fiscal Year 2002 was the first year that CVPIA mandated Full L4 deliveries for all refuges (CVPIA 2013)).

In addition to the above clarification in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," revisions have been made to the following portions of the Final EIS and related appendices:

- Final EIS Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.3, "Direct and Indirect Effects"

- Final EIS Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects"

- Final EIS Chapter 12, "Botanical Resources and Wetlands, " Section 12.3.4, "Direct and Indirect Effects"

- Final EIS Chapter 23, “Power and Energy,” Section 23.3.3, “Direct and Indirect Effects”
- Final Plan Formulation Appendix, Chapter 1, “Introduction”
- Final Modeling Appendix, Chapter 2, “CalSim-II”
- Final Physical Resources Appendix, Hydrology, Hydraulics, and Water Management Technical Report, Chapter 1, “Affected Environment”

33.4 List of Commenters

Table 33.4-1 lists all agencies, organizations, and individuals who submitted comments on the DEIS and who commented on that document during the three public hearings.

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement

Elected Officials
California State Senator Jim Nielsen
Federal Agencies
U.S. Environmental Protection Agency, Region IX
U.S. Army Corps of Engineers
U.S. Forest Service
U.S. Department of the Interior, Fish and Wildlife Service, Sacramento Fish and Wildlife Office
Department of Energy, Western Area Power Administration
Tribes
Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians
Santa Ynez Band of Chumash Indians
United Auburn Indian Community of the Auburn Rancheria
State Agencies
California Department of Transportation
Central Valley Flood Protection Board
Central Valley Regional Water Quality Control Board
Department of Fish and Wildlife
Delta Stewardship Council
Department of Water Resources
Sacramento River Conservation Area Forum
Shasta Regional Transportation Agency
State Water Resources Control Board

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Regional and Local Governments and Agencies
Contra Costa Water District
City of Shasta Lake
East Bay Municipal Utility District
Grassland Water District
Mountain Gate Community Services District
City of Redding
Redding Electricity Utility, City of Redding
Shasta County Board of Supervisors
Santa Clara Valley Water District
Stockton East Water District
San Luis & Delta Mendota Water Authority
State Water Contractors
Special Interest Group
AquAlliance
Butte Environmental Council
CalTrout
Campbell Creek Homeowners Association
California Farm Bureau Federation
Citizens for Clean Air
California Wilderness Coalition and Friends of the River
EMA, Inc.
Environmental Protection Information Center
Environmental Water Caucus
Friends of the Delta Watershed
Friends of the River
International Organization for Self-Determination and Equality
Dale La Forest & Associates
Lakehead Community Development Association
Lakeshore Heights Municipal Water Company
Northern California Power Agency
Natural Resources Defense Council
Northstate Women's Health Network
Pacific Forest Trust
Pacific Gas & Electric Company
Porgans & Associates
Plumbers and Pipefitters Local Union #228
Rotary Club of Redding
Rivers for Change

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Special Interest Group (contd.)
Shasta County Coordination Committee
Salt Creek Summer Homesites Association
Shasta Lake Business Owners Association
Sacred Land Film Project
Sacramento River Preservation Trust
Save The California Delta Alliance
The California Parks Company
The Nature Conservancy
The River Exchange
Individual
Abbe, Jessica
Adomite, Laurie
Adomite, Laurie
Alderson, George
Alexander, Charles W.
Allinder, Bruce
Ambrogi, Karen
Anderson, Donna and Howard
Anderson, Kim Noreen
Anger, Robert
Bacon, Julie
Bahr, Larry
Ball, Jeff
Barrett, Gene
Batchelder, Philip
Battenden, Marlene
Beal, Marc
Beck, C.A.
Beebe, Gordon
Behm, Harriet
Biggins, Harry
Bishop, Steve and Dotty
Bitner, Patricia
Blomquist, Robert and Therese
Boudefoua, Ferhat
Brennan, Brien
Brennan, Dianne

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Individual (contd.)
Brinkhurst, Jim and Cyndi
Brown, Molly Young
Brown, Richard M. and Estella Dee
Burger, Bitsa
Busby, Lois
Buxton, Nick
Byron, Curtis – Coram Ranch
Byron, Curtis and Debbie – Coram Ranch
Cassano, Eric
Castleberry, Robert
Ceragioli, James S.
Chen, Allen
Chetron, Avram
Chitewere, Tendai
Cipra, Michael
Clarke, JoAnne
Clement, Melanie
Clement, Rosemary
Coffey, Karen
Coleman, Judy
Collins, Michele
Cooper, Barbara
Corley, Jane
Correia
Courtier, Christophe
Crockett, Cynthia
Crosland, Richard
Dadigan, Tom
Darling, Jeff
Davison, Matthew B.
DeGroft, Albert
Denison, Lou Anna
Dinh, Zack Haison
Donaldson, Michelle
Doolittle, Will
Drake, Sandra
Drew, Mary Meredith

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Individual (contd.)
Eargle, Dolan
Ediaston, Mayreen – Retired Teachers
Emmons, John-Eric
Erika Giesen
Etter, John
Fagerskog, Carl
Fahner, Fred
Ferris, Jeanne
Filipelli, Deborah
Fitch, Steve
Floyd, Kim F.
Fortino, Robert, S.
France, Jeanne
Freeman, Kyri
Freeman, Robin
Frost, Kelly
Garabedian, Hrach
Garcia, Jesus
Garcia, Nichelle
Gardner, Nick
Gibbs, Dinah
Gill, Barbara
Gill, Joshua
Gilmartin, Steve
Goetz, Robert
Goff, Charles
Goggins, Alan
Goodman, Brenda
Gowan, Jeffrey
Gowan, Jnana
Graham, Nathalie
Granger, Laurie
Green, Sue
Gregor, Dorothy D.
Grey, David – Tsasdi Resort

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Individual (contd.)
Guerrero, Daniel
Gurries, Richard F. and Laurie L.
Hankins, Don
Harrington, Snake
Harte, Mary
Hauck, Jessica
Hazelton, S.
Hazelton, Scott & Laura
Hebert, Allene
Hekkelman, Jamie
Hensher, Cassandra
Hesseldenz, Tom – Tom Hasseldenz & Associates
Hild, Art
Hill, Zack
Hoaglund, Judy
Hodson, Brianne
Hollister, Sidney, J.P.
Holmes, Joanna
Holt, Buford
Holtzclaw, John
Hunrichs, Paul G.
Hunter, Cliff
Imhof, Sheena
Irvine, Roblee and Al
Israel, Debbie
Jerry
Jewell, Aaron
Jones, May
Joo, Misa
Joplin, Catherine
Kaeding, William
Kaljian, Mary Grace
Kass, Sarah
Keel, Dylan
Keith, Christie
Kendall, Enid and Arthur

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Individual (contd.)
Kern, Barbara
Kimberly Anne
Kirkman Campbell, Kathryn
Kisling, Mardy
Kisling, Tom and Mardell
Kisling, Tom and Mardi
Klehr, Gary
Kline, Stacy
Kline, Stacy
Koenig, Ruth
Kohen, Eitam
Kohler, Richard A.
Kossack, David S., PhD.
Kovacs, Christine
Kuelper, Carol
Kurcab, Kim
Lachman, Wesley
Lagrone, Avis
Lagrone, Desiree
Lake Shasta Caverns – Doyle, Matthew
Lakeshore Inn & RV – Marshall, Ross & Charlotte H.
Lamaggiore, Desiree
Lambert, Harmony
Larcade, Denise
Larcade, Jimmie
Lee, Erin
Lee, Roger and Sherri
Lehman, Audra
Lewis, Graham
Li…, Kate B.
Linarez, Karen
Lincke, Jack
Lind, Pat
Lindley, Catherine
Linney, Doug
Livingston, John

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Individual (contd.)
Lorenzetti, Dennis
Luevano, Annarae M.
Lynn, Sue
Mack, Callie
MacNeil, David
MacNeil, Debbie
Manning, Joan
Marin, Gerardo O.
Marquis, Philip G.
Martin, Ernest D.
Martin, Shirley
Martinez, David
Matson, Corinne
McCarthy, Linda
McDonald, Rob
McKee, Richard
McLaughlin, Michael
McNames, Randall
McPherson, Melanie
McVarish, Linda
Messina, Stefanie
Miesse, William
Mitchell, Herbert W.
Morgan, Pam
Moss, Paul
Muirhead, J. Fraser
Mulvey, Roxann
Mungol, Indra R.
Murphy, David
Narbutovskih, Anna
Nelson, Jeff
Newman, Marc
Nishio, John
Nitta, Alex
Nor Cal Beat – McDonald, Rob
Northern California Anglers Association – Bacher, Dan

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Individual (contd.)
O'Connor, Sorca
Ohalloran, Elizabeth
Oliveira, Mauro
Oselett, Barry
Oyung, Frank
Packers Bay Marina – Brooks, Kristine
Palmer, Gracious A.
Palmer, Penny
Pantalone, Al
Pantalone, Arlene
Parks, Katie
Parrinello, Will
Pearce, John
Pedersen, Karen
Penberthy, Gary
Perkins, Anne Raleigh
Perkins, Lowell S.
Perkins, Michelle
Petraitis, Jeannette
Pettit, Joseph
Pfeiffer, Jeanine
Phelps, Virginia and Ed Smith
Philip, Simon
Powell, Charles
Public Water News Service – Wilson, Burt
Quiros, Marcie
Reddin, Roy
Reid, Matt
Rencountre, Rebecca
Reynolds, Gary
Richard, Silke
Richards, Linda
Ricks, Mike
Riverview Golf & Country Club – Anderson, Don
Roderick, Steve
Rosenthal, Michael

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Individual (contd.)
Sagan, Minnie
Sally, Debra
Salus, Penny
Sampson, Cathy & Dan
Samuels, Linda
Sanders, Iris
Schaafsma, William R.
Schanuth, Fusia
Schaser, Kay
Schenck, Alan
Schillo, Noah
Seaborg, David
Searle, Richard C.
Sechrengost, Maureen
Shanafelt, Callie
Shasta Lake Resorts LP – Howe, Rich
Shasta Marina Resort – Harkrader, John and Anna
Shetrawski, Heather
Shufelt, Becky
Silver, Dan
Silverthorn Resort – Reha, Michael
Sims, Sharon
Smith, Dr. Randall
Smith, Paul
Smith, Randall
Spears, Connie
Specht, Fred
St. Amant, Tony
Stapleton, Michael
Steele, Richard & Beverly
Stellar, Joni
Stenberg, Anna Marie
Stephenson, Betty
Stern, Herb
Stevens, Raven
Stokes, John

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Individual (contd.)
Stone, Jeffrey
Strand, Heidi
Straub, Carolyn
Su, Catherine
Sugarloaf Cottages Resort – Jones, Harold
Sujay G
Sullivan, Terrie
Sutton, Alisha
Svoboda, Deborah
Swan, Narim
Swiecicki, Atava Garcia
Switzky, Joshua
Sybert, Michael and Marguerite
Taaffe, Michael
Takaro, Mark
Tanner, Tammey
Thomas, Roy
Thompson, David
Thompson, Jon
Thompson, Sarah Glenn
Thorvund, Sarah
Thrasher, Dianna
Tollgaard, Alden S.
Tossberg, Ross
Townsley, Patricia
Treadway, Frank D.
Tsasdi Resort
United Tribe of Northern California, Inc., Wintoon-Wintu-Wintun
Unknown (D-BSW)
Unknown (D-JIM)
Unknown (D-MIUS)
Unknown (D-PAL)
Van Ry, Diana and Allan Tilton
Vandrack, Jason
Veal, Chris
Voorhees, Julia Catherine

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Individual (contd.)
Voss, Mike and Katie
Wade, Russ
Wagner, Margret and Fritz Griener
Walicki, Joe
Walker, Thomas
Ward, Jill
Watada, Robert
Waugh, Alan
Webb, Loraine
Weidert, Carl
Weidert, Carl L. and Mary Martha
Wilkens, Frank
Williams, Jeannette
Williams, Peggy
Winnemem Wintu Tribe – Fuss, Eddy
Winnemem Wintu Tribe – Volker, Stephan C.
Wolf, Vuku
Woodard, Jessica
Woodcock, Charlene
Wrisley, Gregg
Yardley, Braden
Yowell, Joyce
Zachary, Valerie
Public Hearing, Redding, California September 10, 2013
Brown, Curtis
Burgin, Greg
Cassano, Eric
California Water Impact Network and California Environmental Water Caucus – Stokely, Tom
Davison, Matt
Martinez, David – Winnemem Wintu Tribal Member
Farr, Larry – Mayor of the City of Shasta Lake
Evans, Steve – Friends of the River
France, Jeanne – Winnemem Wintu Tribal Member
Gardener, Nick
Harral, Jerry

Table 33.4-1. List of Commenters on Draft Environmental Impact Statement (contd.)

Public Hearing, Redding, California September 10, 2013 (contd.)
Holt, Buford
Franklin, Robert – Hoopa Valley Tribe (senior hydrologist)
Horkey, Sue
Joplin, Catherine
Kravitz, Kenwa – Winnemem Wintu Cultural Museum
Leavitt, Colleen
Leigh, Craig
Malone, Linda
Marek, Ed
McNeil, Walt
Mundt, David
Preston, Michael
Rider, Rex
Schappell, Bill – District 4
Jones, Harold – Sugarloaf Cottages Resort
Seely, Geenie
Sisk, Caleen – Chief of Winnemem Wintu Tribe
Doyle, Matt – Shasta Lake Business Owners Association
Harkradr, Anna – Read by Michael Tichera from Shasta Marina Resort
Wade, Russ
Watkins, Greg – Councilman of the City of Shasta
Williams, Peggy
Public Hearing, Sacramento, California September 11, 2013
Evans, Steve – Friends of the River
MacNeil, Steve
Public Hearing, Los Banos, California September 12, 2013
No Comments
Comments Submitted After The Deadline
Caporale, John
Esselen Tribe of Monterey County – Brennan, John Polomo
Horne, Adele
Kampa, Richard
Silvers, Dean

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33.5 Comments from Elected Officials and Responses

This section contains copies of comment letters (and any attachments) from the elected officials listed in Table 33.5-1. As noted previously, each comment in the comment letters was assigned a number, in sequential order (note that some letters may have more than one comment). The numbers were then combined with an abbreviation for the official (example: NIEL-1).

Responses to the comments follow the comment letters, and are also numbered, corresponding to the numbers assigned in the letters. The letters and associated responses are sorted alphabetically by abbreviation and appear in this section in that order.

Table 33.5-1. Elected Officials Providing Comments on Draft Environmental Impact Statement

Abbreviation	Elected Official
NIEL	California State Senator Jim Nielsen

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33.5.1 California State Senator Jim Nielsen

NIEL

CAPITOL OFFICE
STATE CAPITOL
SACRAMENTO, CA 95814
(916) 651-4004

ROCKLIN DISTRICT OFFICE
5808 STANFORD RANCH ROAD
SUITE 720
ROCKLIN, CA 95765
(916) 435-0744

CHICO DISTRICT OFFICE
2653 FOREST AVENUE
SUITE 110
CHICO, CA 95928

California State Senate

COMMITTEES
GOVERNMENTAL ORGANIZATION
VICE-CHAIR
BUDGET & FISCAL REVIEW
HEALTH
INSURANCE
VETERANS AFFAIRS

SENATOR
JIM NIELSEN
FOURTH SENATE DISTRICT
REPUBLICAN CAUCUS WHIP

September 25, 2013

Ms. Katrina Chow, Project Manager
Bureau of Reclamation
2800 Cottage Way, MP-720
Sacramento, CA 95825-1898

Subject: Public comment regarding DEIS of Shasta Dam Raise

To whom it may concern:

NIEL-1 I am writing to submit comments in regard to U.S. Bureau of Reclamation's (bureau) Draft Environmental Impact Statement (DEIS) on the Shasta Lake Water Resources Investigation (SLWRI) study examining the impacts of raising Shasta Dam. As a longtime supporter of increasing Northern California's surface water storage capacity, I appreciate that the bureau has laid out plans to raise this dam crest.

NIEL-2 Inasmuch as the state's water needs continue to grow and the climate continues to be unpredictable, the bureau appropriately designates that a primary objective of increased surface water storage is to "increase supply and supply reliability for agriculture, municipal and industry, and to help meet current and future water demands." Raising the crest of the dam will provide a much-needed upgrade to a structure that, over its half-century lifespan, has seen the population it serves double from 20 million Californians to 38 million.

NIEL-3 Secondary goals that were necessarily identified by the bureau include improved water quality, flood management, expanded hydropower generation, and enhanced recreation.

NIEL-4 Of the five plans, three proposals (Comprehensive Plans 3, 4 and 5) call for a maximum 18.5 foot raise of the crest—which would effect a full pool increase of 20.5 feet and a capacity increase of 634,000 acre-feet. I am encouraged that the SLWRI found that an 18.5 foot raise would be "economically justified" and achievable, although each proposal has a different main focuses—some of which are more critical to the benefit of our state. While CPs 3, 4 and 5 do address the "secondary planning objectives," it is

NIEL-5 only CP3 which addresses agricultural water supply reliability as a key point of "focus." Unfortunately, CP3 does not boost water reserves for municipal and industrial (M&I) deliveries; M&I reserves for dry years are necessarily accounted for in CP5. Those are both objectives I would like to see met in the official proposal.

NIEL-6 Additionally, it is my hope that the official proposal will expand findings on the process for managing the effect on private property holdings; in instances when eminent domain is applied, there must be assurances that property owners are properly compensated (taking into account all related expenses accrued, even those not necessarily required under state law, such as moving costs). I am also

NIEL-7 concerned about the impact on the existing marinas, boat ramps, resorts, campgrounds and trails; I would like to see further exploration of the impact on recreational fixtures and use along the lake.

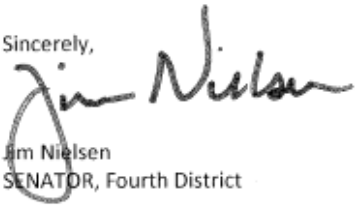
NIEL-8 Similarly, the final proposal should include procedures for relocating local roads and bridges.

NIEL-9 I am pleased that the bureau is considering the dam expansion. I believe that this undertaking is an investment that will provide gains far exceeding the $1.2 billion price tag. The extra water storage

NIEL-10 capacity would advantage Californians statewide, from urban water users to farmers to ratepayers benefitting from increased hydroelectric generation. And while our state needs even more surface water storage than is accounted for by this proposal, this is a realistic first step.

Thank you for your consideration of my comments. If you have any questions about this matter, do not hesitate to contact me.

Sincerely,



Jim Nielsen
SENATOR, Fourth District

Responses to Comments from California State Senator Jim Nielsen

NEIL-1: Thank you Senator Nielsen for your comments on the DEIS and your support of the proposed action.

NEIL-2: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

NEIL-3: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

NEIL-4: Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," and Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report."

NEIL-5: Please refer to Master Comment Response ALTR-1, "Range of Alternatives – General."

NEIL-6: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

NEIL-7: Please refer to Master Comment Response REC-1, "Effects to Recreation at Shasta Lake."

NEIL-8: Please refer to Master Comment Response RBR-2, "Reduced Public Access around Shasta Lake."

NEIL-9: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

NEIL-10: Comment noted.

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33.6 Comments from Federal Agencies and Responses

This section contains copies of comment letters from the Federal Government agencies listed in Table 33.6-1. As noted previously, each comment in the comment letters was assigned a number, in sequential order (note that some letters may have more than one comment). The numbers were then combined with an abbreviation for the Federal agency (example: EPA-1).

Responses to the comments follow the comment letters, and are also numbered, corresponding to the numbers assigned in the letters. The letters and associated responses are sorted alphabetically by abbreviation and appear in the section in that order.

Table 33.6-1. Federal Agencies Providing Comments on Draft Environmental Impact Statement

Abbreviation	Agency
EPA	U.S. Environmental Protection Agency, Region IX
USACE	U.S. Army Corps of Engineers
USFS1	U.S. Forest Service
USFS2	U.S. Forest Service
USFWS1	U.S. Department of the Interior, Fish and Wildlife Service, Sacramento Fish and Wildlife Office
USFWS2	U.S. Department of the Interior, Fish and Wildlife Service, Sacramento Fish and Wildlife Office
WAPA	Department of Energy, Western Area Power Administration

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33.6.1 U.S. Environmental Protection Agency, Region IX

EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

SEP 30 2013

David Murillo, Regional Director
Bureau of Reclamation, Mid-Pacific Region
2800 Cottage Way, MP-700
Sacramento, CA 95825

Subject: Draft Environmental Impact Statement for Shasta Lake Water Resources Investigation, California (CEQ# 20130196)

Dear Mr. Murillo:

The U.S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement for the Shasta Lake Water Resources Investigation. Our comments are provided pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act.

EPA-1 As a crucial storage facility for the Central Valley Project, Shasta Lake is a vital part of California's water supply and economy, and a major influence on the beneficial uses of the Sacramento River. We are aware that Bureau of Reclamation has pursued feasibility studies regarding the enlargement of Shasta dam and reservoir as part of CALFED planning efforts and pursuant to several public laws since 1980. The Draft EIS evaluates five action alternatives that vary in terms of the height of the dam raise and the allocation of the additional water storage among various beneficial uses. We understand that Reclamation plans to identify a preferred alternative in the Final EIS.

EPA-2 Based on our review of the Draft EIS, we have rated all the Action Alternatives and the document as Environmental Concerns – Insufficient Information (EC-2). Please see the enclosed "*Summary of EPA Rating Definitions*". Our detailed comments and recommendations are enclosed.

EPA-3 We recommend including aquatic habitat enhancements as elements of each project alternative, rather than as elements of only two alternatives. Augmenting spawning gravel and restoring aquatic habitat may benefit species as a cost-effectively and efficiently as controlling water temperature.

EPA-4 We also recommend additional mitigation measures such as construction and operation of more advanced wastewater treatment plants,

EPA-5 assistance with remedial efforts at abandoned mines,

EPA-6 and watershed protection and enhancement projects that focus on reducing chronic sources of sediment.

EPA-7 EPA appreciates the opportunity to provide input on this project. We are available to discuss all recommendations provided. When the Final EIS is released for public review, please send one hard copy and one CD to the address above (Mail Code: CED-2). If you have any questions, please contact me at 415-972-3521, or contact Stephanie Skophammer, the lead reviewer for this project. Stephanie can be reached at 415-972-3098 or skophammer.stephanie@epa.gov.

Sincerely,

Kathleen Martyn Goforth, Manager
Environmental Review Office
Communities and Ecosystems Division

Enclosures: Summary of EPA Rating Definitions
Detailed Comments

cc: Katrina Chow, Bureau of Reclamation
Rocky Montgomery, U.S. Fish and Wildlife Service
Maria Rea, National Marine Fisheries Service
Patricia Bratcher, California Department of Fish and Wildlife
Philip Woodward, Central Valley Regional Water Quality Control Board
Kathy Mrowka, Central Valley Regional Water Quality Control Board
Michael Nepstad, U.S. Army Corps of Engineers

EPA-2
CONTD

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

"Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

U.S. EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR SHASTA WATER RESOURCES INVESTIGATION, CALIFORNIA SEPTEMBER 30, 2013

Alternatives

EPA-8 The Bureau of Reclamation evaluates five alternatives for raising Shasta Dam to various heights with the additional storage being allocated for agricultural uses, municipal and industrial uses, anadromous fish uses, or some combination thereof. The purpose and need for the project is to improve operational flexibility of the Delta watershed system by modifying the existing Shasta Dam and Reservoir to meet specified objectives. These dual objectives include, among others, increasing survival of anadromous fish and increasing water supply reliability. A suite of management measures common to all the alternatives includes modifying the temperature control device, reducing demand by allocating funds for water conservation efforts, and enlarging the cold-water pool (p. 2-24).

The Draft EIS states that the primary objectives are given equal priority (p. 2-5). All alternatives provide increased water supply reliability, and this screening criterion removed many alternatives from further consideration (see Scenarios Considered but Dismissed on page 2-99).

EPA-9 We note, however, that only Alternatives CP4 and CP5 include aquatic habitat enhancements, such as augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat - activities that may benefit the listed fish species in the most effective and cost-effective way other than controlling water temperature. It is not clear why these measures were not included in all the alternatives, as they would help to meet the objective of increasing the survival of anadromous fish, independent of dam augmentation.

Recommendation:

EPA-10 Consider including aquatic habitat enhancements for fish, such as those included in Alternatives CP4 and CP5, as part of all the alternatives. In addition to those already included in Alternatives CP4 and CP5, consider incorporating into all of the alternatives other instream aquatic habitat enhancements, such as anchored complex woody debris structures or erosion resistant vegetation near the mouths of the tributaries.

Water Quality

EPA-11 The Draft EIS states that vegetation clearing, relocation of activities, and wave-related shoreline erosion all have the potential to have short-term and long-term sediment impacts. Shoreline processes, including constantly changing reservoir levels that vary month to month and year to year, would provide a constant mechanism by which soil in the new area of inundation could be eroded into the lake, resulting in elevated levels of suspended sediment and turbidity. The quantity of sediment may be on the scale of millions of cubic yards; however, the Draft EIS states that these impacts cannot be quantified because of the size of the lake and the number of variables that influence sediment transport.

EPA-12 The Draft EIS indicates that the direct and indirect impacts to surface water quality, including increased turbidity, could be significant, but would be less than significant after mitigation (p. 7-81). It is not clear how this was determined. The document does not provide sufficient details regarding the mitigation to assess its effectiveness or likelihood of success (p. 7-279).

EPA-13 Hydrologic changes from increased storage and release of water from Shasta Lake have the potential for channel incision and bank erosion below the dam. This is caused by trapping sediment behind the dam and changes in the hydrograph and river stage that effectively lowers the base level of the tributaries. Raising the dam would allow more winter runoff storage which could lower the river stage below the dam during runoff events in the tributaries downstream, causing channel incision, loss of beneficial gravel, and bank erosion.

EPA-13 CONTD: These impacts may affect the beneficial uses assigned to Shasta Lake and downstream in the Sacramento River. These beneficial uses include drinking water supply, freshwater habitat, migration, and spawning. The Draft EIS does not provide specific mitigation measures related to water quality impacts that may occur as a result of the project. The only mitigation proposed is to prepare a Stormwater Pollution Prevention Plan and a remediation plan for historic mine features in the future.

Recommendation:

EPA-14: The Final EIS should provide a reasonable quantitative estimate of the sediment impacts expected from an enlargement of Shasta reservoir and disclose the likely results with regard to beneficial uses in the project area.

EPA-15: The Final EIS should explain how mitigation would lessen the impacts of erosion on water quality in the project area to less than significant. Mitigation actions that should be explored include construction and operation of more advanced wastewater treatment plants, assistance with remedial efforts at abandoned mines, and watershed protection and enhancement projects that focus on reducing chronic sources of sediment.

Endangered and Threatened Species

EPA-16: The US Fish and Wildlife Service, National Marine Fisheries Service, and California Department of Fish and Wildlife, while not cooperating agencies, have been involved for many years and provided comments on feasibility reports and administrative drafts of the EIS. EPA understands that Reclamation intends to initiate consultation under the Endangered Species Act in the future but has not yet done so. On this note, EPA encourages Reclamation to continue to engage with the fish agencies to respond to the dual objectives, employ the best modeling, as well as provide appropriate mitigation for any adverse impacts to species. All of these issues should be addressed in the Final EIS.

EPA-17: SALMOD is the salmon production and mortality model used for the Shasta Enlargement EIS. SALMOD has significant limitations that are described in the appendix to the Draft EIS. For the benefit of the public and decision makers, these limitations should be discussed in more detail in the body of the Final EIS. For example, SALMOD is a comparative model, so any smolt increases should be described in a comparative fashion and the EIS should indicate that these are not firm population increases. SALMOD is not a life cycle model and it does not account for population trends over time nor how those trends may affect annual production.

EPA-18: Additionally the Anadromous Fish Restoration Program has a goal of doubling salmon populations that has also been included in the Water Quality Control Plan as a water quality standard. The Final EIS should describe whether the actions of this project will have a significant impact on achieving this goal.

EPA-19: The Draft EIS indicates that a reduction in the magnitude, duration, or frequency of intermediate to large flows in the Sacramento River would occur as a result of a dam raise and that this is potentially significant (p. 11-269). Capturing more water in wet years would reduce peak flows, which are known to be highly beneficial to fish, as such flows activate floodplains and generally yield good recruitment years for anadromous fish. The reduction in flows in these years and the exposure of fish to more low water years (as some of the water is held in the reservoir and not released downstream) would likely have an adverse effect on juvenile salmonids and other species that rely on floodplain and bypass inundation for foraging. The mitigation proposed is to "develop and implement a mitigation and adaptive management plan to avoid and compensate the impact of altered flow regimes."

EPA-20 Additionally, the anadromous fish benefits, as quantified in the Draft EIS, are minimal (i.e. winter run Chinook salmon Table 11-45 p. 11-285) and many of the impacts to these species are not quantified for clear comparison to the benefits.

Recommendations:

EPA-21 We urge Reclamation to coordinate with USFWS and NMFS on the timing of the Final EIS and the Biological Opinions. The Final EIS should provide an update on the consultation process. We strongly recommend including the Biological Opinion as an appendix.

EPA-22 Continue to consult with USFWS, NMFS, and CDFW to develop appropriate mitigation strategies to minimize the severity of the impacts of reduced peak flows. Mitigation and monitoring measures that would protect sensitive biological resources, including salmon, Shasta snow wreath, bald eagle, and others should be identified in the Final EIS. Flow regimes should be developed that promote natural geomorphic processes necessary to restore riparian and floodplain habitat with the least negative effects.

EPA-23 The limitations of SALMOD should be more clearly stated and potential benefits of the dam enlargement should be accurately acknowledged in the context of all Reasonable and Prudent Measures, Salmon Recovery Program and the Salmon Doubling Goal considered by the fish agencies.

EPA-24 The negative impacts of modifying the hydrology such that there are fewer high flow events should be weighed against the benefits of increasing the cold water pool for anadromous fish and Delta smelt. It is unclear whether the proposed project has a net benefit or adverse impact to threatened and endangered anadromous fish.

EPA-25 The Final EIS should assess the actual impacts to fish, alongside the benefits, to generate a cumulative impact from the negative and positive impacts. For example, the benefits to anadromous fish are limited to a few critical and dry years.

EPA-26 Analysis of impacts should not conclude that, if the impact is greater than a 5% change but is still below the standard, there is no significant impact (e.g. Old Middle River and X2 Delta outflow standard). Scientific research has shown that these physical factors are highly correlated with aquatic life impacts.

National Historic Preservation Act

EPA-27 The Draft EIS states that hundreds of prehistoric resources, ancestral villages, sacred lands, and traditional cultural properties will be inundated or otherwise affected by a raise in Shasta dam and reservoir (p. 14-23). Consultation for tribal cultural resources is required under Section 106 of NHPA. Section 106 of the NHPA requires a federal agency, upon determining that activities under its control could affect historic properties, to consult with the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer (SHPO/THPO). Section 106 of the NHPA requires that Federal agencies consider the effects of their actions on cultural resources, following regulation in 36 CFR 800.

Recommendation:

The Final EIS should discuss how Reclamation would avoid or minimize adverse effects on the physical integrity, accessibility, or use of cultural resources in the area. The Final EIS should

EPA-27 CONTD discuss how Reclamation plans to fulfill its obligations under NHPA, including any future tribal consultation.

Wetland Impacts and Mitigation

EPA-28 The Draft EIS states that approximately 51 acres of wetlands would occur in the impoundment and relocation areas, but that all information regarding jurisdictional waters is just preliminary (p. 12-65). It is unclear how many acres exist currently and whether any of these acreage values are based on a US Army Corps of Engineers-verified jurisdictional delineation.

EPA-29 The Draft EIS is inconsistent in its discussion of mitigation for wetland impacts. For example, specific Best Management Practices (BMPs) and other measures to reduce temporary construction-related impacts to "less than significant levels," are described, while mitigation for permanent wetland losses is not as clearly addressed (p.12-179). A CWA Section 404 permit may be needed for this project. Unavoidable impacts to wetlands must be fully mitigated pursuant to Section 404 requirements. Note that mitigation should compensate for both permanent losses, and residual temporal losses following application of construction BMPs.

Recommendations:

EPA-30 EPA encourages integration of the NEPA and CWA Section 404 permitting process to reduce overall project review timelines and to provide more thorough analysis of potential aquatic resource impacts through the NEPA process. Although detailed wetland delineations may not be available until later in the CWA Section 404 permitting process, we recommend that the Final

EPA-31 EIS disclose the expected acreage of both permanent (drawdown-related) and temporary (construction-related) wetland losses, as well as the basis for the wetland loss estimates. If estimates are not based on a Corps-verified jurisdictional delineation, the Final EIS should note

EPA-32 that these estimates are preliminary and will be revisited in more detail during the Section 404 permitting phase using standard Corps protocols.

EPA-33 Ecosystem functions provided by the specific wetland areas that could be lost should be discussed, and measures that could mitigate such impacts should be identified. The Final EIS should depict the probable areas of wetland loss on maps.

EPA-34 Delete the section on page 3-47 that describes the MOU for the CALFED process and Section 404 permit decision. Any CWA Section 404 analysis that would occur as part of this project will need a new permit application and would not be tiered from the CALFED 2000 ROD.

Feasibility Reports

EPA-35 The Draft EIS states that Federal and State Feasibility Reports have been developed to provide detailed information on the potential project benefits and costs, the allocation of costs to potential project beneficiaries, and project participants. The identification of final project participants and beneficiaries and potential benefits and costs will influence the selection of the preferred alternative in the Final EIS.

Recommendation:

To ensure full public disclosure to support decision-making, we recommend that the conclusions of the Federal and State Feasibility Reports be summarized in the body of the Final EIS, and the Reports be included as appendices in the Final EIS.

4

Responses to Comments from U.S. Environmental Protection Agency, Region IX

EPA-1: The preferred alternative is identified in the Final EIS.

EPA-2: Thank you for your comments. As a follow-up, Reclamation met with EPA representatives to describe how the impacts/mitigation discussion has been revised in the EIS to address EPA's rating.

EPA-3: The development of action alternatives and the focus and major components of each action alternative are described in the EIS Chapter 2, "Alternatives," Section 2.1, "Alternatives Development Process," and Section 2.3, "Action Alternatives." As described in the Final EIS, the dam raise height and primary focus of each action alternative is as follows:

CP1 – 6.5-foot dam raise, primarily focused on anadromous fish survival and water supply reliability

CP2 – 12.5-foot dam raise, primarily focused on anadromous fish survival and water supply reliability

CP3 – 18.5-foot dam raise, primarily focused on anadromous fish survival and agricultural water supply reliability

CP4 and CP4A – 18.5-foot dam raise, anadromous fish survival focus, while also increasing water supply reliability

CP5 – 18.5-foot dam raise, primarily focused on increased water supply reliability, anadromous fish survival, Shasta Lake area and upper Sacramento River environmental resources, and increased recreation opportunities

Different components/measures were incorporated into each action alternative based on the focus of the action alternative, as a way to make distinctions between costs and benefits. As shown above, CP1, CP2, and CP3 have a joint focus on anadromous fish survival and water supply reliability. Therefore, CP1, CP2, and CP3 primarily include measures that simultaneously address both primary objectives, such as increasing the conservation storage in Shasta Reservoir, and measures that would be required for construction and operations of any Shasta Dam raise, such as modification of hydropower facilities and the temperature control device. In contrast, CP4 and CP4A focus primarily on anadromous fish survival, and CP5 focuses more broadly on both the primary and secondary objectives. Accordingly, based on the focus of these alternatives, augmenting spawning gravel and restoring riparian, floodplain, and side channel habitat in the upper Sacramento River were included only in CP4 and CP5.

Spawning gravel augmentation and riparian, floodplain, and side channel restoration could be added into any of the action alternatives as the comment suggests, however it cannot substitute for additional cold water storage and releases from Shasta Dam, which is a critical limiting

factor for salmonids in the Upper Sacramento River below Shasta Dam. Including gravel augmentation and other downstream habitat improvements in some alternatives and not others was a way to make further distinctions in costs and benefits, based on the focus of each alternative. Reclamation's preferred alternative, CP4A has been developed to incorporate elements from CP2 and CP4 in an attempt to balance benefits and impacts. CP4A does include a commitment to include spawning gravel augmentation in the Final Feasibility Report and Final EIS in the action alternative that is recommended for the Secretary of Interior's consideration for Congressional action.

Preliminary economic evaluations show that CP1 and CP3 are not cost-effective. Adding additional components to these alternatives would not improve the cost-effectiveness of these alternatives. Therefore, adding downstream habitat improvements to CP1, CP2 and CP3 would not make any of these alternatives cost-effective. The benefits used to quantify the cost/benefit ratio did not include the benefits of the downstream habitat improvements for CP4 or CP5, but did include the benefits of the additional cold water releases.

EPA-4: The EIS, Chapter 2, "Alternatives," includes a number of physical features that are incorporated into each action alternative. As part of the project description, Reclamation is committed to addressing impacts to a number of wastewater treatment facilities (e.g., septic tanks/drain fields) by either connecting to existing systems or development of new localized wastewater treatment facilities.

In Chapter 2, Section 2.3.8, "Comprehensive Plan Construction Activities," of the DEIS includes the following language that is specific to this comment:

> *"For relocation of wastewater treatment facilities, new septic systems may be constructed on the property if they meet Shasta County requirements for separating septic systems from the lake. Otherwise, the comprehensive plans include facilities for pressurized sewer collection systems to transport wastewater flows to centralized package wastewater treatment plants.*
>
> *Demolished facilities would not be reused to construct relocated facilities. Demolished and relocated utilities are summarized as part of the detailed description of each action alternative. The approach and methodology for demolition, design, and relocation criteria for each category of utilities are discussed in greater detail in the Engineering Summary Appendix."*

EPA-5: There are two historic mining districts in close proximity to Shasta Lake: one west of Shasta Dam and the other between the McCloud and Squaw arms of Shasta Lake. Reclamation is working closely with the Forest Service, BLM and other landowners to identify opportunities to improve water quality as part of the comprehensive mitigation strategy described in Chapter 2, "Alternatives," of the Final EIS. In Chapter 7, "Water Quality," mitigation measures have been revised and/or enhanced to address the potential impacts of metals from historic mining operations (i.e., Bully Hill mine complex). While specific mitigation actions are still under development, Reclamation is committed to working with responsible and cooperating agencies on this issue should an alternative is authorized by Congress.

EPA-6: An enhanced discussion of environmental commitments and mitigation measures is included in Chapter 2, "Alternatives," Chapter 4, "Geology, Geomorphology, Minerals, and Soils," Chapter 7, "Water Quality," and the Preliminary Environmental Commitments and Mitigation Plan Appendix. Specifically, mitigation measures have been developed by an interagency, interdisciplinary team that focused on watershed protection, ecosystem enhancement and sediment reduction to receiving water bodies (e.g., McCloud River).

EPA-7: Thank you for the contact information. The SLWRI mailing list has been updated.

EPA-8: More information on project purpose and need and objectives can be found in DEIS Chapter 1, "Introduction," Section 1.2, "Purpose and Need/Project Objectives," and Chapter 2, "Alternatives," Section 2.1, "Alternatives Development Process." More information on action alternatives evaluated in the DEIS, including management measures common to all action alternatives, can be found in DEIS Chapter 2, Section 2.3, "Action Alternatives."

Please see Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master Comment Response ALTR-1, "Range of Alternatives – General."

EPA-9: Please see response to comment EPA-3.

EPA-10: A large number of management measures to address increasing anadromous fish survival were prioritized in collaboration with federal and state trustee agencies including USFWS and CDFW (formerly California Department of Fish and Game (CDFG)) during the plan formulation process. Subsequently, Reclamation continued to consult with agencies and stakeholders to determine the feasibility of these measures; ultimately the planning team determined that the gravel augmentation and restoration of riparian, floodplain, and side channel

habitat in the mainstem of the upper Sacramento River were prioritized above other potential measures for increasing anadromous fish survival.

During this process, sites were identified and measures were developed that could be used to augment spawning gravel and to restore riparian, floodplain, and side channel habitat in the mainstem of the upper Sacramento River. These sites and measures were prioritized because they would directly improve habitat in the mainstem Sacramento River, where synergy would exist with improved flow and water temperature conditions provided under SLWRI action alternatives, and also providing the highest value of spawning and rearing habitat for anadromous fish in the mainstem Sacramento River. Several of these sites are near the mouths of tributaries to the upper Sacramento River (e.g., Cottonwood Creek). Reclamation anticipates that elements such as anchored, complex woody debris or other habitat features could be specific components that could be incorporated into site-specific evaluations in the next phase of the SLWRI planning process. While we understand the value of improving downstream habitat beyond mitigation for project effects, the anadromous fish benefits of the SLWRI is focused on habitat improvements that result from raising Shasta Dam.

EPA-11: In addition to the revisions made to Chapter 2, "Alternatives," Chapter 4, "Geology, Geomorphology, Minerals, and Soils," Chapter 7, "Water Quality," of the EIS with respect to impacts and mitigation measures, Attachment 1 to the Geologic Technical Report has been revised to enhance the discussion of shoreline erosion. The DEIS, Impact Geo-5, did provide a quantitative discussion of the impacts of shoreline erosion for two discrete time-steps, 15-years and 60-years. For CP4:

> *For the first 15 years after the dam raise, the average rate of shoreline erosion would increase substantially, from 90 cubic yards per acre per year to about 300 cubic yards per acre per year. For the first time step (i.e., 15 years), the total average annual volume of potential shoreline erosion from CP3 would be about 767,000 cubic yards per year. Within 60 years of the dam raise, the average annual volume is predicted to decrease to 216,000 cubic yards per year.*

In addition to refining the information used for this analysis (e.g., additional field data), Reclamation has identified a number of environmental commitments and mitigation opportunities that would be implemented to reduce impacts to and/or improve water quality in Shasta Lake (and tributary watersheds) and the Upper Sacramento River. The Preliminary Environmental Commitments and Mitigation Plan

Appendix provides additional details on these commitments and opportunities. For example, Mitigation Measure WQ-1, "Develop and Implement a Comprehensive Multi-scale Sediment Reduction and Water Quality Improvement Program Within Watersheds Tributary to the Primary Study," is a multi-faceted mitigation measure that will be implemented to reduce overall sediment load to receiving water bodies, including Shasta Lake and its tributaries using site-specific treatments (road-related sediment) and landscape scale actions (fuel reduction measures).

EPA-12: Chapter 2, "Alternatives," and Chapter 7, "Water Quality," of the EIS have been revised to clarify the distinction between environmental commitments and mitigation. In Chapter 2, "Alternatives," of the EIS, revisions have been made to acknowledge that preparation and implementation of the Stormwater Pollution Prevention Plan (SWPPP) is an environmental commitment made by Reclamation as part of the project description.

The discussion of turbidity impacts within Shasta Lake and the upper Sacramento River has been enhanced in Chapter 7, "Water Quality," of the EIS. Specifically, the affected environment section (supplemented by the Water Quality Technical report and Geology Technical Report – Attachment 1) has been revised to respond to the commenters question on turbidity.

Mitigation Measure WQ-1 has been revised to include a description of mitigation opportunities that was developed by Reclamation with involvement from federal responsible and cooperating agencies. Mitigation opportunities are taken into account in the revised discussion of water quality impacts on beneficial uses in Chapter 7, "Water Quality," of the EIS.

EPA-13: Chapter 4, "Geology, Geomorphology, Minerals and Soils," of the EIS has been revised to clarify potential effects to geomorphology downstream from Shasta Dam. This includes additional discussion related to both potential tributary head cutting and general geomorphic changes to the upper Sacramento River.

Mitigation for potential effects to geomorphology and associated potential effects to water quality, wildlife, and fisheries downstream from Shasta Dam has been further developed for inclusion in the Final EIS.

Chapter 7, "Water Quality," of the EIS has been revised to enhance the discussion related to impacts of sediment (e.g., bedload, suspended sediment, turbidity) on beneficial uses associated with Shasta Lake and the upper Sacramento River.

EPA-14: As described in responses to EPA-12 and EPA-13, Chapter 2, "Alternatives," Chapter 4, "Geology, Geomorphology, Minerals, and Soils," Chapter 7, "Water Quality," and Attachment 1 to the Geologic Technical Report have been revised to enhance the understanding of the relationship between SLWRI-related sediment impacts and beneficial uses. Information from a recent report on the water quality of the upper Sacramento River was incorporated into these chapters. Specifically, this new information clarifies that the sediment is not a key constituent that is having negative affects to municipal and industrial water supplies derived from the upper Sacramento River.

Attachment 1 to the Geologic Technical Report has been revised to include additional field data that was used to better calibrate the shoreline erosion predictions presented in Chapter 4, "Geology, Geomorphology, Minerals, and Soils." Subsequent to developing the DEIS, additional field investigations were conducted to support the shoreline erosion model described in this chapter. In addition, additional GIS analysis was performed to revise and substantiate the estimates of shoreline erosion for each alternative.

EPA-15: The EIS has been revised to clarify the distinction between environmental commitments and mitigation measures. Examples of this are illustrated in Chapter 2, "Alternatives," and include conversion of Mitigation Measure WQ-1 (SWPPP) to an environmental commitment. In Chapter 7, "Water Quality," Mitigation Measure WQ-1 has been replaced with a detailed mitigation framework responsive to impacts relate to several water quality impacts.

Responses to comments EPA-4, EPA-5 and EPA-14 also respond to this comment as they relate to water treatment, abandoned mines and sediment soured reduction.

The EIS also includes the Preliminary Environmental Commitments and Mitigation Plan Appendix that provides a comprehensive summary of these commitments and mitigation measures.

EPA-16: Chapter 1, "Introduction," describes the roles and relationships of cooperating, responsible and trustee agencies. In addition to its roles as a responsible and trustee agency, the USFWS is a cooperating agency for the SLWRI EIS. Chapter 33, "Public Comments and Responses," documents the comments and Reclamation's response to these agencies.

Throughout the plan formulation process and subsequent NEPA process, Reclamation has engaged and with USFWS, NMFS and CDFW to ensure that the EIS satisfies the requirements of these agencies to the extent possible with respect to future consultation and/or permitting efforts that would proceed subsequent to issuing the Final EIS.

Chapter 32, "Final EIS," identifies Reclamation's preferred alternative which would be the basis for preparation of Reclamation's Biological Assessment consistent with ESA requirements.

Please refer to Master Comment Response DSFISH-2, "Fisheries Models and Tools."

EPA-17: Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," and Master Comment Response DSFISH-2, "Fisheries Models and Tools."

EPA-18: Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

EPA-19: Impact Geo-9, "Substantial Increase in Channel Erosion and Meander Migration," in Chapter 4 "Geology, Geomorphology, Minerals, and Soils," Section 4.3.3 "Direct and Indirect Effects" describes the characteristics of peak flows, including the duration, magnitude and rate at which flows change downstream from Shasta Dam.

Please refer to Master Comment Response DSFISH-9, "Flow-Related Effects on Fish Species of Concern."

EPA-20: Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

EPA-21: Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

EPA-22: Please refer to Master Comment Response CMS-1, "EIS Mitigation Plan."

EPA-23: The text has been revised in Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.1, "Methods and Assumptions," and Chapter 5, "SALMOD," of the Modeling Appendix.

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," Master Comment Response DSFISH-2, "Fisheries Models and Tools," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

EPA-24: As described in Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.3, "Direct and Indirect Effects," Impact H&H-1, "Change in Frequency of Flows above 100,000 cfs on the Sacramento River below Bend Bridge," there would be a slight

reduction in the frequency of occurrence of flows greater than 100,000 cfs. This, along with the increased benefits to anadromous fish, as described in Chapter 11, "Fisheries and Aquatic Resources," Section 11.3.3, "Direct and Indirect Effects," indicate a net benefit to federally listed anadromous fish resulting from an increased cold water pool through the implementation of the SLWRI.

EPA-25: Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response DSFISH-3, "Fish Habitat Restoration."

EPA-26: Impact indicators for Old and Middle Rivers were not strictly based on a 5 percent change (See EIS Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.1, "Methods and Assumptions"):

> *"For purposes of these analyses, a comparison of reverse flows within Old and Middle rivers under the basis-of-comparison and proposed alternative project operations was prepared for the seasonal period extending from January through June. Per the RPAs in the USFWS 2008 and NMFS 2009 BOs, any reduction in Old and Middle River reverse flows (i.e., flows that are more negative) that result in flows greater than (i.e., flows that are more negative) -5,000 cfs are considered to be a significant impact. Additionally, a 5 percent reduction in Old and Middle River flows making them more negative is also considered a significant impact."*

X2 was based on a change in distance per the standard acceptable movement of X2 in kilometers as established in the USFWS 2008 BO (see Chapter 11, Section 11.3.1, "Methods and Assumptions"):

> *"For purposes of evaluating changes in habitat quantity and quality for estuarine species, a significance criterion of an upstream change in X2 location within 1 kilometer (km) of the basis-of-comparison condition was considered to be less than significant. The criterion was applied to a comparison of hydrologic model results for basis-of-comparison conditions and project alternatives, by month and water year, for the months from February through May and September through November."*

EPA-27: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources."

EPA-28: In the DEIS, Reclamation estimated that there were approximately 51 acres of wetland that would occur in the impoundment

and relocation areas using the USACE approved guidelines for wetland delineation for more than 400 miles of shoreline and over 3,000 acres of potential relocation areas. The EIS has been revised to reflect a substantial reduction in the acres of wetlands and other waters that would be subject to relocation impacts (e.g., roads, bridges, marinas). Under CP4A, there would be a net loss of approximately 29 acres of wetlands and loss of approximately 49 acres of riverine waters by conversion to lacustrine waters. This reduction was based on updated engineering and planning information and redefining relocation areas to avoid wetlands and other sensitive resources (e.g., bald eagle nests and cultural sites). Subsequent to issuance of the EIS, Reclamation will submit a draft wetland delineation report to the USACE with a request for preliminary verification as part of the SLWRI planning process.

EPA-29: As described in response to EPA-12, Reclamation has revised Chapter 2, "Alternatives," to clarify the distinction between environmental commitments (i.e., SWPPP) and mitigation measures. As described in Response to EPA-28, the EIS has been revised to reflect best available information with respect to wetland impacts, both permanent and temporary. Reclamation acknowledges that the USACE has various roles as both a cooperating and responsible agency in the SLWRI planning process and is committed to working with responsible agencies in coordinated fashion to ensure compliance with applicable sections of the Clean Water Act (e.g., 404).

Please refer to Master Comment Response CMS-1, EIS Mitigation Plan."

EPA-30: Pursuant to NEPA, the USACE is a Cooperating Agency for this EIS and the responses to USACE comments on the DEIS are included in Chapter 33, "Public Comments and Responses." Reclamation has coordinated with USACE during development of the EIS. Reclamation has also coordinated with the USACE on CWA Section 404 compliance, including participation in a pre-application meeting with USACE staff in the Sacramento District. If a project is authorized by Congress, Reclamation will develop Section 404 permit applications packages and complete the permitting process.

EPA-31: See response to EPA-28.

EPA-32: The language in the EIS was revised to state that the estimated impacts to wetlands and waters of the United States are preliminary and based on the current footprint of alternatives described in the EIS, Chapter 2, "Alternatives."

EPA-33: Section 12.1, "Affected Environment," was enhanced in Chapter 12, "Botanical Resources and Wetlands," of the Final EIS. The

EIS has been revised to enhance the discussion of impacts and related mitigation measures, including the addition of the Preliminary Environmental Commitments and Mitigation Plan Appendix.

EPA-34: The SLWRI EIS is tiering to the CALFED Final PEIS/R and Programmatic ROD, and is therefore relying on the CWA Section 404 MOU as stated in the MOU as follows:

> *"The record of decision for the CALFED final programmatic EIS/EIR includes a CWA Section 404 memorandum of understanding (MOU) signed by Reclamation, EPA, USACE, and DWR. Under the terms of the MOU, when a project proponent applies for a Section 404 individual permit for CALFED projects, the proponent is not required to reexamine program alternatives already analyzed in the programmatic EIS/EIR. USACE and EPA will focus on project-level alternatives that are consistent with the CALFED programmatic EIS/EIR when they select the least environmentally damaging practicable alternative at the time of a Section 404 permit decision."*

EPA-35: The Final EIS does not include a summary of the Feasibility Report, nor does it summarize the entire Feasibility Report. Also, the Feasibility Report does incorporate by reference the Final EIS.

33.6.2 U.S. Army Corps of Engineers

USACE

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

September 25, 2013

Regulatory Division SPK-2011-00667

Ms. Michelle Denning
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, California 95825-1898

Dear Ms. Denning:

We are responding to your June 25, 2013, request for comments on the Draft Environmental Impact Statement (DEIS) for the Shasta Lake Water Resource Investigation (SLWRI). The Corps has reviewed the DEIS and requests that the following comments and recommendations be incorporated into the document.

USACE-1 The Corps of Engineers' jurisdiction within the study area is under the authority of Section 404 of the Clean Water Act for the discharge of dredged or fill material into waters of the United States. Waters of the United States include, but are not limited to, rivers, perennial or intermittent streams, lakes, ponds, wetlands, vernal pools, marshes, wet meadows, and seeps. Project features that result in the discharge of dredged or fill material into waters of the United States will require Department of the Army authorization prior to starting work.

USACE-2 The stated project purpose in the DEIS is, "to improve operational flexibility of the Delta watershed system through modifying the existing Shasta Dam and Reservoir to meet specified primary and secondary project objectives." However, the operational flexibility appears to be the need and is achieved through the real project purpose of water storage. The project purpose in the DEIS seems to predispose the only way to accomplish this is to raise Shasta Dam. By limiting the project alternatives considered to only the raising of Shasta Dam unnecessarily constrains the range of alternatives that must be considered under the Clean Water Act.

USACE-3 The range of alternatives considered for this project should include alternatives that avoid impacts to wetlands or other waters of the United States. The DEIS alternatives analysis should incorporate the requirements of the 404(b)(1) guidelines in order for the Corps to be able to utilize the analysis for permitting under Section 404 of the CWA.

EPA's 404(b)(1) guidelines (40 CFR 230.10) state that no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impacts to the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. An alternative is considered practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose. To comply with these guidelines the Corps can only issue a permit for the least environmentally damaging practicable alternative (LEDPA).

USACE-4 Additionally, in the Section 12.3.5 covering Mitigation Measures, the DEIS states that "when feasible jurisdictional waters of the United States would be avoided." The term "when feasible" as it pertains to avoidance and minimization of impacts to waters of the United States, should be eliminated from the document. The USEPA's 404(b)(1) guidelines and the 1990 MOU between the Corps and USEPA,

USACE-4 CONTD.

require that impacts to waters of the United States must be avoided and minimized to the maximum extent practicable in order to comply with the Clean Water Act.

USACE-5 Based on our review of the DEIS it appears the delineation of waters of the United States that will be affected by the raising of Shasta Dam is only partially complete. As we commented during review of the Administrative Draft of the DEIS the investigations should be completed and provided to the Corps for verification. The DEIS stated the investigations will be completed and included in the FEIS. The delineation of waters of the United States should be completed and included in the DEIS so that the documents can be adequately reviewed by both the agencies and the public as part of the NEPA review process. The delineation should not be provided as new information the FEIS. Without the completed reports included in the DEIS the document's assessment of impacts to waters of the United States as a result of the proposed project are incomplete.

USACE-6 The DEIS identifies that at this time there have been no mitigation measures developed to mitigate for the loss of waters of the United States as a result of this project. The DEIS states that additional discussion of mitigation for the loss of waters of the United States will be included in the FEIS. As we commented in our review of the Administrative DEIS, at a minimum a conceptual mitigation proposal to off-set impacts to waters of the United States should be developed and included in the DEIS. This information should be available for the agencies and public review and comment. Without at least a conceptual plan we are unable to evaluate if mitigation for the loss of waters of the U.S. is even possible or if the mitigation itself may have impacts that should be considered in the DEIS. The mitigation proposal should not be provided as new information in the FEIS.

USACE-7 At this time unless the DEIS is revised to incorporate the above recommendations and changes, it does not appear that the Corps will be able to sign the Record of Decision and adopt the SLWRI FEIS for our permit requirements.

Please refer to identification number SPK-2011-00667 in any correspondence concerning this project. If you have any questions, please contact me at the Redding Regulatory Office, 310 Hemsted Drive, Suite 310, Redding, California 96002, by email at *Matthew.P.Kelley@usace.army.mil*, or telephone at 530-223-9534. For more information regarding our program, please visit our website at *www.spk.usace.army.mil/Missions/Regulatory.aspx*.

Sincerely,

Matthew P. Kelley
Senior Project Manager

cc:

Ms. Katrina Chow, U.S. Bureau of Reclamation, 2800 Cottage Way, Sacramento, California 95825-1898
Mr. Jason Brush, U.S. Environmental Protection Agency, WRT-8, 75 Hawthorne Street, San Francisco, California 94105-3901
Ms. Stephanie Skophammer, U.S. Environmental Protection Agency, WRT-8, 75 Hawthorne Street, San Francisco, California 94105-3901

Responses to Comments from U.S. Army Corps of Engineers

USACE-1: Comment noted.

USACE-2: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response P&N-1, "Purpose and Need and Objectives, and "Master Comment Response ALTR-1, "Range of Alternatives – General."

USACE-3: The CALFED Programmatic ROD for the CALFED Final PEIS/R includes a CWA Section 404 memorandum of understanding (MOU) signed by Reclamation, EPA, USACE, and DWR. Under the

terms of the memorandum of understanding (MOU), when a project proponent applies for a Section 404 individual permit for CALFED projects, the proponent is not required to reexamine program alternatives already analyzed in the programmatic EIS/EIR. USACE and EPA will focus on project-level alternatives that are consistent with the CALFED PEIS/R when they select the least environmentally damaging practicable alternative at the time of a Section 404 permit decision.

As stated in Chapter 26, "Other Required Disclosures," The LEDPA would be determined on the basis of the entire environmental review and identified in the ROD, consistent with Section 404(b)(1) of the Federal Clean Water Act (CWA), which requires that only the Least Environmentally Damaging Practicable Alternative may be approved and implemented by a Federal agency. This EIS provides a substantive portion of the environmental information necessary for USACE to determine the LEDPA consistent with Section 404(b)(1) guidelines."

Please refer to Master Comment Response ALTR-1, "Range of Alternatives – General."

USACE-4: Chapter 12, "Botanical Resources and Wetlands," Section 12.3.5, "Mitigation Measures," Mitigation Measure Bot-4, "Mitigate Loss of Jurisdictional Waters" has been revised.

USACE-5: The Final EIS includes additional information on waters of the United States and estimated impacts to waters of the United States. A draft preliminary wetland delineation report will be submitted consistent with Reclamation's schedule.

Please refer to Master Comment Response NEPA-1, "Sufficiency of EIS."

USACE-6: The Final EIS includes additional information on waters of the United States and estimated impacts to waters of the United States. A draft preliminary wetland delineation report will be submitted consistent with Reclamation's schedule. At the present time in the planning process, Reclamation is not in the position to mitigate for loss of waters to the United States.

Please refer to Master Comment Response NEPA-1, "Sufficiency of EIS."

USACE-7: Comment noted.

33.6.3 U.S. Forest Service

USFS1

From: **Rezeau, Nathan L -FS** <nrezeau@fs.fed.us>
Date: Tue, Aug 13, 2013 at 3:22 PM
Subject: SLWRI Tech Report Question
To: "Chow, Katrina C (KChow@usbr.gov)" <KChow@usbr.gov>, "Paasch, Mary (Mary.M.Paasch@us.mwhglobal.com) (Mary.M.Paasch@us.mwhglobal.com)" <Mary.M.Paasch@us.mwhglobal.com>
Cc: "Beres, Virginia -FS" <vberes@fs.fed.us>

Hi Katrina and Mary,

USFS1-1 I was reading through the SLWRI DEIS and saw reference to the *Recreation and Public Access Technical Report* on page 17-27. I can't find that document anywhere on my DEIS file disc. Can you tell me where that report resides and how I may get a copy of it?

Thanks!

Nathan Rezeau
Deputy District Ranger
Shasta-Trinity National Forest
National Recreation Area Management Unit
Office Phone: (530) 242-5560
Email: nrezeau@fs.fed.us

Response to Comment from U.S. Forest Service

USFS1-1: The referenced technical report was incorrectly titled in the text. The commenter can find the requested information in the Engineering Summary Appendix. The text has been revised in the Final EIS, Chapter 17, "Land Use," Section 17.3.4, "Direct and Indirect Effects."

33.6.4 U.S. Forest Service

 USFS2

Comments to DEIS

Rezeau, Nathan L -FS <nrezeau@fs.fed.us> Mon, Sep 30, 2013 at 4:55 PM
To: "Chow, Katrina C (KChow@usbr.gov)" <KChow@usbr.gov>, "bor-mpr-slwri@usbr.gov" <bor-mpr-slwri@usbr.gov>
Cc: "Beres, Virginia -FS" <vberes@fs.fed.us>, "Hawkins, Robert H -FS" <rhhawkins@fs.fed.us>

Katrina,

Please accept the attached comments on behalf of the Forest Service for the SLWRI Draft EIS.

Thank you for the opportunity to comment and we look forward to participating in the planning process.

Regards,

Nathan Rezeau

Acting District Ranger

Shasta-Trinity National Forest

National Recreation Area Management Unit

Office Phone: (530) 242-5560

Email: nrezeau@fs.fed.us

SLWRI DEIS COMMENT FORM - Forest Service.xlsx
20K

Shasta Lake Water Resources Investigation DEIS Comment Form - Version July 2013								
Reviewer Name:		Virginia Beres	Julie Kierstead Nelson			Cindy Luzietti	Nathan Rezeau
Reviewer Email:		vberes@fs.fed.us	jknelson@fs.fed.us			cluzietti@fs.fed.us	nrezeau@fs.fed.us
Reviewer Agency:		Forest Service	Forest Service			Forest Service	Forest Service
Reviewer Mailing Address:							
Date:		Sept 26, 2013	Sept. 20, 2013			Sept 12, 2013	Sept. 29, 2013
ITEM	REVIEWER	CHAPTER TITLE	CH #	PG #	Line #	TEXT	COMMENT
USFS2-1 1	vberes	Land Use	17	5	6	Lakeview	Lakeview Marina is gone.The entire document should be search for this marina to ensure all references have been removed.
USFS2-2 2	vberes	Land Use	17	5	9	the STNF to decommission Digger Bay and construct a new marina at Turntable	Is this why the "windows" plates show Digger Bay as slated for abandonment? I don't believe Digger Bay is to be abandoned.
USFS2-3 3	vberes	Land Use	17	5	17	USFS operates recreation residential tracts at Salt Creek...	The USGS map may spell Didallas Creek "Didallas" but the recreation tract is spelled "DIDALLIS". Didallas Creek Bridge can remain but a search and replace should be done for the recreation residence tract spelling.
USFS2-4	vberes	Alternatives	2	80		Figure 2-5.	Digger Bay is not slated for abandonment
USFS2-5 5	vberes	Summary	0	108		Table S-3 "Turntable Bay"	Any new development at Turntable Bay might not be called Turntable Bay Marina as an existing business may be relocated there. Also "Developments" should not be capitalized.
USFS2-6 6	vberes	Aesthetics	19	93		Table 19-3 "Turntable Bay Marina"	Any new development at Turntable Bay might not be called Turntable Bay Marina as an existing business may be relocated there. Also "Developments" should not be capitalized.
USFS2-7	vberes	Engineering Appendix Plates		39		Plate 39	Digger Bay Marina is not slated for abandonment
USFS2-8 8	vberes	Engineering Appendix		34	7	Decisions about whether individual affected facilities would be modified or relocated would be addressed in conjunction with USFS, based on overall effects on the features of individual facilities as well as operational needs. Some relocated facilities may be consolidated within other existing facilities, rather than being relocated at a currently undeveloped area. All plans for replacing of facilities would be evaluated and approved by USFS.	Facility consolidation will only be considered after all feasible undeveloped relocation sites have been considered.

USFS2-9	9	vberes	Engineering Appendix		33	14	Where is the large chart that Reclamation, MWH and the FS worked on that showed what recreation facilities are affected and the proposed action for them? The draft document we have doesn't have a title but one of the row headers is titled "Shasta Recreation Facilities – Basis for 18.5 Cost Estimate" and the footer states that it is for discussion purposes only, do not distribute.	Your response (MWH-Buck)to this comment was that the FS had agreed at the technical meetings in June and July 2012 to maintain the current level of detail presented for recreation in the Draft EIS and related appendices. We do not believe this to be in true and in fact requested that this chart be incorporated in the draft EIS i.e. we want this chart in the final EIS.
USFS2-10	10	vberes		18	5		Table 18-1 - Kamloops Camp	This is the only reference to Kamloops Camp in draft (not in the "windows" plates either. This camp, under FS special use permit, is located on FS lands and will be highly impacted by the PA and needs to be addressed as an impacted facility. This was an oversight.
USFS2-11	11	JK Nelson	Botanical Resources & Wetlands/Survey &	12	33	16	Considered Sensitive or Endemic by USFS	Updated Region 5 USFS Sensitive Species list was released in July, and effective Aug. 16, 2013; EIS & Botany Technical Report will need editing to reflect changes to USFS status.
USFS2-12		JK Nelson	Table 12.3 Plant Species of Concern	12	34		Northern clarkia	please add that it is also USFS S
USFS2-13		JK Nelson	Table 12.3 Plant Species of Concern	12	34		Pacific fuzzwort	no longer USFS S
USFS2-14		JK Nelson	Table 12.3 Plant Species of Concern	12	34		English Peak greenbriar	no longer USFS S
USFS2-15		JK Nelson	Table 12.3 Plant Species of Concern	12	34		Erythranthe taylori	add to table--currently being ranked. Known to occur in project area
USFS2-16	16	JK Nelson	Botanical Resources & Wetlands/Survey &	12	76	31	In a subsequent court-mandated settlement agreement (2011)	Settlement agreement was voided; Survey & Manage program has reverted to 2001 ROD standards & guidelines
USFS2-17	17	cluzietti	Land Use	17	2	17	Late Successional Reserve	It is misleading to label as just LSR since the Land Allocation is called "Late-Successional Reserves, Managed Late-Successional Areas, and other Threatened, Endangered, or Sensitive Species" in the Forest Plan, and the areas in the Shasta Unit of the NRA were designated for bald eagles and peregrine falcon, and do not contain habitat for late-successional and old-growth related species2
USFS2-18	18	cluzietti	Land Use	17	2	30	STNF LRMP direction for administratively withdrawn area.....	if you are quoting this from page 4-112 of the LRMP, it applies to all allocations of the Shasta Unit NRA not just Administratively Withdrawn, and does NOT apply to all of the STNF as this sentence says.
USFS2-19		cluzietti	Land Use	17	5	16	operates	change to "manages"
USFS2-20	20	cluzietti	Land Use	17	5	28	There are five claims in the NRA....	There were more than 5 claims that predated the withdrawal when the NRA was created. Are you saying there are 5 claims that are still active? I don't believe that are any claims that are active in the NRA anymore--would you be able to give us the locations of these 5 claims?
USFS2-21		cluzietti	Land Use	17	5	32	36 CFR	This is NOT in 36 CFR, it is in 43 CFR.
USFS2-22		cluzietti	Land Use	17	5	30	operating plans	operating plans are required under the regs for locatable minerals (36CFR228 Subpart A) not leasable
USFS2-23		cluzietti	Land Use	17	8	19	Chappie-Shasta	The BLM manages all of the Chappie-Shasta OHV Area.
USFS2-24	24	cluzietti	Land Use	17	9	5	land ownership adjustments	If you are going to use this goal you need to include the information on page 4-19 of the Forest Plan which speaks to land ownership adjustments in the NRA (the desired future condition is clarified by the Standards and Guidelines) and the resource objectives that land ownership adjustments are supposed to support. "Within and adjacent to the NRA acquire available, undeveloped private lands needed to fulfill the management goals and objectives of the recreation resource program. Acquire those parcels of land that are specifically needed: (a) for public development; (b) to protect major visual resource values; (c) to protect prime wildlife habitat; and (d) to preserve important cultural values and make them available for public enjoyment."
USFS2-25	25	cluzietti	Land Use	17	9	25	Provide special management for late successional reserves.....	Add "Late-Successional Reserves and Threatened, Endangered, and Selected Sensitive Species" at front of sentence as that is the name of the management prescription. You have the management prescription title under all the other land allocations.
USFS2-26	26	cluzietti	Land Use	17	29	26	It should be noted that even where site specific.....	Every project or activity must be consistent with the applicable plan components. Determining consistency and resolving inconsistency is found in 36CFR 219.15.
USFS2-27	27	Nrezeau	Recreation	18	66	8, 18, 19	recreation residence would be affected	A survey for recreation residence structures is recommended, similar to what was done for the Lakehead community, so that impacts to recreation residences can be refined.
USFS2-28	28	Nrezeau	Recreation	18	Tables 18-3 and 18-8		Campgrounds	Mariners Point Campground is not listed in any of the impacts tables. Mariner's Point is a developed campground, unlike the other shoreline campgrounds, that will be impacted by inundation and should be listed as impacted.
USFS2-29	29	Nrezeau	Alternatives, & Engineering Appendix	2 & Eng App.	73	Table 2-10	Lakeshore Drive	Due to significant community interest from private residents and business owners, it is recommended that a proposed/ conceptual plan for the realignment of Lakeshore Drive be included as an Engineering Appendix Plate.
USFS2-30		Nrezeau	Aesthetics and Visual Resources	19	4	20	there are 10 marinas on Shasta Lake	There are 9 not 10 marinas on Shasta Lake. Please correct to 9 marinas.

Response to Comments from U.S. Forest Service

USFS2-1: The text has been revised to not include Lakeview Marina in discussion related to recreation activities and marinas.

USFS2-2: Plate 39, "Recreation Site Status," identifies that the marina at Digger Bay will be abandoned, and the site will be used as a public boat ramp under all action alternatives.

USFS2-3: Text in EIS Chapter 17, "Land Use," has been updated to have the proper spelling of Didallis recreation tract.

USFS2-4: Figure 2-5, "Recreation Study Windows," will be updated to not indicate that Digger Bay Marina is to be abandoned. The Engineering Summary Appendix Plate 39, "Recreation Study Windows," will be updated to include the same information.

USFS2-5: Text has been revised to not reference Turntable Bay Marina, because any new development may not be called that; instead, it is identified as the Turntable Bay area.

USFS2-6: Text has been revised to not reference Turntable Bay Marina, because any new development may not be called that; instead, it is identified as the Turntable Bay area.

USFS2-7: Plate 39, "Recreation Site Status," identifies that the marina at Digger Bay will be abandoned, and the site will be used as a public boat ramp under all action alternatives.

USFS2-8: The Engineering Summary Appendix Chapter 4, "Design Considerations for Reservoir Area Infrastructure Modifications and/or Relocations," has been clarified to state that the preference is to relocate recreation facilities in the immediate vicinity.

USFS2-9: The requested table describing preliminary proposed relocations and modifications was added to the EIS Engineering Summary Appendix, Chapter 4, "Design Considerations for Reservoir Area Infrastructure Modifications and/or Relocations."

USFS2-10: Possible Impacts to Kamloops Camp are included in the DEIS Chapter 18, "Recreation and Public Access," in Tables 18-4, 18-6, and 18-8, "Effects of CP1-3 (respectively) on Developed Recreation facilities at Shasta Lake."

USFS2-11: The plant lists in both the Botanical Resources and Wetlands Technical Report and the EIS were revised to reflect the changes to the Region 5 USFS Sensitive Species list as of April 2014.

USFS2-12: This was revised in Table 12.3 in Chapter 12, "Botanical Resources and Wetlands" of the EIS.

USFS2-13: This was revised in Table 12.3 in Chapter 12, "Botanical Resources and Wetlands" of the EIS.

USFS2-14: This was revised in Table 12.3 in Chapter 12, "Botanical Resources and Wetlands" of the EIS.

USFS2-15: This was revised in Table 12.3 in Chapter 12, "Botanical Resources and Wetlands" of the EIS.

USFS2-16: This was revised in Table 12.3 in Chapter 12, "Botanical Resources and Wetlands" of the EIS.

USFS2-17: Comment noted. The land use allocation was relabeled throughout the Final EIS as "Late-Successional Reserves, Managed Late-Successional Areas, and other Threatened, Endangered, or Sensitive Species."

USFS2-18: Comment noted. The requested changes were made to Chapter 17, "Land Use and Planning," Section 17.1.1, "Land Use," in the Final EIS concerning the application of STNF direction.

USFS2-19: Comment noted. The requested changes were made in the Final EIS and can be found in Chapter 17, "Land Use and Planning," Section 17.1.1, "Land Use."

USFS2-20: Comment noted. According to page II-12 of the NRA Guide (STNF 1996) there are seven claims in the NRA that predate the withdrawal and remain open to mineral leasing. Chapter 17, "Land Use and Planning," will be updated in the Final EIS to reflect current information.

USFS2-21: Comment noted. The correct reference (43 CFR) was used in the Final EIS and can be found in Chapter 17, "Land Use and Planning," Section 17.1.1, "Land Use."

USFS2-22: Comment noted. Text was altered in Chapter 17, "Land Use and Planning," Section 17.1.1, "Land Use," of the Final EIS to reflect that operating plans are not required for leasable minerals.

USFS2-23: Comment noted. Text was included in Chapter 17, "Land Use and Planning," Section 17.1.1, "Land Use," of the Final EIS to indicate that BLM manages the Chappie-Shasta OHV Area.

USFS2-24: Comment noted. The requested changes were made to Chapter 17, "Land Use and Planning," Section 17.1.1, "Land Use," in the Final EIS concerning the addition of text regarding land ownership adjustments in the NRA and resource objectives that land ownership adjustments are supposed to support.

USFS2-25: Comment noted. The requested changes were made to Chapter 17, "Land Use and Planning," Section 17.1.1, "Land Use," in the Final EIS.

USFS2-26: Comment noted. The EIS, Chapter 17, “Land Use and Planning,” has been revised accordingly.

USFS2-27: Please refer to Master Comment Response FSCABINS-9, “Structure Surveys for USFS Cabins.”

USFS2-28: The EIS Chapter 18, "Recreation," has been clarified to include the proposed modifications to Mariners Point Campground.

USFS2-29: The proposed alignment of Lakeshore drive has been included in the EIS Engineering Summary Appendix, Chapter 4, “Design Considerations for Reservoir Area Infrastructure Modifications and/or Relocations.”

USFS2-30: Text in EIS Chapter 19, “Aesthetics and Visual Resources,” has been corrected to state that there are currently nine marinas on Shasta Lake.

33.6.5 U.S. Department of the Interior, Fish and Wildlife Service, Sacramento Fish and Wildlife Office

USFWS1

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

BUREAU OF RECLAMATION
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to: K Cha

In Reply Refer To
08ESMF00-2013-CPA-0021

Memorandum

To: Regional Director, U.S. Bureau of Reclamation, Mid-Pacific Regional Office, Sacramento, California

From: Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Shasta Lake Water Resources Investigation, Comments on the Draft Environmental Impact Statement

USFWS1-1 This memorandum transmits the U.S. Fish and Wildlife Service's (Service) general comments on the 2013 Draft Environmental Impact Statement (Draft EIS) for the Shasta Lake Water Resources Investigation Project (Project). The Service received the document for review from the U.S. Bureau of Reclamation (Reclamation) on July 1, 2013. The Service limited its review to selected chapters of the Draft EIS, and did not review the Appendices or Attachments.

The majority of the Service's comments have been previously provided to Reclamation during review of the Administrative Draft Environmental Impact Statement (see Service letters of November 14, 2008, March 22, 2011, and March 7, 2013), the Administrative Draft and Draft Feasibility Reports (see Service letters of November 14, 2008 and February 7, 2013), and the Service Planning Aid Memorandum (September 11, 2008).

General Comments

USFWS1-2 **Purpose and Need for Action**
Reclamation should include a Shasta Lake Water Reliability Investigation (SLWRI) alternative that increases water supply reliability and anadromous fish survival without enlarging Shasta Dam. Since Reclamation has stated in the Draft EIS that the purpose and need for the proposed action is to "improve operational flexibility of the Delta watershed system," then an alternative that would accomplish this without enlarging Shasta Dam should be included (Service draft Fish and Wildlife Coordination Act Report [CAR] for the SLWRI, 2008).

SCANNED

Classification	ENV-6.00
Project	214
Control No.	13042598
Folder I.D.	1261130
Date Input & Initials	9-20-13 RM

Use of SALMOD Model

USFWS1-3 Reclamation has used SALMOD to compare the effects of the different alternatives on the different runs of salmon found in the upper Sacramento River downstream of Keswick Dam. SALMOD is a model based on past conditions, assumptions, and limited variables that is used to make hypothetical comparisons between alternatives, including a baseline "No-Action." The SALMOD model has significant limitations for making these kinds of comparisons. SALMOD is not a life-cycle model, it does not account for population trends over time and how those trends may affect annual production. It does not account for habitat conditions downstream of the Red Bluff Pumping Plant (RBPP), including the Sacramento-San Joaquin Delta and ocean. SALMOD uses CalSim II modeling which is based on monthly averages. This temporal scale is coarse and may compound the uncertainties in SALMOD.

USFWS1-4 *"Because no true calibration has been completed for this SALMOD model application, note that simulated outmigration numbers and their attributes are best used not as absolute values, but rather as relative values* (Prager and Mohr 1999). *Even if the model were fully calibrated, measurements for outmigrating salmon are imprecise and subject to poorly understood biases. Further, because this is not a full life cycle model, including complex estuarine and ocean dynamics, nothing is known about what happens to salmon successfully migrating downstream from the RBDD (RBPP), where other density-dependent phenomena may constrain the populations."* (**Interpreting Model Results**, 5-55, Modeling Appendix; Draft EIS, Reclamation 2013).

USFWS1-5 Based on the description of the appropriate use and interpretation of SALMOD results (Chapter 11, page 49) the results of the model appear to be used in a manner not supported by the model. For example, in the Executive Summary, on page ES-26, Table S-2, under **Benefits Related to Project Objectives**, Production Increase numbers are given as, "Average annual increase in juvenile Chinook salmon surviving to migrate downstream from Red Bluff Pumping Plant. Numbers derived from SALMOD." This use of implied specific increases of salmon from the project is not an appropriate use of the SALMOD results. The projections of salmon production increases presented in this table imply population increases that would result from implementation of the project alternative. These numbers are also included in the described benefits of each alternative in Chapter 2. This could easily be misinterpreted by someone who does not fully understand the limitations of the model.

USFWS1-6

USFWS1-7

USFWS1-8 The Service and the California Department of Fish and Wildlife (CDFW) have expressed repeated concerns regarding Reclamation's use of SALMOD in the Service's Planning Aid Memorandum (September 11, 2008), draft CAR for the SLWRI (June 2008), and comments on the draft Feasibility Report for the SLWRI (February 2013); and the CDFW letter of February 3, 2006.

Benefits to Anadromous Fish

USFWS1-9 The Service believes Reclamation is overestimating the potential benefits of the enlargement of Shasta Dam to anadromous fish. As reported in the draft CAR for the SLWRI, only 9-15 percent of the 82 water years modeled appear to show any substantial benefit to salmon. These benefits are limited to alternative CP4 and primarily to winter- and spring-run Chinook salmon. The remaining water years show no substantial benefit and in some water year types a decrease in fish numbers (Table 1). The remaining alternatives (CP1, CP2, CP3, and CP5) show fewer benefits to anadromous fish.

Table 1. Average Percent Increase of Production and Number of Potential Returning Female Spawners, all Runs Combined

Action Alternative	Average Increased Production[1]	Percent of Average Production[2]	Potential Increased Number of Returning Females[3]
CP1	61,300	0.288	153 - 307
CP2	379,200	1.78	948 - 1,896
CP3	207,400	0.975	519 - 1,037
CP4	812,600	3.82	2,032 - 4,063
CP5	377,800	1.78	945 - 1,889

[1] Average increased production according to Reclamation as derived from SALMOD for Action Alternatives (Reclamation 2013)
[2] Average estimated production from 2002 through 2011 of 21,271,465 Chinook salmon fry (B. Poytress, USFWS, *pers. com.* 2013)
[3] Estimated return of 0.5 to 1.0 percent for all runs combined (B. Poytress, USFWS, *pers. com.* 2013)

USFWS1-10 The primary benefit that Reclamation describes as being derived from the dam enlargement for anadromous fish is a larger cold-water pool that would allow Reclamation to better maintain required water temperatures between Keswick Dam and the RBPP.

USFWS1-11 The Service recognizes the importance of water temperature for salmon survival, particularly for the winter- and spring-runs, but there are other factors, such as access to important rearing habitat for juvenile salmon (including floodplains, bypasses, and non-natal tributaries), restoration of downstream fish habitats (including restoration of spawning habitats, shaded riverine aquatic cover and large woody debris), the screening of intakes to eliminate fish entrainment, and flow management that would reduce redd dewatering, that would likely have more substantial effects on the long-term survivability of all anadromous fish in the Sacramento River beyond water temperature (Service draft CAR for the SLWRI, 2008).

USFWS1-12 Reclamation has included riparian/fish habitat restoration in the Draft EIS for both CP4 and CP5. However, the six proposed restoration projects remain conceptual only, and Reclamation has only committed to implementing one restoration project, the remaining five are tentative actions.

Reduced Inundation and High Water Periods

USFWS1-13 Access to, and time spent in, high quality rearing habitat for juvenile fish has been shown to be very important in salmonid survivability.

USFWS1-14 The water management that would go along with the enlargement of Shasta Dam would decrease the inundation flows that provide juvenile salmon access to the floodplains, nonnatal streams and tributaries, and bypasses that provide important

USFWS1-14 CONTD
salmonid rearing habitat. The Service does not see where Reclamation has accounted for these impacts in its analysis of effects to anadromous fish. The reduced high water flows would also

USFWS1-15
affect other fish species that benefit from the inundated floodplains and bypasses such as the Sacramento splittail and delta and longfin smelt.

USFWS1-16
The changes in water management operations as a result of enlarging Shasta Dam would reduce the frequency, duration and magnitude of intermediate to large flows downstream from Shasta Dam during winter and spring in some water years, especially wet and above-normal years.

USFWS1-17
These reduced flows would also adversely affect the diversity of riparian forest along the Sacramento River and the recruitment of cottonwood and willow stands. The long-term reduction of cottonwood and willow recruitment would likely have an adverse effect on the populations of a number of neotropical migratory song birds such as the yellow warbler (a species of concern), least Bell's vireo (federally-listed as threatened), and western yellow-billed cuckoo (a candidate species for federal listing).

Spawning Gravel Augmentation

USFWS1-18
Reclamation proposes that part of the ecosystem enhancement for CP4 and CP5 include 10 years of spawning gravel augmentation within the upper Sacramento River. The locations for these gravel augmentations would be determined later.

USFWS1-19
The 10 year duration of spawning gravel augmentation is too short. The reason that it is necessary to augment spawning gravel in the upper Sacramento River is that Shasta Dam has stopped the natural spawning gravel recruitment process. Without the ongoing injections of spawning gravels, salmon spawning sites would diminish over time because of the effects of the dam. As long as Shasta Dam remains in place, blocking the natural recruitment processes, there will be a need for spawning gravel augmentation.

USFWS1-20
The augmentation of spawning gravel in the upper Sacramento River is an ongoing action being undertaken by a number of programs including Reclamation in compliance with the Central Valley Project Improvement Act (CVPIA).

USFWS1-21
Although the opportunities and benefits derived from additional spawning gravel augmentation on the upper Sacramento River are limited, the Service believes that any action that modifies Shasta Dam should also include a spawning gravel augmentation program that augments spawning gravels downstream of Keswick Dam in perpetuity.

USFWS1-22
Reclamation should also include an endowment designed to fund spawning gravel augmentation for the life of Shasta Dam for all the alternatives.

Modified Flow Management

USFWS1-23
No amount of enhancements to the river habitat aimed at increasing anadromous fish survival will be of any real benefit unless river flow levels are managed in a way that provides sufficient flow when needed for anadromous fish survival.

USFWS1-24
Augmenting spawning gravel and then reducing river flow and causing redds to become dewatered is counterproductive and contrary to the stated intent of the Project.

USFWS1-25
The Service recommends that all action alternatives include operational management criteria that will allow for sufficient flows to substantially reduce the instances of redd dewatering and allow juvenile salmonid access to nonnatal tributaries in the upper Sacramento River.

Increased Reverse Flows in the Delta

USFWS1-26 The Draft EIS indicates that reverse flows will increase in Old and Middle Rivers in the Sacramento-San Joaquin Delta (Delta) as a result of the Project. According to the Draft EIS, the increase of reverse flows would likely have an adverse effect on the Delta smelt (*Hypomesus transpacificus*) and other fish species in the Delta, including an increase in entrainment or salvage at the CVPIA and State Water Project facilities. Reclamation does not sufficiently address these effects in the Draft EIS.

USFWS1-27 Analysis of the proposed project's effects on federally-listed species will be completed with the Service and the National Oceanographic and Atmospheric Administration's National Marine Fisheries Service under section 7 of the Endangered Species Act, as amended (16 U.S.C. §1531 *et seq.*) once a preferred alternative is selected.

Any questions or comments regarding these comments should be directed to Mark Littlefield Chief, Watershed Planning Branch, at (916) 414-6520 or Rocky Montgomery, Senior Fish and Wildlife Biologist at (916) 414-6600.

cc:
Patricia Bratcher, California Department of Fish and Wildlife, Redding, CA
Katrina Chow, Bureau of Reclamation, Sacramento

References

Draft Environmental Impact Statement for Shasta Lake Water Resources Investigation, U. S. Bureau of Reclamation, Mid-Pacific Region, June 2013.

Pers. com.:

Bill Poytress, Program Manager SRFM, U.S. Fish and Wildlife Service, Red Bluff Fish and Wildlife Office.

Responses to Comments from U.S. Department of the Interior, Fish and Wildlife Service, Sacramento Fish and Wildlife Office

USFWS1-1: The commenter referenced comments previously submitted by USFWS on Administrative Draft versions of the SLWRI DEIS. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

USFWS1-2: Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," and Master Comment Response P&N-1, "Purpose and Need and Objectives."

USFWS1-3: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

USFWS1-4: Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," and Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

USFWS1-5: Reclamation disagrees with this comment, and feels that SALMOD has been appropriately used for the purposes of this project, and that the results have been used in a manner supported by SALMOD.

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon."

USFWS1-6: In Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.1, "Methods and Assumptions," SALMOD inputs are described which show that that the same number of spawners is used every year, showing that SALMOD is not a lifecycle model. As described in the DEIS, SALMOD is used to identify the differences among the No-Action Alternative, Existing Conditions and the action alternatives, not to determine a population estimate. By using the same starting number of spawners each year, the fish are exposed to the same conditions under each alternative, and as such, we are able to identify what alternative would provide the best conditions for survival for each run. Averaging the survival over the 82 year simulation period, whether combining or separating by water-year type allows us to show the overall benefits to each run of Chinook salmon of the SLWRI without implying a population estimate.

USFWS1-7: DEIS Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.1, "Methods and Assumptions," and Chapter 5, "SALMOD," of the Modeling Appendix describe the limitations of SALMOD. Based on comments received, clarifications of the limitations were added to both chapters.

USFWS1-8: The commenter referenced comments previously submitted by USFWS and CDFW on Administrative Draft versions of the SLWRI DEIS, Draft Feasibility Report, and through the production of USFWS and CDFW reports. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

USFWS1-9: To respond to this comment, a follow-up conversation with Bill Poytress (USFWS) occurred. The estimates of 0.5 to 1.0 percent for

all runs combined was found to be incorrect and cannot be used to estimate the number of returning females as calculated by the USFWS in this comment. The estimate of 0.5 to 1.0 is the return rate of fall-run Chinook salmon to Coleman Hatchery. Winter-run Chinook salmon have a lower return rate to the Sacramento River. According to CDFW and DWR biologists, there is no correlation between the juvenile to adult return rate for spring-run Chinook salmon, and there is no estimated juvenile to adult return rate for late fall-run Chinook salmon. Therefore, these values presented in the table are considered invalid. However, had the return rates been correct, the returning females would have been as high as over 31,500.

Additionally, the project is primarily intended to improve Chinook salmon survival in critical and dry years, particularly in a drought condition, when they are likely to be most at risk of significant population declines or even extinction. While overall benefits to production when all water year types are combined are insignificant, benefits in dry and critical years are significant. With the added risks of climate change, the benefit of an increased source of cold water adds to the reliability of suitable habitat available for Chinook salmon and other listed fish in the Sacramento River. It is expected that CP4 would have the greatest benefits to Chinook salmon, including both winter-run and spring-run, as it has the greatest focus on a cold water pool for a reliable cool water release to fish during the critical water years. Adding to that, the habitat restoration components provides an additional amount of available habitat necessary to improve conditions that can help increase the number of Chinook salmon and other listed fish in the Sacramento River. By combining all water year types in the calculations made by the USFWS, it mutes the actual benefits of the SLWRI.

USFWS1-10: Please refer to Master Comment Response GEN-1, “Comment Included as Part of the Record.”

USFWS1-11: Please refer to Master Comment Response DSFISH-5, “Fish and Wildlife Coordination Act Report.”

USFWS1-12: Major components of SLWRI action alternatives are described in EIS Chapter 2, “Alternatives,” Section 2.3, “Action Alternatives.” As described in the EIS, under CP4 and CP5, riparian, floodplain, and side channel habitat restoration would occur at one or more of six potential locations along the upper Sacramento River. Potential restoration activities at each site are described in Chapter 2, Section 2.3, “Action Alternatives,” and related construction activities are summarized in Chapter 2, Section 2.3.8, “Comprehensive Plan Construction Activities.” Construction activities for each of the six potential restoration sites are described in more detail in the EIS Engineering Summary Appendix, Chapter 4, “Design Consideration for

Reservoir Area Infrastructure Modifications and/or Relocations," Section "Ecosystem Restoration." For each of the six potential sites the DEIS Engineering Appendix presents the following information:

- Description of site location and potential restoration/enhancement activities
- Maps delineating areas for potential enhancements
- General description of construction activities (e.g., earth moving activities, site access, channel dimensions)
- Estimated construction quantities, including length of modified channel, acreages for vegetation removal and planting, and volumes of excavation and gravel placement

Ground-proofing was performed for each site to confirm site access and feasibility of implementing proposed restoration activities and at each potential site. Additionally, the HEC-RAS hydraulic modelling was used to estimate river stages at different Sacramento River flow rates for the sites to verify hydraulic connectivity. As described above, designs for riparian, floodplain, and side channel habitat restoration at each of the six potential sites were developed to a feasibility level, and this information was included in the Engineering Appendix and summarized in DEIS Chapter 2, "Alternatives."

USFWS1-13: Please refer to Master Comment Response DSFISH-9, "Flow-Related Effects on Fish Species of Concern."

USFWS1-14: As described in Impact Aqua-15 and Impact Aqua-16 in Chapter 11 "Fisheries and Aquatic Ecosystems,", Section 11.33.3 "Direct and Indirect Effects, " the DEIS acknowledges the potential adverse effects of altered flow regimes on the frequency of inundation events that provide juvenile salmonids access to floodplains and other high-quality rearing habitats. Changes in river flow for each alternative, relative to the basis-of-comparison, were used to reflect and evaluate potential impacts to juvenile salmonid rearing habitat that could result from altered flow regimes. For purposes of evaluating the potential effects of changes in Sacramento River flows on fish habitat, and considering the accuracy and inherent noise within the hydrologic model, it was assumed that changes in the average monthly flows less than 5 percent (plus or minus) relative to the basis-of-comparison would not be expected to result in a significant (i.e., detectable) effect on habitat quality or availability. Text was added to the Chapter 11 "Fisheries and Aquatic Ecosystems," Section 11.3.2 "Methods and Assumptions" to clarify the methods.

Please refer to Master Comment Response DSFISH-9, "Flow-Related Effects on Fish Species of Concern."

USFWS1-15: In Chapter 11, "Fisheries and Aquatic Ecosystems," the DEIS acknowledges the potential adverse effects of altered flow regimes on fisheries resources and habitats within the project footprint, including potential impacts to Sacramento splittail, delta smelt, and longfin smelt. Altered flow regimes have the potential to affect these species by affecting quality and access to floodplain and other high-quality spawning and rearing habitats, altering water temperature regimes, increasing entrainment and salvage at Delta export facilities, and increasing the likelihood of reverse flows in the Delta. Effects analyses for these species and these factors are provided in Section 11.3, "Environmental Consequences and Mitigation Measures," of the DEIS. In most instances, potential impacts were found to be less than significant. For those analyses where potential impacts were found to be potentially significant, mitigation in most instances was not proposed because operations will be guided by RPMs or RPAs established by NMFS and USFWS BOs to reduce any impacts to listed fish species, and will thus benefit non-listed fishes as well. In the upper Sacramento River and associated tributaries, altered flow regimes have the potential to significantly impact splittail spawning and rearing habitat; these impacts would be mitigated through implementation of Mitigation Measure BOT-7 and Mitigation Measure Aqua-15.

USFWS1-16: Impact Geo-9: Substantial Increase in Channel Erosion and Meander Migration in Chapter 4, "Geology, Geomorphology, Minerals, and Soils," Section 4.3.3, "Direct and Indirect Effects," describes the characteristics of peak flows, including the duration, magnitude and rate at which flows change downstream from Shasta Dam.

Please refer to Master Comment Response DSFISH-9, "Flow-Related Effects on Fish Species of Concern."

USFWS1-17: Impact Wild-17, "Impacts on Riparian-Associated Special-Status Wildlife Resulting from Modifications to the Existing Flow Regime in the Primary Study" in Chapter 13, "Wildlife Resources," Section 13.3.3, "Direct and Indirect Effects," describes potential impacts of flow modifications on riparian associated special-status wildlife. This impact is considered potentially significant.

USFWS1-18: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

USFWS1-19: Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration."

USFWS1-20: Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration."

USFWS1-21: Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration."

USFWS1-22: Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration."

USFWS1-23: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

USFWS1-24: Please refer to Master Comment Response Master Comment Response DSFISH-3, "Fish Habitat Restoration and DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

USFWS1-25: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

USFWS1-26: Based on the flows identified between January and June, flows rarely become more negative than -5,000. Only in July of critical water years is there any potentially significant change from No-Action or Existing Conditions. This is not enough to be considered a potentially significant impact, particularly to delta smelt, nor was it identified as a significant impact in the DEIS. Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects," describes the impacts to Delta fish resulting from changes to Old and Middle river flows and identifies the level of impact under each alternative as less than significant.

Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

USFWS1-27: Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

33.6.6 U.S. Department of the Interior, Fish and Wildlife Service, Sacramento Fish and Wildlife Office

USFWS2

USFWS2-1 On Mon, Jul 1, 2013 at 11:34 AM, Rocky Montgomery <rocky_montgomery@fws.gov> wrote:

> Hi Katrina,
>
> Can I get a copy of the doc on a disk?
>
> Thanks,

Rocky Montgomery
Senior Biologist, Watershed Planning
Sacramento Fish and Wildlife Office
2800 Cottage Way, Rm. W-2605
Sacramento, CA 95825

Responses to Comment from U.S. Department of the Interior, Fish and Wildlife Service, Sacramento Fish and Wildlife Office

USFWS2-1: A hard copy of the DEIS was sent to Mr. Rocky Montgomery on June 26, 2013, and a DVD of the DEIS was included.

33.6.7 Department of Energy, Western Area Power Administration

WAPA

Department of Energy
Western Area Power Administration
Sierra Nevada Region
114 Parkshore Drive
Folsom, California 95630-4710

SEP 27 2013

Ms. Katrina Chow
Project Manager
Planning Division
Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95258

Dear Ms. Chow:

Western Area Power Administration (Western) appreciates the opportunity to review Reclamation's draft environmental impact statement for the proposed Shasta Lake Water Resources Investigation and is transmitting the following comments.

WAPA-1 In general, at this point in the study process, Western believes that there are too many uncertainties in a number of other ongoing parallel, but inter-related regulatory processes to be able to provide as definitive comments as we'd like on the anticipated outcomes of each alternative future scenario identified in this study. Specifically, the economic and financial feasibility (especially from a cost allocation and repayment ability on the part of the reimbursable project beneficiaries) is going to be especially important in determining the ultimate feasibility of the project.

WAPA-2 Western believes that reduced project accomplishments and increased costs associated with additional regulatory and environmental oversight, resulting in reduced project water accomplishments, have significantly eroded the historic margin between the cost of service and market prices for the Federal hydropower product.

WAPA-3 A recent Department of Interior Inspector General's audit (Report No.WR-EV-BOR-0003-2012 released March 2013) indicated that the irrigation function for the Central Valley Project is currently not on track to fully recover its share of the allocated capital investment costs by the year 2030. The Inspector General found that, if Reclamation was unable to undertake the necessary corrective actions to the rates in a timely manner, the "increases to water contractors ..... could create the potential for rates to exceed irrigation contractors' ability to pay and shift the repayment requirement to power users." If not corrected, and assuming current trends, the projected shortfall could range from a low of $330 million to a high of $390 million. Should this situation be allowed to occur, the overall economic and financial viability of the base Central Valley Project, notwithstanding any new project addition, could be significantly impacted more adversely than what is being assumed in this study.

WAPA-4 The California State Water Resources Control Board (SWRCB) is actively considering new water flow standards in the Sacramento and San Joaquin River systems which when applied to this effort, could also impact not only the timing and reliability, but also the anticipated water and hydropower accomplishments of any proposed dam modification. A final decision in this process will undoubtedly impact the project's water and hydropower accomplishments. Depending on what flow standard is ultimately adopted by the SWRCB, it may be possible that some of the underlying assumptions used to generate the water and hydropower outputs for this study may need to be revisited and/or revised.

WAPA-5 Additionally, Reclamation is currently in the process of reallocating the costs of the "Base" Central Valley Project facilities. The outcome of this effort could potentially affect not only the costs assigned to each authorized project purpose, but in addition, with respect to the power function, have an impact on financial feasibility since Reclamation law allows for the reassignment of any capital investment costs which are beyond the ability of the irrigators to repay to be reassigned for repayment to the preference power customers. Consequently, integrating any new costs associated with this new increment block, especially, if a potential for an irrigation cost reassignment opportunity exists, could add additional new financial burdens on the existing preference power customer base.

WAPA-6 Coupled with increased environmental regulatory oversight on the project (e.g., consultation on a new biological opinion, implementation activities associated with the San Joaquin River Restoration Program, the Central Valley Project Improvement Act implementation activities, bypass releases, as well as other Endangered Species Act consultations), it is more likely than not, that in the future, water and hydropower accomplishments for the project, even given this new project addition, will decrease, impacting the price competitiveness of the Federal hydropower product, as the per unit cost of the water and hydropower product from the project could increase.

WAPA-7 We noted with some interest that the report stated that existing hydropower facilities would need to be modified in order to enable them to continue to be able to take full advantage of the increased hydropower generation capability associated with each proposed project enlargement alternative.

WAPA-8 We understand the desire of Reclamation to move forward. However, as Reclamation finalizes its feasibility report and moves to the next step in the process, Reclamation may want to consider revisiting the various future alternatives to ensure that the assumptions used in the analysis continue to make sense, are still relevant, and are consistent with any real-time changes which may be occurring in any ongoing parallel regulatory processes.

WAPA-9 Particular attention may need to be paid to the economic and financial feasibility aspects of the project, as projected accomplishments are going to drive the ultimate decision as to whether to proceed with the project.

WAPA-9 CONTD

The viability of the project is contingent on project accomplishments and are going to be highly correlated to the various outcomes of the ongoing parallel processes that are currently underway. Consequently, when re-estimating benefit-cost ratios and attendant cost allocation and financial repayment responsibilities, Reclamation needs to ensure that it either has established a realistic environmental baseline on which to assess impacts, or in the alternative, to ensure that the baseline continues to make sense if a decision is made to move forward with this project.

Thank you for the opportunity to provide comments. We look forward to continuing to work and provide comments on your work products in the future.

Sincerely,

Sonja A Anderson

Sonja Anderson
Power Marketing Manager

Responses to Comments from Department of Energy, Western Area Power Administration

WAPA-1: Please see Master Comment Response COST/BEN-5, "Potential Project Financing." As described in COST/BEN-5, evaluations in the SLWRI Final Feasibility Report related to economic and financial feasibility, including preliminary cost allocation and potential water beneficiaries' payment capacities, were updated based on alternatives refinements and updated operational assumptions included in the SLWRI DEIS.

WAPA-2: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

WAPA-3: Thank you for your comment related to historical CVP repayment and potential project beneficiaries' payment capacity. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

Please refer to Master Comment Response COST/BEN-5, "Potential Project Financing."

WAPA-4: Please refer to Master Comment Response GEN-4, "Best Available Information," and Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability."

WAPA-5: Thank you for your comment related to historical CVP repayment and potential project beneficiaries' payment capacity. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

Please refer to Master Comment Response COST/BEN-5, "Potential Project Financing."

WAPA-6: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," and Master Comment Response ALTS-1, "Alternative Selection."

WAPA-7: Please refer to EIS Engineering Appendix for further information on potential modifications to hydropower under SLWRI project alternatives.

WAPA-8: Comment Noted. Section 32.7, "Next Steps," of Chapter 32, "Final EIS," discusses the next steps for SLWRI.

WAPA-9: As described in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.2.3, "Methods and Assumptions," quantitative evaluations of beneficial and adverse effects of alternatives in the EIS, consistent with NEPA and CEQA guidelines, were based on two baselines:

- "Existing Conditions," based on a 2005 level of development and current facilities, as defined in 2012 (a 2005 baseline)
- "Future Conditions" based on without-project forecasted 2020-2030 level of development and reasonably foreseeable future projects and facilities (a 2030 baseline)[1]

Both the existing and future condition baselines include operational requirements in the 2008 OCAP BA, 2008 USFWS BO, and 2009 NMFS BO. Specific facilities and operational assumptions under each baseline are described in EIS Chapter 6, "Hydrology, Hydraulics, and Water Management," and the Modeling Appendix, Chapter 2, "CalSim-II."

Evaluations of direct and indirect effects in each resource area chapter (EIS chapters 4 through 25) are based on comparisons of with-project and without project conditions under both existing conditions and future conditions baselines, as well as comparisons of the No-Action Alternative to existing conditions.

[1] The level of development used for future conditions is a composite of multiple land use scenarios developed by DWR and Reclamation. The Sacramento Valley hydrology, which includes the Sacramento and Feather River basins, is based on projected 2020 land use assumptions associated with DWR Bulletin 160-98 (1998) and the San Joaquin Valley hydrology is based on the 2030 land use assumptions developed by Reclamation. Under any 2020 to 2030 level of development scenario, the majority of the CVP and SWP unmet demand is located south of the Delta, including the San Joaquin Valley. Please see Table 2-1 in the Modeling Appendix for additional information on CalSim-II modeling assumptions.

As described in COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," evaluations of economic and financial feasibility were not included in the DEIS, because they are not required under NEPA. However, estimated non-monetized benefits are presented in EIS Chapter 2, "Alternatives," Section 2.3, "Action Alternatives," and Section 2.5, "Summary of Potential Benefits of Action Alternatives." Estimated non-monetized benefits presented in the DEIS were determined by comparison of the with-project condition to the No-Action Alternative, both under future conditions, consistent with the Federal planning process identified in the P&Gs.

Please refer to Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," and Master Comment Response COST/BEN-5, "Potential Project Financing."

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33.7 Comments from Tribes and Responses

This section contains copies of comment letters (and any attachments) from the tribes listed in Table 33.7-1. As noted previously, each comment in the comment letters was assigned a number, in sequential order (note that some letters may have more than one comment). The numbers were then combined with an abbreviation for the tribe (example: SICBI-1).

Responses to the comments follow the comment letters, and are also numbered, corresponding to the numbers assigned in the letters. The letters and associated responses are sorted alphabetically by abbreviation and appear in this section in that order.

Table 33.7-1. Tribes Providing Comments on Draft Environmental Impact Statement

Abbreviation	Tribe
BARR	Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians
SYBCI	Santa Ynez Band of Chumash Indians
UAICAR	United Auburn Indian Community of the Auburn Rancheria

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33.7.1 Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians

BARR

BISON CONNECT

Sacred Lands

1 message

Doug Barrett <DBarrett@ctclusi.org> Mon, Sep 30, 2013 at 9:04 AM
To: "BOR-MPR-SLWRI@usbr.gov" <BOR-MPR-SLWRI@usbr.gov>

BARR-1 Why does the government allow this to still happen to native people? If you allow this to happen, it will once again desecrate and bury the tribes land once again. In ten years or less, there will be 60 feet of contaminated sludge at the bottom of the
BARR-2 dam. Instead of removing that, you will build the dam higher? Why not take the existing sludge out for allot cheaper and truck it to the Umatilla dump site to cover the barrels of radioactive material already there? Someone needs to do what is right, don't build the dam higher! Make LA pay for their water and remove the
BARR-3 sludge caused by your dam and greed!
Again, please do the right thing!

Thank You,
Doug

Sent from my iPhone

Doug Barrett CADC 1, CPS
Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians
1245 Fulton Ave.
Coos Bay OR 97420

this email. You are hereby notified that any dissemination, misuse or copying or disclosure of the communication by a recipient who has received this message in error is strictly prohibited. If this message is received in error, please return this email to the sender and immediately highlight any error in transmittal. Thank You

Response to Comments from Confederated Tribes of Coos, Lower Umpqua & Siuslaw Indians

BARR-1: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources."

BARR-2: Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability."

BARR-3: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

33.7.2 Santa Ynez Band of Chumash Indians

SYBCI

Fw: Shasta Dam Comment Letter

Freddie Romero <freddyromero1959@yahoo.com> Mon, Sep 30, 2013 at 12:04 PM
Reply-To: Freddie Romero <freddyromero1959@yahoo.com>
To: "BOR-MPR-SLWRI@usbr.gov" <BOR-MPR-SLWRI@usbr.gov>

Ms. Chow,

I am resending this. I had the incorrect e-mail adress.

If you could confirm that you recieved this, I would very much appreciate it.

Freddie Romero
Cultural Preservation Consultant
SYBCI Elders Council
805-688-7997 X37
----- Forwarded Message -----
From: Freddie Romero <freddyromero1959@yahoo.com>
To: "SLWRI@usbr.gov" <SLWRI@usbr.gov>; Winnemem Wintu <winnememwintutribe@gmail.com>
Sent: Monday, September 30, 2013 10:45 AM
Subject: Shasta Dam Comment Letter

Ms. Chow,

I would like to submmit my comment letter for the record on the above mentioned proposed project.

Freddie Romero
Cultural Preservation Consultant
SYBCI Elders Council
805-688-7997 X4109
----- Forwarded Message -----
From: SYBMI Copier 1 <copier1@santaynezchumash.org>
To: freddyromero1959@yahoo.com
Sent: Monday, September 30, 2013 10:37 AM
Subject: Send data from MFP07309817 09/30/2013 10:37

Scanned from MFP07309817

Date: 09/30/2013 10:37
Pages: 4
Resolution: 200x200 DPI

DOC093013-09302013103752.pdf
141K

September 30, 2013

Ms. Katrina Chow, Project Manager
United States Bureau of Reclamation

Re: Shasta Damn Proposed Raising

Ms. Chow,

SYBCI-1 I would like to add my voice in support of opposition to this proposed project. The Winnemem Wintu tribe is a tribe that lived and occupied these northern lands for thousands of years. They have created a complete and complex society of sustainability within their territory.

The have created and designed their own government according to traditional values, religious and sacred practices, along with shrine and ceremonial sites, established villages with place names, food gathering and hunting locations, and cemeteries.

SYBCI-2 The Winnemem Wintu tribe is an indigenous group of individuals that is recognized by other indigenous nations within North America and is anticipating the formal re-recognition by the US government. But due to a lack of recognition by the US Government does not diminish the fact that the Winnemem Wintu has ties to these lands and established sacred and ceremonial areas that would be directly affected by this proposed project.

I would ask that your agency consider the following statement made by US Supreme Court Justice Brennan;

U.S. Supreme Court Justice Brennan in his dissent in LYNG v. NORTHWEST INDIAN CEMETERY PROT. ASSN., 485 U.S. 439 (1988) continues:

SYBCI-3

> In marked contrast to traditional Western religions, the belief systems of Native Americans do not rely on doctrines, creeds, or dogmas. Established or universal truths - the mainstay of Western religions - play no part in Indian faith. Ceremonies are communal efforts undertaken for specific purposes in accordance with instructions handed down from generation to generation. Commentaries on or interpretations of the rituals themselves are deemed absolute violations of the ceremonies, whose value lies not in their ability to explain the natural world or to enlighten individual believers but in their efficacy as protectors and enhancers of tribal existence. Ibid. Where dogma lies at the heart of Western religions, Native American faith is inextricably [485 U.S. 439, 461] bound to the use of land. The site-specific nature of Indian religious practice derives from the Native American perception that land is itself a sacred, living being. See Suagee, American Indian Religious Freedom and Cultural Resources Management: Protecting Mother Earth's Caretakers, 10 Am. Ind. L. Rev. 1, 10 (1982).

SYBCI-3 CONTD

Rituals are performed in prescribed locations not merely as a matter of traditional orthodoxy, but because land, like all other living things, is unique, and specific sites possess different spiritual properties and significance. Within this belief system, therefore, land is not fungible; indeed, at the time of the Spanish colonization of the American Southwest, "all . . . Indians held in some form a belief in a sacred and indissoluble bond between themselves and the land in which their settlements were located." E. Spicer, Cycles of Conquest: The Impact of Spain, Mexico, and the United States on the Indians of the Southwest, 1533-1960, p. 576 (1962).

SYBCI-4

As a federal agency and although the Winnemem Wintu does not have Federal Recognition status, under Sec106 the federal agency is still obligated to consult with them as a stakeholder CFR 36 part 800.2 (5)(1) Sec106 also states that in your ROD you need to show that adverse affects to cultural and heritage sites were mitigated. See the following;

SYBCI-5

(2) Record of Decision Must Mitigate any Impacts to Cultural Resources (copied from **http://www.npi.org/NEPA/impact)**

Once the EIS analysis has resulted in a draft environmental impact statement (DEIS), it is subjected to public and agency review, and comments are addressed – this may require further analysis. Then, assuming the project has not been abandoned, or so changed that a supplemental DEIS is needed, a final EIS (FEIS) is prepared and published. The FEIS is considered in making the agency's decision about whether and how to proceed with the action that was the subject of the EIS. This decision is recorded in a Record of Decision (ROD). According to 40 CFR 1505.2, the ROD must:

- State what the decision was.
- Identify all alternatives considered.
- Specify the alternative or alternatives considered to be "environmentally preferable." (Note that the agency does not have to select the environmentally preferable alternative, but it does have to discuss what it is.)
- Identify and discuss the factors balanced in making the decision (whether for or against the environmentally preferable alternative).
- State whether "all practicable means to avoid or minimize environmental harm . . . have been adopted, and if not, why they were not."

Having notified the world of its decision, the agency implements it. In doing so, it must carry out any mitigation, i.e., "means to avoid or minimize environmental harm," it has said in the ROD or EIS that it will carry out (40 CFR 1505.3).

SYBCI-6 The Winnemem Wintu Tribe has identified sacred sites and sustainability areas within the project area that would be directly affected by this proposed project significantly, negatively, and for the long term. Those impacts constitute a significant adverse impact and may require additional analysis prior to approval or permitting of this project. I would ask that this be carefully considered and that a decision not be hastily made.

I would ask that the Bureau of Reclamation consider President Obama's and ACHP's view for recognition of the UN Declaration of Rights of Indigenous Peoples;

SYBCI-7 In December 2010, the United States announced support for the **United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and the ACHP in 2012**. In announcing this support, President Obama stated: "The aspirations it affirms—including the respect for the institutions and rich cultures of Native peoples—are one we must always seek to fulfill…[W]hat matters far more than any resolution or declaration – are actions to match those words." The UNDRIP addresses indigenous peoples' rights to maintain culture and traditions (Article 11); and religious traditions, customs, and ceremonies (Article 12); to participate in decision making in matters which would affect their rights (Article 18); and to maintain spiritual connections to traditionally owned lands (Article 25).

I would like you also to look at the connection between Sec106 and EO 13007 according to the ACHP;

The Advisory Council on Historic Preservation (ACHP) has explained
"The Relationship Between Executive Order 13007 Regarding Indian Sacred Sites and Section 106,"
http://www.achp.gov/eo13007-106.html

SYBCI-8

> To the extent that the requirements of the executive order and ACHP's regulations are similar, Federal agencies can use the Section 106 review process to ensure that the requirements of E.O. 13007 are fulfilled. For example, E.O. 13007 requires that agencies contact Indian tribes regarding effects and the Section 106 regulations require consultation with Indian tribes to identify and resolve adverse effects to historic properties.
>
> Consultation regarding the identification and evaluation of historic properties of religious and cultural significance to an Indian tribe could include identification of those properties that are also sacred sites. Similarly, consultation to address adverse effects to such historic properties/sacred sites could include discussions regarding access and ceremonial use.

SYBCI-9 The raising of this dam will also have a direct negative affect on the salmon population which has struggled since the inception and development of dams in this country, not to mention the economy. Efforts over the years and millions, if not billions of federal dollars, not to mention State dollars have been used in the recovering efforts of the salmon population.

SYBCI-10 This a 10 million plus dollar project that may end up cost the people of this country even more in the long run in jobs (due to impacts on fishing, sport and commercial), restoration, analysis, and recovery cost to offset the loss of salmon downstream from this project.

SYBCI-11 Without additional comments and Federal law being added and creating a convoluted letter, I ask that you agency would respect the Winnemem Wintu people and truly reconsider any approval of this proposal.

Sincerely,

Freddie R. Romero
Cultural Preservation Consultant
Santa Ynez Band of Chumash Indians
Elders Council
805-688-7997 X4109

Response to Comments from Santa Ynez Band of Chumash Indians

SYBCI-1: Thank you for your input. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project. A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR 1503.4). Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process.

SYBCI-2: Please refer to Master Comment Response CR-2, "Federal Recognition." Chapter 14, “Cultural Resources,” describes the relationship of the Winnemem Wintu tribe with the Shasta Lake region including the use of sacred and ceremonial sites. Refer to Master Comment Response CR-1, “Potential Effects to Cultural Resources,” the Winnemem Wintu would be included in the consultation processes regarding potential effects and measures to avoid, minimize, or mitigate effects to these resources as discussed in Chapter 14, “Cultural Resources.”

SYBCI-3: Thank you for sharing your insights. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project. A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR 1503.4). Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process.

SYBCI-4: Please refer to Master Comment Response CR-1, “Potential Effects to Cultural Resources,” Master Comment Response CR-2, “Federal Recognition,” and Master Comment Response CR-15, “National Historic Preservation Act Section 106 Consultations.”

SYBCI-5: Please refer to Master Comment Response CR-1, “Potential Effects to Cultural Resources,” and Master Comment Response CR-11, “Cultural Resources and NEPA.”

SYBCI-6: Please refer to Master Comment Response CR-1, “Potential Effects to Cultural Resources,” Master Comment Response CR-11, “Cultural Resources and NEPA,” and Master Comment Response CR-15, “National Historic Preservation Act Section 106 Consultations.”

SYBCI-7: Please refer to Master Comment Response CR-6, “United Nations Declaration on ‘The Rights of Indigenous Peoples.’”

SYBCI-8: Chapter 14, “Cultural Resources,” of this Final EIS has been revised in response to comment to further describe Executive Order 13007.

Please refer to Master Comment Response CR-1, “Potential Effects to Cultural Resources,” Master Comment Response CR-11, "Cultural Resources and NEPA,” and Master Comment Response CR-15, "National Historic Preservation Act Section 106 Consultations.”

SYBCI-9: Please refer to Master Comment Response DSFISH-3, “Fish Habitat Restoration,” Master Comment Response DSFISH-5, “Fish and Wildlife Coordination Act Report,” and Master Comment Response DSFISH-6, “Historic Dam Effects on Fisheries.”

SYBCI-10: Effects to Chinook salmon, including beneficial effects, are discussed in EIS Chapter 11, “Fisheries and Aquatic Ecosystems,” Section 11.3.3, “Direct and Indirect Effects.” As described in the EIS, all action alternatives would generally result in improved flow and water temperature conditions for Chinook salmon in the upper Sacramento River downstream from Shasta Dam. This would benefit anadromous fish survival in the upper Sacramento River.

Please refer to Master Comment Response COST/BEN-1, “Intent of EIS and Process to Determine Federal Interest.”

SYBCI-11: Thank you for your input. A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR 1503.4). Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

33.7.3 United Auburn Indian Community of the Auburn Rancheria

UAICAR

From: **Marcos Guerrero** <mguerrero@auburnrancheria.com>
Date: Mon, Aug 19, 2013 at 9:35 AM
Subject: Shasta Lake Draft EIS
To: "kchow@usbr.gov" <kchow@usbr.gov>
Cc: TribalpreservationDG <TribalpreservationDG@auburnrancheria.com>

Hello Ms. Chow,

UAICAR-1 In order to accurately assess the potential for your project to impact Native American resources I would like to take a look at the cultural resources inventory and management reports. This includes any survey, evaluation, or mitigation reports, include but not limited to PAs, MOA, HPTPs, and HPMPs.

Thanks you for your patience,

With respect,

Marcos Guerrero, RPA, THPO
Cultural Resources Manager
United Auburn Indian Community of the Auburn Rancheria
10720 Indian Hill Road
Auburn, CA 95603
Office: (530) 883-2364
Cell: (916) 300-8792
Fax: (530) 885-5476

Response to Comments from United Auburn Indian Community of the Auburn Rancheria

UAICAR-1: The Cultural Resources Technical Report is a confidential report of the EIS. Because the report contains sensitive information for other tribal entities this information cannot be provided. Chapter 14, "Cultural Resources," contains a summary of the information presented in the technical report. At this time Historic Properties Management Plans, Historic Properties Treatment Plans, Memorandums of Agreement, and Programmatic Agreements have not been developed. As discussed in Chapter 14 and Master Comment Response CR-1, "Potential Effects to Cultural Resources," additional NHPA Section 106 consultations will be initiated should an affirmative alternative be selected. Agreement documents will likely result from those consultations.

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33.8 Comments from State Agencies and Responses

This section contains a copy of comment letters (and any attachments) from the State government agencies listed in Table 33.8-1. As noted previously, each comment in the comment letters was assigned a number, in sequential order (note that some letters may have more than one comment). The numbers were then combined with an abbreviation for the State agency (example: DFW-1).

Responses to the comments follow the comment letters, and are also numbered, corresponding to the numbers assigned in the letters. The letters and associated responses are sorted alphabetically by abbreviation and appear in the section in that order.

Table 33.8-1. State Agencies Providing Comments on Draft Environmental Impact Statement

Abbreviation	Agency
CTRAN1	California Department of Transportation
CTRAN2	California Department of Transportation
CVFPB1	Central Valley Flood Protection Board
CVFPB2	Central Valley Flood Protection Board
CVRWQCB	Central Valley Regional Water Quality Control Board
DFW	Department of Fish and Wildlife
DSC1	Delta Stewardship Council
DSC2	Delta Stewardship Council
DWR	Department of Water Resources
SRCAF	Sacramento River Conservation Area Forum
SRCAF2	Sacramento River Conservation Area Forum
SRTA	Shasta Regional Transportation Agency
SWRCB	State Water Resources Control Board

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33.8.1 California Department of Transportation

CTRAN1

From: "Stoughton, David W@DOT" <david.stoughton@dot.ca.gov>
Date: July 18, 2013, 2:29:50 PM PDT
To: "kchow@usbr.gov" <kchow@usbr.gov>
Cc: "Flora, Kevin S@DOT" <kevin.flora@dot.ca.gov>
Subject: Lake Shasta meeting yesterday

Good afternoon Katrina,

CTRAN1-1

I enjoyed meeting you the other day here in Sacramento at the public review and comment meeting on the Lake Shasta EIS. Before the meeting I had a chance to review a few of the chapters that might be relevant to what I do at Caltrans……2d hydraulic modeling at bridge sites on state routes. You mentioned that what might be more helpful for me to review is the Environmental Feasibility Study done in 2012….I was wondering if you would be able to send a copy of that to me?

I realize you're probably on the road, so no worries if you can't get to it right away. I'll be out of town starting tomorrow and will be back on July 29th. The business card I gave you has our mailing address on it, but just so you use the right one, our address is:

Dave Stoughton
Structure Maintenance & Investigations, MS 9-1/9I
1801 30th Street
Sacramento, CA 95816-8041

Thanks for your time,

Dave

David Stoughton, PE
Structure Hydraulics
Structure Maintenance & Investigations
(916) 227-8015

Responses to Comment from California Department of Transportation

CTRAN1-1: The requested information was sent to the commenter.

33.8.2 California Department of Transportation

CTRAN2

STATE OF CALIFORNIA - CALIFORNIA STATE TRANSPORTATION AGENCY — Edmund G. Brown Jr. Governor

DEPARTMENT OF TRANSPORTATION
OFFICE OF COMMUNITY PLANNING
1657 RIVERSIDE DRIVE
REDDING, CA 96001
PHONE (530) 229-0517
FAX (530) 225-3020

Flex your power!
Be energy efficient!

September 19, 2013

IGR/CEQA Review
Sha-Admin
Shasta Lake Water Resources Investigation
Draft Environmental Impact Statement
SCH# 2013082040

Ms. Katrina Chow
Bureau of Reclamation
2800 Cottage Way, MP-700
Sacramento, CA 95825-1893

Dear Ms. Chow:

Thank you for the opportunity to review the Shasta Lake Water Resources Investigation Draft Environmental Impact Statement (DEIS) to consider five alternatives to raise Shasta Dam.

CTRAN2-1 Our concerns relate primarily to traffic and circulation impacts. Impact Trans -5 recognizes that accelerated degradation of surface transportation facilities in the primary study area may occur (p. ES-113, 20-34). This impact is potentially significant to State Route (SR) 151 (Shasta Dam Boulevard) that begins at Shasta Dam and ends at Interstate 5 (I-5), 6.9 miles away. Other routes that could be affected include I-5, SR 273, SR 299, and SR 44. The impact will depend on where material sources will be transported from. As described in the DEIS, 95-177 truck trips per day for 4.5 to 5 years would occur with a maximum haul route distance of up to 20 miles (p. 20-9). We agree with Mitigation Measure Trans-5 to identify and repair roadway segments damaged by the project.

CTRAN2-2 We also suggest that prior to commencing operations a pre-project condition report of the roadway segments should be prepared to document the before construction roadway conditions.

CTRAN2-3 Based on the potential impact to the aforementioned routes, we agree that the contractor(s) shall notify the owner of the right of way (ROW) in writing and request conditional approval to use the ROW as a haul route. Before commencement of hauling activities the contractor(s) shall implement the conditions of approval for use of the haul route ROW. Conditions may include constructing repairs to damaged lengths of roadway or the payment of fees to compensate for roadway wear resulting from truck trips (pp. 20-52, 53).

CTRAN2-4 Caltrans is the owner/operator of the State routes and requests that an interagency meeting be required to agree on a maintenance agreement for the routes impacted by the project.

CTRAN2-5 I-5/Pit River Bridge - The alternatives address bridge pier and bearing protection modifications to the I-5/Pit River Bridge. These modifications would provide protection to the bearings and are more fully described in the Engineering Summary Appendix (pp 4-12-14). However, the modifications would result in added maintenance responsibilities. We request that an interagency meeting be required to agree upon a maintenance agreement for the new facilities proposed to modify the I-5/Pit River Bridge.

CTRAN2-6 Scenic Highways - Page 19-73 states that both I-5 and SR 151 are designated as State Routes eligible for official scenic highway designation. SR 151 is a State designated scenic highway, please correct this reference. The correct reference is made on page 19-84.

"Caltrans improves mobility across California"

Ms. Katrina Chow
Shasta Lake Water Resources Investigation
Draft Environmental Impact Statement
SCH# 2013082040
September 19, 2013
Page 2

If you have any questions, or if the scope of this project changes, please call me at (530) 225-3369.

Sincerely,

MARCELINO GONZALEZ
Local Development Review
Office of Community Planning
District 2

Responses to Comments from California Department of Transportation

CTRAN2-1: The commenter's support for Mitigation Measure Trans-5 is noted. No revisions to the DEIS are required.

CTRAN2-2: Mitigation Measure Trans-5 on page 20-52 has been revised as requested.

CTRAN2-3: The commenter's support for Mitigation Measure Trans-5 is noted. No revisions to the DEIS are required.

CTRAN2-4: Reclamation commits to interagency meetings with Caltrans before the start of construction if the action is approved by Congress.

CTRAN2-5: Reclamation commits to interagency meetings with Caltrans before the start of construction if the action is approved by Congress.

CTRAN2-6: Chapter 19, "Aesthetics and Visual Resources," Section 19.1.1, "Visual Environment," will be revised in the Final EIS to reflect that State Route 151 is a State designated scenic highway.

33.8.3 Central Valley Flood Protection Board

10/23/13 DEPARTMENT OF THE INTERIOR Mail - Fwd: Shasta Lake Water Resources Investigation Draft Environmental Impact Statement (DEIS) June 2013 (D...

CVFPB1

Fwd: Shasta Lake Water Resources Investigation Draft Environmental Impact Statement (DEIS) June 2013 (Document Number: 2013-15659)

KATRINA CHOW <kchow@usbr.gov> Wed, Oct 23, 2013 at 1:08 PM
To: KATHLEEN DUNCAN <kduncan@usbr.gov>

Sent from my iPhone

Begin forwarded message:

From: "Herota, James@DWR" <James.Herota@water.ca.gov>
Date: September 30, 2013, 4:55:08 PM PDT
To: "KChow@usbr.gov" <KChow@usbr.gov>
Cc: "Butler, Eric@DWR" <Eric.Butler@water.ca.gov>
Subject: Shasta Lake Water Resources Investigation Draft Environmental Impact Statement (DEIS) June 2013 (Document Number: 2013-15659)

Dear Ms. Chow,

CVFPB1-1 Please accept this update, staff of the California Central Valley Flood Protection Board are finalizing comments on the Shasta Lake Water Resources Investigation Draft Environmental Impact Statement (DEIS) June 2013 (78 Federal Register 39315; Document Number: 2013-15659). The comment letter will be submitted tomorrow.

Sincerely,

James Herota

Senior Environmental Scientist

Central Valley Flood Protection Board

(916) 574-0651

James.Herota@water.ca.gov

Responses to Comment from Central Valley Flood Protection Board

CVFPB1-1: Comment noted.

33.8.4 Central Valley Flood Protection Board

CVFPB2

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., GOVERNOR

CENTRAL VALLEY FLOOD PROTECTION BOARD
3310 El Camino Ave., Rm. 151
SACRAMENTO, CA 95821
(916) 574-0609 FAX: (916) 574-0682
PERMITS: (916) 574-2380 FAX: (916) 574-0682

OCT 24 2013

KDuncan
23 Oct 13
to: KChow

September 30, 2013

Ms. Katrina Chow
Bureau of Reclamation
2800 Cottage Way
Sacramento, California 95825

Subject: Shasta Lake Water Resources Investigation
Draft Environmental Impact Statement (DEIS) June 2013;
78 Federal Register 39315; Document Number: 2013-15659

Dear Ms. Chow:

The Central Valley Flood Protection Board (Board) staff appreciates the opportunity to review and comment on the subject document.

CVFPB2-1 Resources project is intended to improve operational flexibility of the Delta watershed system through modifying the existing Shasta Dam and Reservoir.

CVFPB2-2 Our comments are intended to clarify the Board's authority for regulatory compliance. Shasta Dam and Lake are part of the Central Valley Project, which is exempt from Board jurisdiction per California Code of Regulations, Title 23 (CCR 23) Section 2(c) and (d).

CVFPB2-3 The Board may, however, have concerns about adverse flooding impacts downstream of Keswick Dam, along the Sacramento River to the Delta, due to sedimentation, erosion, and modified ecosystem resource impacts from operation of the proposed project.

CVFPB2-4 As a result, the Board may require encroachment permits to be obtained by State agencies, non-federal, and non-government agencies.

Regulatory Compliance

CVFPB2-5 According to the Regulatory Framework, as described in the project's Draft Environmental Impact Statement (DEIS) on page 3-60, "*Under CCR Title 23, the Central Valley Flood Protection Board (formerly called the State of California Reclamation Board), issues encroachment permits to maintain the integrity and safety of flood control project levees and floodways that were constructed according to the flood control plans adopted by the board or the California Legislature.*" This description only partially describes the Board's authority.

Recommendation – Board staff recommends revising this description as follows:

- The Board enforces standards for the construction, maintenance, and protection of adopted flood control plans that will protect public lands from floods. The jurisdiction of the Board includes the Central Valley, including all tributaries and distributaries of the Sacramento River, the San Joaquin River, and designated floodways (California Code of Regulations, Title 23, Section 2). The Board has all the responsibilities and authorities

necessary to oversee future modifications as approved by the U.S. Army Corps of Engineers (Corps) pursuant to assurance agreements with the Corps and the Corps' Operation and Maintenance Manuals under Title 33 Code of Federal Regulations, Section 208.10 and Title 33 United States Code, Section 408.

CVFPB2-5 CONTD

The Board, in cooperation with the Corps, is responsible for controlling flooding along the Sacramento and San Joaquin Rivers and their tributaries. The Board maintains the integrity of the existing flood control system and designated floodways through its regulatory authority by issuing permits for encroachments. Construction and habitat restoration projects within the jurisdiction of the Board are required to meet standards for the construction, maintenance, and protection of adopted plans of flood control that will protect public lands from floods. The State, through the Board, shares in the costs of construction, assumes responsibility for ensuring the operation and maintenance of the facilities, and holds the federal government harmless from liability. For the Board's flood management projects, the Board delegates operation and maintenance to the Department of Water Resources (DWR), or local maintaining agencies.

Effects on Flood Flows

1. Impacts to Regulated Streams

The DEIS discusses the potential impacts on biological resources, however, it fails to analyze impacts to regulated streams under Board jurisdiction in accordance with CCR 23, Section 112, including the Sacramento River below Keswick Dam and the tributaries to the Sacramento River between Keswick Dam and Red Bluff. These streams include Battle Creek (Tehama County), Bear Creek (reach within designated floodway of the Sacramento River), Clear Creek (Sacramento River to Whiskeytown Dam), Cow Creek (Shasta County to 0.6 miles upstream of Millville Plains Road), Cottonwood Creek (Shasta and Tehama county border to Dutch Gulch Dam), and Cottonwood Creek South Fork (Tehama County).

CVFPB2-6

Recommendation – Board staff recommends that the DEIS analyze impacts to regulated streams under Board jurisdiction in accordance with CCR 23, Section 112.

2. Impacts due to Mitigation Measure Geo-2 (CP2)

According to DEIS Mitigation Measure Geo-2 (CP2), page 4-97: *"Replace Lost Ecological Functions of Aquatic Habitats by Restoring Existing Degraded Aquatic Habitats in the Vicinity of the Impact. The loss of 18.5 miles of intermittent and perennial streams (including 6.2 miles of streams with a gradient less than 7 percent) will be mitigated by compensating for the impact by replacing or providing substitute resources or environments. Compensation will be accomplished by restoring and enhancing the aquatic functions of existing, degraded aquatic habitats in or near the Shasta Lake and vicinity area. Examples of techniques that may be used include channel and bank stabilization, channel redirection, channel reconstruction, culvert replacement and elimination of barriers to fish passage, and enhancement of habitat physical structure (e.g., placement of woody debris, rocks). The nature and extent of the restoration and enhancement activities will be based on an assessment of the ecological functions that are lost as a consequence of implementing this alternative. Implementation of this mitigation measure would reduce Impact Geo-2 (CP1) to a less-than-significant level."*

CVFPB2-7

The DEIS includes mitigation measures that may have adverse impacts on flood flows in waterways under Board jurisdiction. It is foreseeable that implementation of these mitigation measures may result in significant adverse impacts to flood flows.

CVFPB2-7 CONTD **Recommendation** – Board staff recommends revising Mitigation Measure Geo-2 to include a long term management plan to manage flood flows during peak flood conditions to minimize flood damage. Riparian preservation and enhancement in mitigation areas within floodways may expose people or structures to potential substantial adverse effects, including the risk of loss, or injury, or death. The long term management plan should include a Safe Harbor Agreement that would allow the channel and levee maintaining agencies to conduct maintenance in the event of the need for take of covered or listed species due to required maintenance.

3. Impacts due to Mitigation Strategy under Development

Page 1-35 of the DEIS states *"Off-Site Mitigation for Impacts on Biological Resources, Details about off-site opportunities to mitigate impacts on biological resources in the primary study area are not yet available. Potential mitigation lands containing wetland and special-status species habitat comparable to those that would be affected by the project have been identified near the study area. A comprehensive mitigation strategy is currently under development. Additional discussion of how these lands may be applied as mitigation and at what ratios will be provided in future documents. A discussion of mitigation for loss of habitat through preservation and enhancement in mitigation areas will be included in future documents."*

CVFPB2-8

Because the comprehensive mitigation strategy is not yet available for review, Board staff is unable to determine whether feasible alternatives or mitigation measures will be presented to lessen adverse impacts on flood flows.

Request – Board staff requests that you provide the comprehensive mitigation strategy to Board staff for review upon its completion. Additional mitigation measures for channel and levee improvements and maintenance to prevent and/or reduce hydraulic impacts may be required.

4. Impacts due to Change in Flow Regimes

Page 11-72 of the DEIS states, *"By altering reservoir storage and releases, the project would change flow regimes in downstream waterways. In turn, these alterations to the flow regime could affect fishery resources and important ecological processes on which the fish community depends, particularly their instream and seasonal floodplain habitats along waterways immediately downstream from reservoirs."*

CVFPB2-9

Board staff is concerned about the potential for increased sedimentation and erosion within floodways under Board's jurisdiction due to direct and indirect effects of altering reservoir releases and changes in flow regimes.

Recommendation – Board staff recommends including mitigation measures to minimize peak flood flows during flood season, primarily from November 1 through April 15.

Ms. Katrina Chow
September 30, 2013
Page 4 of 4

Encroachment Permits

CVFPB2-10 Non-federal, non-governmental, and State agencies are required to obtain a Board Encroachment Permit in accordance with CCR 23. Federal agencies should consult with Board staff and consideration should be made early in the project design phase to provide maximum flexibility to avoid increasing potential adverse flood impacts.

Copies of the Board's Encroachment Permit Application forms and complete text of our Regulations can be found on the Board's website at http://www.cvfpb.ca.gov/regulations/.

If you have any questions regarding these recommendations or requests, please contact Ali Porbaha, Senior Engineer, at (916) 574-2378, or Mohammad.Porbaha@water.ca.gov, or James Herota, Senior Environmental Scientist, at (916) 574-0651, or James.Herota@water.ca.gov.

Sincerely,

Jay S. Punia
Executive Officer

cc: Governor's Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 121
Sacramento, California 95814

Responses to Comments from Central Valley Flood Protection Board

CVFPB2-1: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CVFPB2-2: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CVFPB2-3: Please refer to Master Comment Response FM-6, "Effects to Downstream Flooding."

CVFPB2-4: Please refer to Master Comment Response FM-6, "Effects to Downstream Flooding."

CVFPB2-5: Recommendations submitted by the comment author have been incorporated into Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.4.2 "State," of the Final EIS.

CVFPB2-6: Please refer to Master Comment Response FM-6, "Effects to Downstream Flooding."

CVFPB2-7: Mitigation Measure GEO-2 in EIS Chapter 4, "Geology, Geomorphology, Minerals, and Soils," Section 4.3.5, "Mitigation Measures" refers to mitigation to take place only in the Lake Shasta and Vicinity portion of the primary study area (as described in Chapter 1, "Introduction," Section 1.3, "Setting and Location") and not downstream from the dam on the Sacramento River.

CVFPB2-8: Please refer to Master Comment Response CMS-1, "EIS Mitigation Plan."

CVFPB2-9: Please refer to Master Comment Response FM-6, "Effects to Downstream Flooding," and Master Comment Response DSFISH-3, "Fish Habitat Restoration."

CVFPB2-10: Thank you for providing this information related to the CVFPB encroachment permit process. Your comment does not raise a significant issue with the DEIS, and therefore, does not require a specific response.

33.8.5 Central Valley Regional Water Quality Control Board

CVRWQCB

CALIFORNIA
Water Boards

Edmund G. Brown Jr.
Governor

Matthew Rodriquez
Secretary for
Environmental Protection

Central Valley Regional Water Quality Control Board

BUREAU OF RECLAMATION
OFFICIAL FILE COPY
RECEIVED
SEP 2 5 2013

CODE	ACTION	SURNAME & DATE
720	✓	K Duncan
2210	W.F.	3
O'K Chow		

11 September 2013

Ms. Katrina Chow, Project Manager
U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
2800 Cottage Way
Sacramento, CA 95925-1898

COMMENTS ON THE SHASTA LAKE WATER RESOURCES INVESTIGATION DRAFT ENVIRONMENTAL IMPACT STATEMENT, SHASTA COUNTY

Thank you for the opportunity to review the *Shasta Lake Water Resources Investigation Draft Environmental Impact Statement* (Draft EIS). The Central Valley Regional Water Quality Control Board (Central Valley Water Board) has regulatory authority over any projects that have the potential to discharge wastes that may impact water quality within the Sacramento River drainage, therefore our comments on the Draft EIS focus on water quality and the protection of the beneficial uses assigned to Shasta Lake and the Sacramento River below Shasta Dam.

CVRWQCB-1

The specific beneficial uses assigned to water bodies in the Central Valley Region are listed in the document titled *Water Quality Control Plan for the Sacramento River and the San Joaquin River Basins*, Fourth Edition, revised October 2011 (Basin Plan). Table II-1 of the Basin Plan, *Surface Water Bodies and Beneficial Uses*, lists the beneficial uses assigned to Shasta Lake as Municipal and Domestic Supply, Agricultural and Industrial Water Supply, Contact and Non-contact Recreation, Warm and Cold Freshwater Habitat, Warm and Cold Water Spawning, and Wildlife Habitat. The beneficial uses assigned to the Sacramento River from Shasta Dam to the Colusa Basin Drain include those assigned to Shasta Lake, and also include Warm and Cold Water Migration of Aquatic Organisms and Navigation.

CVRWQCB-2

The Board's primary concerns about the project are related to the impacts to water quality that will be caused by the sediment that will be generated by the raised water level. The comments discussed below reference Table S-3, *Summary of Impacts and Mitigation Measures*.

- Impact WQ-4, Page ES-46:
  "Long-Term Sediment Effects that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Uses in Shasta Lake or Its Tributaries"

Classification	PRJ-13.00
Project	214
Control No.	13043364
Folder I.D.	1222472
Date Input & Initials	25 SEP 2013

Karl E. Longley ScD, P.E., Chair | Pamela C. Creedon P.E., BCEE, Executive Officer
364 Knollcrest Drive, Suite 205, Redding, CA 96002 | www.waterboards.ca.gov/centralvalley

CVRWQCB-2 CONTD

This impact is listed as "Long-term" and "PS" (Potentially Significant) before mitigation, and as "LTS" (Less Than Significant) after mitigation. The proposed mitigation is to "Prepare and Implement a Stormwater Pollution Prevention Plan that Minimizes the Potential Contamination of Surface Waters, and Comply with Applicable Federal Regulations Concerning Construction Activities". While the specifics of the Stormwater Pollution Prevention Plan are not provided, we believe the quantity of sediment generated by the periodic inundation of the additional lakeshore

CVRWQCB-3

will be on the scale of hundreds of thousands of cubic yards and, despite available mitigation measures, the direct and indirect impacts to water quality will be significant and unavoidable.

CVRWQCB-4

Further, once clay-sized soil particles are suspended in the water column, they do not readily settle out and can cause widespread impacts for an extended period of time.

CVRWQCB-5

Shoreline processes, including wave action and changing reservoir levels, along with storm water runoff, will provide a constant mechanism by which soil in the new area of inundation can be constantly eroded and sediment transported into the lake, resulting in elevated levels of suspended sediment and turbidity. The current area of inundation, where all residual soil has been washed away (leaving only bare rock), provides an example of the potential magnitude of the issue. Further, if existing timber and vegetation are removed from the new area of

CVRWQCB-6

inundation, this will disturb the native soil and will remove the soil-retaining vegetation and root structures, thus exacerbating the situation. It is also unknown how often the lake elevation will

CVRWQCB-7

rise into the new inundation zone, and how long it will take for the soil erosion and transport to be reduced to a degree of insignificance.

CVRWQCB-8

Increases in suspended sediment and the associated increase in turbidity will have numerous impacts on domestic water supplies, aquatic life, and wildlife habitat. Three public domestic

CVRWQCB-9

water suppliers withdraw their water directly from Shasta Lake: Shasta Lake City, Mountain Gate, and Jones Valley. The increased sediment in the raw water supply will require additional filtration and treatment, and will result in increased costs to the rate payers.

CVRWQCB-10

The increase in suspended sediment and turbidity will also impact aquatic life, including benthic invertebrates, the zooplankton that provide a food source for fish, and the aquatic environment that the aquatic life rely upon for spawning and habitat. The increase in turbidity will also reduce

CVRWQCB-11

the ability of predatory birds (i.e., Bald Eagles, Osprey, etc.) to visually spot and capture fish, which are their main food supply.

CVRWQCB-12

Shasta Lake is currently on the Federal Clean Water Act Section 303(d) list of Impaired Water Bodies for mercury, because Shasta Lake is among many lakes and reservoirs in California where fish have been found with concentrations of mercury in their tissue that may warrant limited consumption by humans. Inorganic mercury enters reservoirs and other water bodies through a variety of sources, including erosion from soils naturally enriched with mercury and from runoff from mining sites. Increased sediment loads to reservoirs can also introduce organic matter. This can contribute to the mercury impairment because methylmercury can bind to the organic matter and thus move up the food chain via phytoplankton and zooplankton, eventually bio-accumulating in game fish such as bass. The Central Valley Water Board is

CVRWQCB-12 CONTD concerned that additional inputs of inorganic mercury and organic matter caused by erosion and sediment delivery generated by the inundation of additional lakeshore has the potential to accelerate the process by which methylmercury is formed and makes its way up the food chain.

CVRWQCB-13 Based on the discussion above, we believe the Level of Significance of the long-term impact of sediment on Shasta Lake to be Significant and Unavoidable.

- Impact WQ-10, Page ES-49:
  "Long-Term Sediment Effects that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Uses in in the Upper Sacramento River"

CVRWQCB-14

This impact is listed as "Long-term" and "LTS" (Less than significant), and therefore no mitigation is needed or proposed.

However, the increase in fine-grained suspended sediment in Shasta Lake would also increase the suspended sediment in the Sacramento River downstream of Shasta Lake. The City of Redding and the Bella Vista Water District obtain their municipal water supply from the Sacramento River approximately 8 miles downstream of Shasta Dam. As discussed above, the increase in suspended sediment will increase the costs of treating the domestic water supply.

CVRWQCB-15

The transport of additional suspended sediment from Shasta Lake into the Sacramento River may also elevate the ambient concentrations of priority pollutant metals (i.e., copper, zinc, etc.) in the Sacramento River. Many of these metals are already near or at the water quality objective that is designed to ensure the protection of beneficial uses. If concentrations of these metals increase, it could eliminate assimilative capacity in the river, thereby increasing regulatory compliance costs for the Cities of Redding and Anderson, as well as other downstream communities that discharge wastewater to the Sacramento River. Without assimilative capacity in the River, these communities may be required to expend their limited resources on extensive and costly treatment plant upgrades and/or enforcement actions as required by the federal Clean Water Act and the California Water Code. The potential for such an increase in metals concentrations must be thoroughly investigated and, if indicated, appropriate mitigation measures must be developed and implemented.

CVRWQCB-16

CVRWQCB-17 Based on the discussion above, we believe the Level of Significance of the long-term impact of sediment on the Upper Sacramento River to be Significant and Unavoidable.

CVRWQCB-18 The project will have a number of significant and unavoidable direct and indirect impacts on water quality and the environment that cannot be mitigated to the point where these impacts could be considered less than significant. It is therefore appropriate for the Bureau of Reclamation to investigate potential for off-site projects to enhance water quality and the environment to help offset the environmental impacts of the project.

Potential mitigation projects that may help to protect and enhance the beneficial uses of surface waters include:

CVRWQCB-19

1) Construction and operation of more advanced wastewater treatment and disposal systems for sewage generated from recreational activities on Shasta Lake;

CVRWQCB-20

2) Assistance with remedial efforts at abandoned mines within the Shasta Lake watershed, including the Mammoth, Golinsky, Bully Hill, and Rising Star mines, which discharge acid mine drainage to Shasta Lake. Such assistance could include financial aid and facilitating land exchanges between the private mine owners and the U.S. Forest Service so as to provide the mine owners with flat ground suitable for the installation of treatment systems for the mine drainage;

CVRWQCB-21

3) Assistance with remedial efforts at abandoned mines within the "Primary Study Area" including the Greenhorn Mine on Willow Creek upstream of Whiskeytown Lake and the Afterthought Mine on Little Cow Creek;

CVRWQCB-22

4) Assistance with remedial efforts at abandoned mines contributing mercury to the Sacramento River in the "Extended Study Area".

CVRWQCB-23

5) Assistance with watershed protection and enhancement projects in the Pit, McCloud, Upper Sacramento River and major tributaries to Shasta Lake that focus on reducing chronic sources of sediment (e.g., roads and historic mining features).

Thank you for your consideration of our comments regarding water quality on the Draft EIS. If you have any questions, please contact Katie Bowman at (530) 226-3458, or Philip Woodward at (530) 224-4853, or the letterhead address.

Pamela C Creedon
Executive Officer

PVW:

cc:
Ms. Michelle Denning, U.S. Dept of Interior, Bureau of Reclamation, 2800 Cottage Way, Sacramento, CA 95825-1898
Ms. Alexis Strauss, U.S. EPA, Region 9, San Francisco
Mr. Tom Howard, State Water Resources Control Board, Sacramento
Mr. Clint Snyder, Central Valley Regional Water Quality Control Board, Redding

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Responses to Comments from Central Valley Regional Water Quality Control Board

CVRWQCB-1: The information the comment author has provided was included in the DEIS, Chapter 7, "Water Quality," which acknowledges the beneficial uses assigned to Shasta Lake and the Sacramento River. Throughout this chapter, these uses are discussed, impacts to them are

analyzed and where applicable, mitigation measures have been identified.

CVRWQCB-2: Subsequent to release of the DEIS, Reclamation made substantial revisions to the EIS with respect to environmental commitments and mitigation measures. Specifically, in the DEIS, mitigation measure WQ-1 was to prepare and implement a SWPPP. The EIS has been revised to clarify the distinction between environmental commitments (e.g., SWPPP) and enhance the discussion of mitigation measures in a number of resource chapters, including Chapter 7, "Water Quality." The Preliminary Environmental Commitments and Mitigation Plan Appendix has been added to the EIS. This appendix provides a compilation of all the environmental commitments described in Chapter 2, "Alternatives," as well as summarizes all the mitigation measures discussed in chapters 4-25.

CVRWQCB-3: Working closely with its cooperating agencies, Reclamation has substantially revised a number of mitigation measures to ensure compliance with CEQ regulations, and if applicable CEQA guidelines. This effort was conducted over several months' time following receipt of public comments on the DIES using an interagency, interdisciplinary team. In addition, the impacts related to shoreline erosion were reanalyzed using updated field sampling information. As described in the EIS, Chapter 7, "Water Quality," Impacts WQ-1 and Impact WQ-4 and the associated mitigation measures have been revised to reflect Reclamation's commitment to mitigation measure WQ-1 "Develop and Implement a Comprehensive Multi-scale Sediment Reduction and Water Quality Improvement Program Within Watersheds Tributary to the Primary Study Area."

This mitigation measure focuses on proactive activities intended to reduce sediment delivery to receiving waters using a framework approach. At this point in Reclamation's planning process there is substantial uncertainty with respect to the specific location and types of mitigation activities that may be appropriate and or effective. At a minimum, the framework includes four fundamental components intended to meet the primary objectives of reducing sediment impacts and improving water quality. These components are generally consistent with the type of management opportunities identified in the Upper Sacramento River Watershed Assessment and Management Strategy (The River Exchange 2010):

- Stabilize and/or remediate localized point-source locations that are directly affecting waters tributary to Shasta Lake and/or the Upper Sacramento River (e.g., active landslides).

- Reduce road-related sediment and improve hydrologic functions by implementing erosion prevention and sediment control and stormproofing measures at the appropriate scale (5th-field watersheds).

- Use silviculture techniques to manage fuel loads in a manner that reduces the potential for large-scale high intensity wildfires (e.g., Bagley Fire) that often result in wide-spread erosion and resultant water quality impacts.

- Stabilize and/or restore channels using both active (construction) and passive (revegetation) measures that reestablish form and function in a manner that improves water quality. This component is consistent with the objectives for Mitigation Geo-2 (Chapter 4).

CVRWQCB-4: Chapter 4, "Geology, Geomorphology, Minerals, and Soils," and Chapter 7, "Water Quality," of the EIS acknowledge that erosional processes associated with construction and operation of Shasta Dam has resulted in localized elevated levels of turbidity and suspended sediments. The EIS has been revised based on updated analysis of impacts related to shoreline erosion; mitigation for these types of impacts has also been updated. Chapter 7, "Water Quality," of the EIS provides a discussion of the current conditions and potential impacts of reservoir-related erosion on beneficial uses, including both construction and shoreline erosion within Shasta Lake, and to the upper Sacramento River. Mitigation measure WQ-1 has been revised to reduce sediment-related impacts to these water bodies, with an emphasis on actions to reduce turbidity and suspended sediments.

CVRWQCB-5: See response for CVRWQCB-3 and CVRWQCB-4.

CVRWQCB-6: Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," includes differing vegetation removal protocols based on the area: Clearing Portions of Inundated Reservoir Area, Complete Vegetation Removal, Overstory Removal, and No Treatment. This chapter has also been revised to clarify Reclamation's environmental commitments with respect to maintaining, restoring and enhancing structural measures (e.g., brush structures, boulder complexes) intended to provide near-shore habitat and soil cover/energy dissipaters at high potential erosion areas. Clearing portions of the inundated reservoir area would involve removing trees and other vegetation from around the reservoir shoreline at select areas. Willows, cottonwoods, and buttonbush would not be removed in and along the riparian areas. Consistent with the environmental commitments, manzanita removed in cleared areas would be stockpiled and used for fish habitat/soil cover structures placed in

designated locations. Complete vegetation removal would clear all existing vegetation from the designated treatment area and would generally be applied to locations along and adjacent to developed recreation areas, including boat ramps, day use areas, campgrounds, marinas, and resorts. Exceptions would be made in areas with high shoreline erosion potential, or habitat for special-status species. Overstory removal involves removing all trees from the treatment area that are greater than 10 inches in diameter at breast height, or 15 feet in height, generally in houseboat mooring areas or narrow arms of the reservoir where snags pose the greatest risk to boaters. The remaining understory vegetation would be left in place. Overstory removal is intended to minimize the risk to visitors from snags and water hazards. For the last protocol (No Treatment), designated areas of the inundation zone would be left untreated with no vegetation removed. This prescription would generally be applied to stream inlets, the upper end of major drainages, the shoreline of wider arms of the reservoir, and special habitat areas. Additionally, Impact GEO-5, "Substantial Soil Erosion or Loss of Topsoil Due to Shoreline Processes," and Impact GEO-6, "Substantial Soil Erosion or Loss of Topsoil Due to Upland Processes," in Chapter 4, "Geology, Geomorphology, Minerals, and Soils," addresses these impacts. Measures taken to reduce vegetation removal will result in less soil erosion and more stabilized slopes. Mitigation Measure Geo-2 and Mitigation Measure WQ-1 are intended to minimize soil erosion and reduce the overall delivery of sediment to Shasta Lake and the upper Sacramento River.

CVRWQCB-7: The EIS, Chapter 11, "Fisheries and Aquatic Ecosystems," Impact Aqua-1 provides a comprehensive discussion of the increase in water surface levels by month, by water year type. Under the No-Action Alternative, the lake fills one out of four years. For most water year types, this trend would be similar.

Collectively, Chapter 4, "Geology, Geomorphology, Minerals and Soils," the Geologic Technical Report and the Shoreline Erosion Technical Memorandum included in the EIS provide a detailed discussion of the location, type and timing of shoreline erosion based on comprehensive field investigations and a predictive model. The model predicts that over the first 15 year period, shoreline erosion could yield as much as 767,000 cubic yards per year with an 18.5 foot raise. Within 60 years of the dam raise, the average annual volume is predicted to decrease to 216,000 cubic yards per year.

CVRWQCB-8: Chapter 4, "Geology, Geomorphology, Minerals, and Soils," and Chapter 7, "Water Quality," of the EIS acknowledges that erosional processes associated with construction and operation of Shasta Dam has resulted in localized elevated levels of turbidity and suspended sediments. The EIS has been revised based on updated analysis of

impacts related to shoreline erosion; mitigation for these types of impacts has also been updated. Chapter 7 of the EIS provides a discussion of the current conditions and potential impacts of reservoir-related erosion on beneficial uses, including both construction and shoreline erosion. These impacts are considered to be significant and mitigation measures have been revised and/or enhanced in the EIS.

CVRWQCB-9: The short- and long-term impacts from increases in suspended sediment in water supplies are addressed in Chapter 7, "Water Quality." The following impacts state that any increases in short- or long-term sediment levels would result in less-than-significant impacts and thus additional filtration would not be needed: Impacts WQ-1, "Temporary Construction-Related Sediment Effects on Shasta Lake and Its Tributaries that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Use"; WQ-4, "Long-Term Sediment Effects that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Uses in Shasta Lake or Its Tributaries"; WQ-7, "Temporary Construction-Related Sediment Effects on the Upper Sacramento River that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Uses"; and WQ-10, "Long-Term Sediment Effects that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Uses in the Upper Sacramento River.". The project design measures (e.g., SWPPP) are intended to address any sedimentation impacts from construction or operation activities for all action alternatives.

CVRWQCB-10: Reclamation has gathered information and performed focus studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The methods used to evaluate the impacts of the alternatives were based upon Reclamation's standard practices and input from agencies and subject matter experts.

CVRWQCB-11: Reclamation has gathered information and performed focus studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The methods used to evaluate the impacts of the alternatives were based upon Reclamation's standard practices and input from agencies and subject matter experts.

CVRWQCB-12: Comment noted. In Chapter 7, "Water Quality," of the EIS, Impact WQ-12, "Long-Term Metals Effects that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Uses in the Upper Sacramento River," addressed impacts associated with mercury. Specifically, the elevated levels of metals (including mercury are directly related to historic mining operations at two mining districts; one of which is directly adjacent to the current shoreline of

Shasta Lake (Bully Hill). Mitigation Measure WQ-12, "Implement Mitigation Measure WQ-6 (CP1) to Reduce Long-Term Metals Effects on the Upper Sacramento River," will reduce Impact WQ-12 to a less-than-significant level.

CVRWQCB-13: Reclamation has gathered information and performed focus studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The methods used to evaluate the impacts of the alternatives were based upon Reclamation's standard practices and input from agencies and subject matter experts.

CVRWQCB-14: Reclamation has gathered information and performed focus studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The methods used to evaluate the impacts of the alternatives were based upon Reclamation's standard practices and input from agencies and subject matter experts.

CVRWQCB-15: The short- and long-term impacts from increases in suspended sediment in water supplies are addressed in Chapter 7, "Water Quality." The following impacts state that any increases in short- or long-term sediment levels would result in less-than-significant impacts and thus additional filtration would not be needed: Impacts WQ-1, "Temporary Construction-Related Sediment Effects on Shasta Lake and Its Tributaries that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Use"; WQ-4, "Long-Term Sediment Effects that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Uses in Shasta Lake or Its Tributaries,"; WQ-7, "Temporary Construction-Related Sediment Effects on the Upper Sacramento River that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Uses"; and WQ-10, "Long-Term Sediment Effects that Would Cause Violations of Water Quality Standards or Adversely Affect Beneficial Uses in the Upper Sacramento River." The project design measures (e.g., SWPPP) are intended to address any sedimentation impacts from construction or operation activities for all action alternatives.

CVRWQCB-16: Reclamation has gathered information and performed focus studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The methods used to evaluate the impacts of the alternatives were based upon Reclamation's standard practices and input from agencies and subject matter experts.

CVRWQCB-17: Reclamation has gathered information and performed focus studies to document resource conditions and evaluate the potential

impacts of the range of alternatives developed through the SLWRI feasibility study. The methods used to evaluate the impacts of the alternatives were based upon Reclamation's standard practices and input from agencies and subject matter experts.

CVRWQCB-18: Reclamation has gathered information and performed focus studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The methods used to evaluate the impacts of the alternatives were based upon Reclamation's standard practices and input from agencies and subject matter experts.

CVRWQCB-19: The EIS, Chapter 2, "Alternatives," provides a discussion of actions related to relocation and/or enhancement of recreational facilities. All action alternatives provide for modernization of relocated recreation facilities, including, at a minimum, modifications to comply with current standards of health and safety.

CVRWQCB-20: Please refer to Master Comment Response WQ-1, "Remediation of Abandoned Mines in the Shasta Lake Area."

CVRWQCB-21: Please refer to Master Comment Response WQ-1, "Remediation of Abandoned Mines in the Shasta Lake Area."

CVRWQCB-22: Please refer to Master Comment Response WQ-1, "Remediation of Abandoned Mines in the Shasta Lake Area."

CVRWQCB-23: Please refer to Master Comment Response WQ-1, "Remediation of Abandoned Mines in the Shasta Lake Area."

33.8.6 Department of Fish and Wildlife

BISON CONNECT

CDFW Response Letter SLWRI 2013 Public DEIS FINAL with WB Comments

Baker, Dawn@Wildlife <Dawn.Baker@wildlife.ca.gov> Mon, Sep 30, 2013 at 4:13 PM

To: "BOR-MPR-SLWRI@usbr.gov" <BOR-MPR-SLWRI@usbr.gov>, "bperson@usbr.gov" <bperson@usbr.gov>, "dreck@usbr.gov" <dreck@usbr.gov>, "tkisanuki@usbr.gov" <tkisanuki@usbr.gov>, "pzedonis@usbr.gov" <pzedonis@usbr.gov>, "Rocky_montgomery@fws.gov" <Rocky_montgomery@fws.gov>, "Mark_Littlefield@fws.gov" <Mark_Littlefield@fws.gov>, "jim_smith@fws.gov" <jim_smith@fws.gov>, "aolson@fs.fed.us" <aolson@fs.fed.us>, "nrezeau@fs.fed.us" <nrezeau@fs.fed.us>, "jknelson@fs.fed.us" <jknelson@fs.fed.us>, "Rea, Maria@NOAA" <Maria.Rea@noaa.gov>, "Alston, Naseem@NOAA" <Naseem.Alston@noaa.gov>, "Lester, Aric@DWR" <Aric.Lester@water.ca.gov>, "Lyons, Amy@DWR" <Amy.Lyons@water.ca.gov>, "Woodward, Phil@Waterboards" <Phil.Woodward@waterboards.ca.gov>, "skophammer.stephanie@epa.gov" <skophammer.stephanie@epa.gov>, "valentina@epa.gov" <valentina@epa.gov>, "Babcock, Curt@Wildlife" <Curt.Babcock@wildlife.ca.gov>, "Milliron, Curtis@Wildlife" <Curtis.Milliron@wildlife.ca.gov>, "Callas, Richard@Wildlife" <Richard.Callas@wildlife.ca.gov>, "Zezulak, Dave@Wildlife" <Dave.Zezulak@wildlife.ca.gov>, "Baumgartner, Steven@Wildlife" <Steven.Baumgartner@wildlife.ca.gov>, "Berry, Mike@Wildlife" <Mike.Berry@wildlife.ca.gov>, "Lis, Richard@Wildlife" <Richard.Lis@wildlife.ca.gov>, "Figura, Pete@Wildlife" <Pete.Figura@wildlife.ca.gov>, "Grover, Joshua@Wildlife" <Joshua.Grover@wildlife.ca.gov>, "Dibble, Chad@Wildlife" <Chad.Dibble@wildlife.ca.gov>, "jason.roberts@wildlfe.ca.gov" <jason.roberts@wildlfe.ca.gov>, "Cantrell, Scott@Wildlife" <Scott.Cantrell@wildlife.ca.gov>, "Henderson, Brad@Wildlife" <Brad.Henderson@wildlife.ca.gov>, "Harris, Michael R.@Wildlife" <Michael.R.Harris@wildlife.ca.gov>, "Lehr, Stafford@Wildlife" <Stafford.Lehr@wildlife.ca.gov>, "Shaffer, Kevin@Wildlife" <Kevin.Shaffer@wildlife.ca.gov>, "Bratcher, Patricia@Wildlife" <Patricia.Bratcher@wildlife.ca.gov>, "Carlson, Jennifer@Wildlife" <Jennifer.Carlson@wildlife.ca.gov>, "Kovacs, Karen@Wildlife"

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Please see all 4 attachments above.

4 attachments

CDFW Response Letter SLWRI Public DEIS FINAL with WB Comments 27Sept2013.pdf
2040K

Copy of Attachment 1 SLWRI Public DEIS COMMENT FORM CDFW FINALCBEDITS.xlsx
51K

Copy of Attachment 2 2013 SLWRI DEIS Comment Form CDFW Fisheries FINALCBEDITS.xlsx
19K

Copy of Attachment 3 2013 SLWRI Comments CDFW Water Branch FINAL CB edits.slk
9K

State of California – Natural Resources Agency
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Region 1 – Northern
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EDMUND G. BROWN JR., Governor
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September 30, 2013

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Bureau of Reclamation, Planning Division
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Subject: Comments on the Draft Environmental Impact Statement and Proposed Shasta Dam Enlargement Project/Shasta Lake Water Resources Investigation

Dear Ms. Chow:

As trustee agency for California's fish, wildlife, and botanical resources the California Department of Fish and Wildlife (CDFW) appreciates the opportunity to provide comments on the Public Draft Environmental Impact Statement (DEIS) for the Shasta Lake Water Resources Investigation (SLWRI – "Project").

DFW-1 CDFW has been involved with the SLWRI since 2000. During this time we have regularly participated by reviewing draft material and in the many discussions about the project impacts and benefits described in the DEIS. Although we still have many questions and concerns, we believe there is sufficient information for CDFW to comment on the results of the investigation and make some broad recommendations and conclusions regarding the Project's effects to biological resources. Our comments, recommendations, and conclusions on the DEIS for the SLWRI are based on staff's scientific expertise on California's fish and wildlife and associated habitats including anadromous fish species in the Sacramento River watershed. CDFW has completed comment spreadsheets for several of the SLWRI DEIS documents, which are attached. In addition, CDFW has the following comments and concerns:

Investigation Results, Recommendations, and Conclusions

DFW-2 The DEIS demonstrates that all proposed action alternatives would result in significant and unavoidable impacts to fish, wildlife, native plants, and natural communities.

DFW-3 All action alternatives propose very costly enlargements to the cold water pool of Shasta Lake and have highly suspect benefits to anadromous fish survival

DFW-4 while providing limited contributions to additional water supply.

DFW-5 These benefits, as currently described in the DEIS, would be of minimal value and would not significantly contribute to recovery of anadromous species.

DFW-6 We feel a multitude of less expensive and higher value recovery actions that benefit anadromous species should be considered and included as an alternative or alternatives in the DEIS. For example, modifying the existing temperature control device (TCD) and improving flow management can be implemented without raising Shasta Dam.

DFW-7 We are also concerned that if implemented,

DFW-7 CONTD
DFW-8

the cost of the Project will reduce funding allocated to other higher priority restoration projects aimed at benefiting anadromous fish survival in the Sacramento River and tributaries. Based on this, CDFW recommends including an alternative that is clearly beneficial to anadromous fish.

Purpose and Need

DFW-9

The DEIS states that a primary component of the purpose for the Project is promoting increased anadromous fish survival in the upper Sacramento River. It is unclear whether the Project is capable of substantially benefiting anadromous fish, particularly in a manner that provides equal weight to the other primary objective, Water Supply Reliability. CDFW also questions the emphasis on expanding the cold water pool by raising Shasta Dam without first determining whether the Temperature Control Device can be modified to more efficiently use the current cold water pool. The 2000 CALFED Bay-Delta Program Record of Decision (ROD) identifies Shasta Lake as a

DFW-10

potential surface storage project which could increase the pool of cold water available to maintain lower Sacramento River temperatures. Despite the absence of a complete cumulative effects analysis of all project-related actions on anadromous fish, CDFW has concluded that the Project's benefit to anadromous fish would be minimal. Per the

DFW-11

DEIS, benefits to anadromous fish appear to be further limited whenever in conflict with current operational guidelines or water supply reliability.

DFW-12

There are many projects that could increase survival and recovery of anadromous fish. CDFW believes increasing the cold water pool via a dam enlargement is not the top recovery priority. Because the expanded cold water pool is closely linked with the purpose and need/project objective, any alternatives that do not increase reservoir capacity for the expanded cold water pool specifically for the benefit of anadromous fish tend to not meet the stated purpose and need. As a result, lower impact or lower cost alternatives have been eliminated from consideration, while only alternatives proposing raising Shasta Dam are brought forward for detailed analysis in the DEIS.

DFW-13

A range of other higher priority recovery actions are identified in various recovery plans, five-year reviews, and recovery strategies for Central Valley anadromous fish. For example, improving flow management; screening pumps and diversions; enhancement of spawning and rearing habitat; removing fish passage barriers, and floodplain restoration could also achieve increased anadromous fish survival, and would do so in a much more efficient and cost effective manner than raising Shasta Dam. Changing existing Shasta Dam releases in the fall/late fall to eliminate the

DFW-14

dewatering of salmonid redds would increase anadromous fish survival dramatically without the need for a costly construction project. These and other restoration actions

DFW-15

are identified in the DEIS as an attachment, but only a fraction of what was recommended was included in the action alternatives (CP4 and CP5).

DFW-16

Modification of the TCD on Shasta Dam with or without raising Shasta Dam also has the potential to improve anadromous fish survival. At the July 31, 2008, Reclamation meeting, the SALMOD modeler for the SLWRI mentioned that the modeling of the

DFW-16 CONTD

modification of the TCD on Shasta Dam with and without raising Shasta Dam had been completed. The results showed that modifying the TCD without raising Shasta Dam achieved the same benefits for anadromous fish as raising Shasta Dam 18.5 feet and enlarging the cold water pool.

DFW-17

During the same meeting, the modeler conducting the CALSIM modeling for the SLWRI stated it was not known whether it was technically feasible to modify the TCD.

DFW-18

Reclamation stated that they would provide the modeling results to the USFWS and CDFW and investigate the feasibility of modifying the TCD. This did not happen, despite numerous requests from USFWS and CDFW.

DFW-19

While all the action alternatives appear to include modification of the TCD to account for an increased dam height and to reduce leakage of warm water into the structure, there is no discussion of modifying the TCD without raising Shasta Dam to achieve the same benefits for anadromous fish as raising Shasta Dam. A more thorough discussion of the TCD modification and potential benefits to anadromous fish should have been included in the DEIS. This illustrates the fact that the potential benefits to anadromous fish, due to the concept of raising Shasta Dam, has been overstated in the DEIS.

DFW-20

While the complete extent of the affected area is unknown, unfortunately all dam raise alternatives will result in significant and unavoidable impacts to a large number of terrestrial and riverine resources. This will be caused by a substantially larger reservoir and/or as a result of relocation of infrastructure. This includes the inundation of habitat that would be used by anadromous fish, as per the reintroduction above Shasta Dam and Keswick Dam Priority 1 Recovery Actions (1.8.1.1 and 1.8.2.1) as described in the draft Recovery Plan for winter-run Chinook (*Oncorhynchus tshawytscha*), spring-run Chinook (*O. tshawytscha*), and Central Valley steelhead (*O. mykiss*) (National Marine Fisheries Service 2009a). Reclamation has started the environmental review process on this issue, as per direction found in the Long-term Operations of the Central Valley Project and State Water Project Biological Opinion, Reasonable and Prudent Alternative NF4 (National Marine Fisheries Service 2009b). This apparent conflict should be better disclosed and considered prior to any approval action for this Project.

DFW-21

Approximately four thousand acres of wildlife habitat in the Primary Study Area would be impacted under CP1 and over five thousand would be impacted under CP3, CP4, and CP5. Such an enormous loss of public trust resources (fish, wildlife, native plants, and natural communities) is a substantial loss to the region and to the State. We are not convinced, at this point, that the impact to wildlife and botanical resources can be effectively mitigated. Benefits to fish should not be looked at as a means to offset, mitigate, or account for impacts to wildlife, botanical, and other resource values. CDFW recommends finding lower impact and more effective ways to benefit and recover anadromous species.

NEPA and CEQA Disclosure

DFW-22

While CDFW appreciates the great effort put into preparation of the DEIS, we have found the document to be lacking in some key areas. Due to the complexity of the

DFW-22 CONTD

project CDFW previously requested selection of a preferred action alternative using U.S. Bureau of Reclamation (Reclamation)'s best and most current information. The preferred alternative should have been disclosed for agency and public review during the public review period. The numerous and similar dam raise alternatives analyzed in the current DEIS creates an excessively complex and lengthy document, while the only other alternative was the "No Action" alternative.

DFW-23

The DEIS states repeatedly that it is prepared in compliance with the California Environmental Quality Act (CEQA). However, as it is currently written, the DEIS is not fully in compliance with the CEQA or the National Environmental Policy Act (NEPA). Guidelines 15140 to 15045 call for environmental documents to be written in plain language and reasonable limits on the length of the document.

DFW-24

CEQA Guidelines Section 15126.6 (e)(2) requires identification of "Environmentally Superior" Alternative in the draft Impact Report. Until the Environmentally Superior Alternative is identified, the document is not in compliance with CEQA.

DFW-25

Additionally, directives found within NEPA encourage the identification of the agency's preferred alternative or alternatives, if one or more exists, in the draft statement or public DEIS.

DFW-26

Similarly, based on our past experiences, identification of the preferred alternative is needed in order to consult with the agencies as per Section 7 of the Endangered Species Act, and the California Endangered Species Act.

DFW-27

Both NEPA and CEQA are primarily designed to identify and disclose the significant environmental impacts of a proposed project prior to its consideration and approval. The current structure of DEIS makes the Project impacts very difficult to follow. For example, simple total impact acreages are generally not provided in a straightforward manner, making the task of assessing the Project's impacts as a whole very cumbersome.

DFW-28

Section 15126.4 of the CEQA Guidelines states the requirement that feasible measures shall be described. However, mitigation measures are generally vague, are lacking in measurable standards, and defer any detail to "future documents" (additional comments on mitigation are found in another section of this letter below).

DFW-29

CDFW feels that the DEIS falls short of making the project impacts and mitigation measures understandable for both agency and public review, and to meet CEQA requirements.

Benefit to Anadromous Fish

DFW-30

As discussed above, CDFW is concerned that the proposed project would not substantially increase survival of anadromous fish populations in the upper Sacramento River, primarily upstream from the Red Bluff Diversion Dam (RBDD).

DFW-31

CDFW has previously provided comments in several letters regarding the use of SALMOD to support technical analysis and the representation of data. Specifically, we have questioned how the data is being used to show benefits to anadromous fish from the various alternatives. Overall, the concerns CDFW has outlined in the past remain valid regarding SALMOD and associated illustrations of benefits to fish.

DFW-32

We have additional concerns about what appears to be overdependence on the SALMOD

DFW-32 CONTD

model and the assumptions to drive the model. The analysis within the DEIS on impacts to salmonids in the upper Sacramento River is largely restricted just to the SALMOD model results and does not include any other quantitative or qualitative analysis.

DFW-33

It's unclear in the DEIS if production includes all fish, or wild vs. hatchery fish. The Central Valley Project Improvement Act (CVPIA) Anadromous Fish Restoration Program (AFRP) fish production targets are focused on the natural production of fish from each watershed (USFWS 2001). Due to potential discrepancies between the premises that SALMOD, AFRP, and other restoration programs are based upon, the DEIS fish benefit predictions may be skewed and/or misrepresented.

DFW-34

In addition, the restoration and doubling goals of AFRP identify targets of adult fish, not juvenile fish which is presented in the DEIS. Although there are relationships between juvenile production and adult returns, this is not well defined in the DEIS. Therefore, this approach can lead to a misunderstanding by the public of the true benefits of the Project. With the return rate of adult fish being very low, and the potential benefit of the project being primarily in critically dry years, this further shows the lack of benefit of the Project for anadromous fish.

DFW-35

Use of a cohort replacement rate would be helpful. This is being used within Bay Delta Conservation Plan and more generally within the Central Valley. Using the cohort replacement rate is generally recognized as a more accurate way of looking at salmon population trends over a longer term.

DFW-36

A statement is made in Alternative CP4 that causes CDFW to question the true fisheries benefit of the project. Specifically, the statement reads *"The adaptive management plan may include operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, as long as there are no conflicts with current operational guidelines or adverse impacts to water supply reliability."* If the 378,000 acre feet of water is specifically for anadromous fish survival, its use may conflict with current operational guidelines and/or have adverse impacts on water supply reliability, for that specific quantity of increased storage. Therefore, to truly benefit fish the increased reservoir storage space of about 378,000 acre-feet should include only the operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish and other critical natural resources, regardless of the potential conflicts or impacts to operations and water supply.

DFW-37

The Project could result in direct and indirect effects to various fish species. The Project would result in detrimental impacts to reservoir salmonids. The DEIS identified a significant (negative) effect on Sacramento-San Joaquin Delta smelt (*Hypomesus transpacificus*), Sacramento splittail (*Pogonichthys macrolepidotus*), longfin smelt (*Spirinchus thaleichthys*), and striped bass (*Morone saxatilis*) due to increased reverse flows in Old and Middle Rivers, and also due to increased risk of entrainment or salvage of species at Central Valley Project (CVP) and State Water Project (SWP) facilities caused by changes in CVP and SWP exports. Sacramento-San Joaquin Delta smelt is already in an extremely imperiled condition and is listed as endangered under the California Endangered Species Act, and threatened under the federal Endangered Species Act.

DFW-38 The Project would result in a reduction of larger peak flows, which are typically channel changing flows that often result in habitat improvements. Reducing those flows may have a negative impact on downstream aquatic habitat and species.

DFW-39 Another concern CDFW has is that despite over 10,000 pages of material in this DEIS, details about off-site opportunities to mitigate impacts on biological resources in the primary study area are either not yet available, or lack the necessary level of detail. Of the mitigation measures outlined, some are already being completed through other activities. For example, one of the main components of CP4, augmenting spawning gravel in the upper Sacramento River, is already being performed by Reclamation in compliance with CVPIA. Proposed mitigation should be specific to this project and not from other existing projects.

DFW-40 The DEIS should present a complete picture of the net effect to anadromous fish and other special status species. This would include addressing impacts such as losses of fish at sites of known entrainment (DEIS, Biological Resources Appendix – Fisheries and Aquatic Ecosystem Technical Report, Table 2-170); the potential increase or decrease and the projected increase (as per SALMOD) resulting from (limited) proposed fish enhancement actions; the effects of the pilot reintroduction project; the effects of the preferred alternative in Bay Delta Conservation Plan; and the potential downriver effects as the reservoir is filled. These and other considerations should be made when evaluating the net effects of an action. Only then can CDFW make a complete evaluation of the total effects to anadromous fish survival.

Significant and Unavoidable Impacts, and Mitigation Measures

DFW-41 As previously stated, CEQA requires the identification of mitigation measures but does not require that all significant impacts be mitigated to less-than-significant values for a project to be approved if it can be shown that there is no feasible mitigation or alternative to the significant unavoidable impact. Lead agencies are required to adopt a statement of overriding considerations as to why the project should still be approved, notwithstanding the significant and unavoidable impact, but must make findings demonstrating that there are no feasible mitigation measures or alternatives which would reduce the impact to a less-than-significant level. The mitigation measures provided in the DEIS do not include performance measures or other standards that allow the reader to gauge the adequacy of mitigation. It is not appropriate to defer disclosure of mitigation details to the FEIS.

The current DEIS does identify numerous significant and unavoidable impacts, however the list appears to be incomplete. This includes impacts to State and federally listed species; species whose numbers will be so reduced by a dam raise that it may result in their listing under ESA and/or CESA; and loss of habitat that affect assemblages of special status species, such as neotropical migratory birds. The DEIS does not identify the overriding considerations as to why the Project should proceed despite these impacts.

DFW-42 In addition, due to the lack of clear analysis of effects and/or benefits of the Project for anadromous fish, it has not been quantitatively shown that benefits outweigh the impact and cost of proposed mitigation measures.

DFW-43 Mitigation measures identified to offset some of the impacts are inadequate and/or are not clearly defined. Proposed mitigation measures appear to be relied upon solely to address the sometimes "significant" impacts to special status species, when the degree of the project impact is unclear (e.g. Impact Aqua-15 in the Fisheries chapter of the DEIS). This includes species which are identified on a list of "evaluated species for which direct mortality as a result of implementing CALFED actions is prohibited as a condition of the Multi-Species Conservation Strategy (MSCS)..." (CALFED 2000a, b).

DFW-44 Mitigation measures are proposed in the DEIS when surveys for certain species are not completed within the entire Project footprint, including areas proposed for relocation of roads and/or structures (e.g. Shasta salamander (*Hydromantes shastae*)). Discussions regarding the potential for mitigation, or a clarification of the degree of mitigation needed to offset impacts, have not occurred. Therefore, it is erroneous to assume that mitigation can, in all cases, offset impacts to below a level of significance.

DFW-45 Appropriate mitigation measures must be feasible and have a standard by which they can be measured (i.e., performance criteria). For example, preconstruction surveys are provided as part of a "potential" mitigation measure. Monitoring pre- and post-project effects is required and is typically not accepted as a mitigation measure. Effects of the proposed action, as a result of surveys, needs to be clearly described in order to establish any potential mitigation that would help offset significance of impact.

Summary of additional issues:

DFW-46 **The Potential for Species Listing and Threat of Extirpation**
There are several species that appear to be significantly impacted, should the dam raise occur. For example, raising Shasta Lake would inundate the limited habitat of Shasta snow-wreath (*Neviusia cliftonii*) and Shasta salamander (*Hydromantes shastae*).

DFW-47 **Listed Species and Habitat Analyses, and Mitigation**
Title 50 Code of Federal Regulations (CFR) Section 402.02 states the effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, **together** with the effects of other activities that are interrelated or interdependent with that action. This information is then added to the environmental baseline. The DEIS contains contradictions and utilizes improper information in evaluating the potential impact on a large number of special status species, including fish, wildlife, and plants, as well as water-quality, geological, and geomorphological attributes. This includes several special status species, such as bank swallow (*Riparia riparia),* bald eagle (*Haliaeetus leucocephalus),* and northern spotted owl (*Strix occidentalis caurina).*

DFW-48 **California Wild and Scenic Act, the McCloud River**
Raising the water level behind Shasta Dam will convert part of the McCloud River into reservoir habitat, changing the free-flowing condition of the McCloud River. As per the California Wild and Scenic Rivers Act (Act), the determination of adverse effect as a result of this change is made by the Secretary of the State of California's Resource

DFW-48 CONTD

Agency, currently known as the Natural Resource Agency (Public Resource Code, Section 5093.60). Reclamation should request an effects determination from the California Natural Resources Agency.

Clarification on the Dedicated Pool, Alternative CP4

DFW-49

The 2008 Planning Aid Memorandum (PAM) (U.S. Fish and Wildlife Service 2008) identified an earlier recommendation from U.S. Fish and Wildlife Service, CDFW, and National Marine Fisheries Service (NMFS) for "dedicated environmental water" to be included in a SLWRI alternative, which was in the amount of 378,000-acre feet in Alternative CP4. This water was to be adaptively managed and used at the discretion of the federal and State fisheries resource agencies, not the Sacramento Temperature Task Group.

Water Quality Impacts

DFW-50

The level of effect on water quality as a result of a dam raise continues to be insufficiently analyzed. This includes the potential impacts created by inundation of abandoned mines, increased sedimentation along the new lakeshore due to erosion, mercury methylation, and the cumulative effects of mining local substrate to provide dam construction materials.

Impacts to Tributaries below Keswick Dam

DFW-51

Channel incision and bank erosion, in both the main channel and tributaries, commonly occurs below dams. Problematic channel incision has largely been documented in Clear Creek, Cow Creek, Bear Creek, and Cottonwood Creek. Additional analysis is needed to assess the effects of proposed operations and flows on these and other critical tributaries below Keswick Dam. This impact warrants further investigation including consideration of mitigation measures such as gravel augmentation, bank stabilization, and riparian restoration to reduce potential erosion.

Concluding Remarks

DFW-52

Based upon CDFW's review of the DEIS, we recommend additional analysis to fully identify impacts, inclusion of avoidance or mitigation measures, and adding to or enhancing the alternatives to further benefit one of the Primary Objectives: Anadromous Fish Survival. Currently, CDFW believes that the Project's impacts to biological resources far outweigh any benefits to anadromous species survival that are proposed to occur in the current DEIS under various action alternatives.

If you have further questions regarding our comments, please contact Staff Environmental Scientist Patricia Bratcher by at Patricia.Bratcher@wildlife.ca.gov, or by phone at (530) 225-3845. Thank you for your time and consideration.

Sincerely,

NEIL MANJI, Regional Manager
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Attachment 1	SLWRI Draft Environmental Impact Statement Comment Form - CA Dept. of Fish and Wildlife Version June 2013							
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Reviewer Agency:	CA Dept. of Fish and Wildlife							
Reviewer Mailing	Address: 601 Locust St., Redding, CA 96001						Comments on SLWRI Public Draft Environmental Impact Statement	
Date:	Sept. 2013							
ITEM	REVIEWER	DOCUMENT TITLE	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
1	DFW-53 CDFW	SLWRI DEIS	Summary	N/A	ES-1	13	N/A	Please identify the Proposed Action here. The proposed action is still not clearly identified; however, it's purpose and objecitves are stated. It is possible that, according to the first page of the Executive summary, that the proposed action is conducting an investigation, as opposed to enlarging a dam (ES-1, line 2)...? The selection of a preferred alternative would not be the same, depending on which of these two proposed actions is being evaluated.
2	DFW-54 CDFW	SLWRI DEIS	Summary	N/A	ES-3	7	...increasing demands for water supplies and growing concerns over declines in ecosystem resources in the Central Valley of California...	The specific declines in ecosystem resources that prompted this study, and how such declines relate to Shasta Dam, should be thoroughly discussed in the EIS.
3	DFW-55 CDFW	SLWRI DEIS	Summary	N/A	ES-4	37	The purpose of an EIS is not to recommend approval or rejection of a project,	Due to the complexity of the project and the Department's limited resources for thorough review of all impacts for all project alternatives, the Department requests selection of a preferred action alternative using Reclamation's best and most current information. The preferred alternative should be disclosed for agency and public review during the EI/EIRS public review period. The numerous alternatives analyzed in the current EIS creates an excessively complex and lengthy document. CEQA Guidelines 15140 to 15045 call for environmental documents to be written in plain language and reasonable limits on the length of the document. Any actions taken to facilitate meaningful review by reducing the complexity of the review process would be appreciated.
4	DFW-56 CDFW	SLWRI DEIS	Summary	N/A	ES-6	3	Increase the survival of anadromous fish populations in the Sacramento River, primarily upstream from the RBPP	The EIS has not yet demonstrated that there is an issue with survival that is in any way related to the current configuration or operation of Shasta Dam. Previous EIS discussion of a temperature problem in the Sacramento River have only addressed Chinook. Please discuss how other anadromous species have been negatively affected by inappropriate temperatures under the current configuration and operation of Shasta Dam.

		Page 2		SLWRI DEIS Review by CDFW					
DFW-57	5	Henderson	SLWRI DEIS	Summary	N/A	ES-7	1	Unsuitable water temperatures in the upper Sacramento River...critical factor...can be detrimental.	The agencies agree that temperature in the river is a major reason for the decline of Chinook, but there has not been a complete discussion that the best way to improve temperatures in the river is raising the dam.
DFW-58	6	CDFW	SLWRI DEIS	Summary	N/A	ES-7	16	Despite these steps, additional actions are needed to address anadromous fish survival in the upper Sacramento River.	Identify the additional actions needed. Please reference federal or state wildlife agency recovery plans, recovery strategies, biological opinions, conservation strategies, or species management documents
DFW-59	7	CDFW	SLWRI DEIS	Summary	N/A	ES-8	13	a significant need remains to conserve and restore ecosystem resources along the Sacramento River.	Please identify the specific needs to conserve and restore habitat and how the current configuration and/or management of Shasta Dam precludes conservation and restoration. Please identify any issues with survival of Chinook in the River that can be attributed to the current configuration or operation of Shasta Dam.
DFW-60	8	CDFW	SLWRI DEIS	Summary	N/A	ES-14	9	...plan to raise Shasta Dam to help increase anadromous fish survival ...	It has not been determined that raising the dam is the only way that anadromous fish survival can be helped. The environmental analysis associated with the Trinity River evaluated impacts, both beneficial and negative, to listed anadromous fish.
DFW-61	9	CDFW	SLWRI DEIS	Summary	N/A	ES-16	8	Enlarging Shasta Reservoir would increase the depth	The EIS needs to provide the acreage of the larger Shasta Reservoir for each alternative.
DFW-62	10	CDFW	SLWRI DEIS	Summary	N/A	ES-17	21	Accordingly, storage in the overall full pool would increase from 4.55 MAF to 5.0 MAF	The EIS needs to provide the acreage of the larger Shasta Reservoir for each alternative.
DFW-63	11	CDFW	SLWRI DEIS	Summary	N/A	ES-18	29	Accordingly, storage in the overall full pool would be increased from 4.55 MAF to 5.19 MAF.	The EIS needs to provide the acreage of the larger Shasta Reservoir for each alternative.
DFW-64	12	CDFW	SLWRI DEIS	Summary	N/A	ES-19	18	CP4 focuses on increasing anadromous fish survival...	The EIS needs to provide the acreage of the larger Shasta Reservoir for each alternative.
DFW-65	13	CDFW	SLWRI DEIS	Summary	N/A	ES-20	28	SECTION S.6.6.	The EIS needs to provide the acreage of the larger Shasta Reservoir for each alternative.
DFW-66	14	CDFW	SLWRI DEIS	Summary	N/A	ES-22	12	Clearing vegetation from portions of the inundated reservoir area	The EIS needs to provide the acreage of the inundated reservoir area for each alternative.

		Page 3		SLWRI DEIS Review by CDFW					
DFW-67	15	CDFW	SLWRI DEIS	Summary	N/A	ES-22	26	...increase the ability of Reclamation to regulate water temperatures...	Please provide some comparison factor, percentage, degrees of temperature, etc. that would demonstrate the level of increased ability to regulate temperature in the Sacramento River over current levels.
DFW-68	16	CDFW	SLWRI DEIS	Summary	N/A	ES-29	34	As shown in Table S-3, after consideration of actions, operations, and features to avoid, mitigate, and/or compensate for adverse effects...	List of significant and unavoidable direct and indirect impacts lacks impact to water quality through increased erosion/sediment discharges, and pollutant introductions due to inundation of existing mine(s). There is also no mention of significant impacts on fisheries, adfluvial salmonids, anadromous or Delta species.
DFW-69	17	CDFW	SLWRI DEIS	Summary	N/A	ES-34	33	A discussion of mitigation for loss of habitat through preservation and enhancement in mitigation areas will be included in future documents.	The DEIS should identify more specific mitigation measures that will be implemented to mitigation unavoidable impacts, rather than state the discussions will be included in future documents.
DFW-70	18	CDFW	SLWRI DEIS	Summary	N/A	ES-35	17	"Environmentally Superior Alternative" consistent with CEQA	CEQA Guidelines Section 15126.6 (e) (2) requires identification of the environmentally superior alternative in the draft EIR. Please identify an environmentally superior alternative among the other alternatives. This will ensure that the EIS remains consistent with the provisions of CEQA.
DFW-71	19	CDFW	SLWRI DEIS	Summary	N/A	ES-37	Table S-3	Mitigation Measure Aqua-7: Implement Mitigation Measure Geo-2: Replace Lost Ecological Functions of Aquatic Habitats by Restoring Existing Degraded Aquatic Habitats in the Vicinity of the Impact	Adding nearshore fish habitat and spawning gravel is not going to compensate for the impact to intermittent and perennial tributaries, and/or adfluvial salmonids within the lake.
DFW-72	20	CDFW	SLWRI DEIS	Summary	N/A	ES-66	Table S-3	Table S-3: Impact Bot-1: Loss of Federally or State Listed Plant Species	Rare, threatened, and endangered species to be addressed shall include all those which meet the California Environmental Quality Act (CEQA) definition (see CEQA Guidelines, § 15380). A species not included in any formal listing identified in subdivision shall nevertheless be considered to be endangered, rare or threatened, if the species can be shown to meet the following criteria: (1) Although not presently threatened with extinction, the species is existing in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or (2) The species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered "threatened".

Page 4			SLWRI DEIS Review by CDFW					
DFW-73								
21	CDFW	SLWRI DEIS	Summary	N/A	ES-68	Table S-3	Table S-3l; Loss of general vegetation habitats because of inundation, vegetation removal, or construction activities	Please quantify the impacts.
DFW-74								
22	CDFW	SLWRI DEIS	Summary	N/A	ES-77	Table S-3	Table S-3, Impact Wild-2 and Impact Wild-3: Loss of approximately habitat	Please quantify the impact
DFW-75								
23	CDFW	SLWRI DEIS	Introduction	1	Page 1-8	Line 28	The recovery plan emphasizes that, under current conditions, even two consecutive years of drought …	As per the OCAP BO, Reasonable and Prudent Alternatives were developed to address the impacts of the CVP and SWP. It did not include raising the dam as an RPA or an item to explore. As written, the document implies that this project is needed to address flow and temperature concerns. The recovery plan references the OCAP BO in the context of flow management and addressing low water years; in addition, the 2009 NMFS recovery plan actions include (pp 99 and 100)) "Continue(ing) to implement a river flow management plan that balances carryover storage needs with instream flow needs for winter-run Chinook salmon based on runoff and storage conditions, including flow fluctuation and ramping criteria (USFWS 2001). This has not been changed in the public draft EIS.
DFW-76								
24	CDFW	SLWRI DEIS	Introduction	1	Page 1-9	Line 26	…the overall trend for the past 10 years has shown increases…	CDFW does not agree with this statement. While populations showed increases in the mid 2000's to as large as 15 to 17 thousand fish, the populations since then have not rebounded as hoped and remain less than 5 thousand for the past six years. Go to http://www.fws.gov/stockton/afrp/ to review Grandtab and ChinookProd tables, which currently contains data through the 2011 spawning season. We made a a comment on this in the SLWRI Draft Feasibility Report comment letter. Please address that comment.
DFW-77								
25	CDFW	SLWRI DEIS	Introduction	1	Page 11-13	Line 9	Climate change could also result in reduced end-of-September carryover storage volumes…	Consider evaluating climate change results…indications are that Mt. Shasta will get cooler and/or experience more rain. Need more input on this in terms of climate change analysis.

Page 5			SLWRI DEIS Review by CDFW					
DFW-78								
26	CDFW	SLWRI DEIS	Introduction	1	Page 1-15	Line 6	Modification of seasonal flow patterns by dams and water diversions also has inhibited …	Please note this sentence. Will the SLWRI address this impact by a change in flow patterns which will enhance riparian habitat succession and/or increase riparian habitat? This paragraph/sentnce implies that the SLWRI could provide a solution to this problem in a similar way that it could address increasing water demand stated earlier in the document. However, there is little mention of doing this in the alternatives. It appear to an element of CP4 by using the dedicated pool, however, it is not clearly described how this would be implemented. Riparian succession, floodplain inundation, etc., directly and indirectly improves anadromous fish survival. This applies to the next paragraph e on fish and wildlife species/riparian habitat.
DFW-79								
27	CDFW	SLWRI DEIS	Introduction	1	Page 1-27	No line	CDFW Permits	See our Comment letter on the Draft Feasibility Report, Feb. 2013, regarding compliance with CDFW Codes and Permit requirements.
DFW-80								
28	CDFW	SLWRI DEIS	Introduction	1	Page 1-27	No line	CA Resource Agency Role	The correct name is the California NATURAL Resources Agency. Compliance with the state Wildlife and Scenic Rivers Act also applies here.
DFW-81								
29	CDFW	SLWRI DEIS	Introduction	1	1-31	25	The *STNF LRMP* direction requires that know sites be protected from disturbance during management.	The Survey and Manage rules are stringent—not all categories of SM species require predisturbance surveys, but most all require that known sites be managed for persistence of the SM species, not just managed for disturbance impacts. The management recommendations are here-- http://www.blm.gov/or/plans/surveyandmanage/recommendations/
DFW-82								
30	CDFW	SLWRI DEIS	Alternatives	2	2-34	24	…an average annual increase in the Chinook salmon population of about 207,400…juvenile fish.	This alternative contains, in its title, "Anadromous Fish Survival", yet it has less benefit than CP2 (379,000 juvniles) as per the SALMOD analysis. Alt. 2 is a smaller dam raise. Consider removing those words from the title of this alternative.
DFW-83								
31	CDFW	SLWRI DEIS	Alternatives	2	2-50	40	Restoration measures for six potential sites…	This is new information in the context of actual locations and has not been discussed, relatively speaking, with CDFW. Additional elaboration on how these projects may actually benefit fish is needed, in addition to more coordination with the fish agencies.
DFW-84								
32	CDFW	SLWRI DEIS	Alternatives	2	2-56	15	Sacramento River Temperature Task Group	See our comment letter on the SLWRI Feasibility Report. The SRTTG is not necessarily the right forum for this discussion/coordination, and they have not been given this responsibility within the NMFS OCAP BO. The use of the SRTTG was also never discussed with the fish agencies involved with the dedicated pool (see 2008 PAM letter).

Page 6			SLWRI DEIS Review by CDFW					
DFW-85								
33	CDFW	SLWRI DEIS	Alternatives	2	2-58	33	Restoring riparian, floodplain, and side channel habitat in the upper Sacramento River	These restoration projects are not described in the CP5 section. Are they the same as the ecosystem restoration actions on the Sacramento River that are described in CP4? Please elaborate.
DFW-86								
34	CDFW	SLWRI DEIS	Alternatives	2	2-67	6	Exceptions would be made in areas with high shoreline erosion potential, or habitat for special-status species	The impact on special status species could be extensive. For example, removal of trees and/or complete vegetation removal could affect bald eagles significantly. Leaving trees for retention but removing others, for example, could make the remaining trees more susceptible to high wind effects. Removing vegetation could also make areas susceptible to NIS plant invasion and expose prey species to predation. It would also remove potential cover habitat for resresvoir fisheries. CDFW expects that this will be completed evaluated in the Environmental Consequences section.
DFW-87								
35	CDFW	SLWRI DEIS	Alternatives	2	2-101 2-102	35 Line 2 to 10	...the preferred alternative for implementation will be identified in the Final EIS.	California Environmental Quality Act (CEQA) Guidelines Section 15126.6 (e)(2) requires identification of the "Environmentally Superior" Alternative in the draft Environmental Impact Report. Until the Environmentally Superior Alternative is identified in the draft environmental document, the document is not in compliance with CEQA. See also our comment letter on the Administrative draft SLWRI EIS, April 2013.
DFW-88								
36	CDFW	SLWRI DEIS	Considerations	3	3-6	5	These criteria are based on the checklist presented in Appendix G	Appendix G states: "All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts." The draft EIS does not accomplish this to a required level of detail and/or analysis. As defined in Section 15355, a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts.
DFW-89								
37	CDFW	SLWRI DEIS	Considerations	3	3-24	1	...degradation caused by sedimentation and urbanization, and developing a watershed management and analysis plan.	Degradation was primarily caused by mining and flow regulation on Clear Creek. The other programs under CVPIA also play a large role in Sacramento River flow management and restoration, particularly 3406(b)(2) and 3406 (b)(13), the Red Bluff diversion dam project/new pump facility (still being implemented), refuge water supply, etc.
DFW-90								
38	CDFW	SLWRI DEIS	Considerations	3	3-26	20	Recovery Plans	Bank Swallow conservation Plan is also missing, as is the NMFS 2009 Draft Recovery plan for anadromous salmonids. CA RL Frog also has a recovery plan; that is missing.
DFW-91								
39	CDFW	SLWRI DEIS	Considerations	3	3-29	35	The Invasive Non-Native Plant (Weed) Management Plan for the Mouth of Cottonwood Creek Wildlife Area	This is not an active project. However, there is an AFRP-funded project for non-native weed management control on Cottonwood Creek, associated currently with SF Cottonwood Creek, which is several miles upstream of the Wildlife Area.

Page 7			SLWRI DEIS Review by CDFW					
DFW-92								
40	CDFW	SLWRI DEIS	Considerations	3	3-30	6	Deer Creek Flow Enhancement Program	This project has been changed significantly, including the dropping of the groundwater well pumping element. Negotiations are underway for a possible water lease with Deer Creek Irrigation District. "The Deer Creek Flow Enhancement Program is a component of the conceptual framework for the Deer Creek Flow Enhancement Program.–this makes no sense– the Program is a component of the same program? Please edit.
DFW-93								
41	CDFW	SLWRI DEIS	Considerations	3	3-31	2	Projects	In relation to the DCFEP, DWR is currently developing 50% designs for fish passage solutions at the DCID Dam site, and AFRP is funding of the 100% engineered designs of the preferred alternative. There are several other AFRP projects, such as redd dewatering monitoring, acoustic tagging of juvenile fish, and implementation projects on the other tributaries (Mill Creek, Antelope Creek, Cow Creek) that are missing in this section. Some of them have a direct relationship with conditions on mainstem Sacramento River.
DFW-94								
42	CDFW	SLWRI DEIS	Considerations	3	3-42	17	Natomas Levee Improvement Program Landside Improvement Project	Natomas Irrigation District recently installed a new, very expensive fish screen. That should be listed in this document.
DFW-95								
43	CDFW	SLWRI DEIS	Geology	4	4-68	25	Geomorphic changes at these major tributaries have not been linked with Shasta Dam operations.	This effect has been observed at the confluence with Cow Creek and the Sacramento River. On Cow Creek, historical gravel removal occurred several miles upstream and can similarly not be considered the reason behind the downcutting seen at the confluence with the Sacramento River. The linkage, as defined in this paragraph, has not been formally made because no one has been assessing this potential effect. Observation from professionals who have been working in this area for decades (from CDFW and the Regional Water Quality Control Board) are the ones who are noticing these effects. The effect of downcutting and channel adjustment on tributaries following construction of a dam on a river is well documented (see attached list of references). The conclusion drawn within this document is inaccurate. See comments 6-8 below for evidence and research on this subject.

Page 8			SLWRI DEIS Review by CDFW					
DFW-96								
44	CDFW	SLWRI DEIS	Geology	4	4-68	27	...impact would be less than significant.	(As described in Brandt 2000) The primary effect of dams on system stability is to reduce peak discharges and sediment supply to the downstream channel. Upstream effects of a dam and associated reservoir include delta formation, gradual raising of stream levels in the backwater zone, and a more pronounced meandering (USACE, EM 1110-2-1418, 1994). Downstream effects result from flow control through the dam and retention of sediment. A reduction in peak discharge often reduces bank instability downstream by inducing deposition at the channel margin in the form of berms. The channel adapts to a lower channel forming discharge by shrinking. Reducing peak discharge and lowering the flowlines in the downstream channel may also induce tributary instability by lowering their effective base level.
DFW-97								
							Above comment cont'd	Channel degradation in the form of a head cut advances up the tributaries and ultimately increases the sediment supply to the main river. However, reducing the sediment supply to the stream through reservoir retention also often induces channel degradation downstream, which can actually lead to mass instability of the banks by increasing bank heights. This may trigger a reversal of main channel response and lead to eventual aggradation due to increased sediment supply from tributaries (Biedenharn, 1983). System response to flow control and sediment retention aspects of dams are very complex and cannot be easily predicted or generalized (Brandt 2000).
DFW-98								
45	CDFW	SLWRI DEIS	Geology	4	4-68	27	...impact would be less than significant.	Impacts from dams: The major effect of main stream changes on the tributaries will often be a change in their base levels. An increase of water flow or aggradation, and by that base level raising, will only affect the tributaries up to a level where the backwater curve intersects the original profile _Leopold et al., 1964. For most occasions, however, a lowering of base level due to decreased water flow or degradation could be expected. Several reasons exist for this (Germanoski and Ritter, 1988): 1) Channel bed degradation will lower the flow level of the trunk river at any given discharge; 2) channel widening by bank erosion of the trunk river will produce the same effect;
DFW-99								
							Above comment cont'd	and 3) if flow regulation is significant, the peak discharge of the trunk river will be out of phase with the peak discharge of the unregulated tributary streams. The third effect has, for example, been noted in Canada where tributaries adjust by degrading their beds in the vicinity of the junction to the main channel (Kellerhals and Gill, 1973).

Page 9			SLWRI DEIS Review by CDFW					
DFW-100								
46	CDFW	SLWRI DEIS	Geology	4	4-68	27	...impact would be less than significant.	Army Corps of Engineers, http://www.spn.usace.army.mil/russian/overview031600.html) Coyote Dam has also altered the movement of sediment in the Russian River. According to the Sonoma County Water Agency estimates, an average of 210,000 tons (approximately 98 acre feet) of sediment per year is trapped in Lake Mendocino from the 105 square miles of watershed upstream (Florsheim and Goodwin 1993). Consequently, the Russian River below the dam is starved of this material. Compensating for this lack of sediment, flows below the dam scour gravel from the bed and erode banks of the channel contributing to incision and bank failure. While flood peaks are diminished downstream of the dam, the duration of moderate flood flows from controlled releases has increased, promoting bank erosion along the river for miles downstream of the dam. Oral histories, observations, and anecdotal evidence all suggest that river downcutting and erosion has significantly increased since the construction of Coyote Dam in 1958. There have been reports of channel incision from 8 to 14 feet since the early 1960s...
DFW-101								
							Comment #8 cont'd	...Likewise, the tributaries in the upper reach of the Russian River have exhibited significant head cutting and incision in response to the erosion of the main channel. Rapid incision through the loose alluvium of the floodplains and headcutting in all the associated tributaries have resulted in significant economic costs in lost farmland, bridge replacements, grade control structures, bank protections, and modifications to pump intakes.
DFW-102								
47	CDFW	SLWRI DEIS	Fisheries	11	11-13	Table 11-1	Redband Trout	McCloud River Redband Trout. This is a CA Species of Special Concern.
DFW-103								
48	CDFW	SLWRI DEIS	Fisheries	11	11-15	Table 11-1	River Lamprey	River lamprey (*Lampetra ayresii)* may also occur. They are a Species of Special Concern.
DFW-104								
49	CDFW	SLWRI DEIS	Fisheries	11	11-28	8	NMFS has jurisdiction over anadromous and marine species...	NMFS is also responsible for designating Critical Habitat and preparing Recovery Plans.
DFW-105								
50	CDFW	SLWRI DEIS	Fisheries	11	11-31	17	CALFED Ecosystem Restoration Program Plan	This program is no longer called CALFED ERP, just ERP.
DFW-106								
51	CDFW	SLWRI DEIS	Fisheries	11	11-33	7	Based on Reclamation's Long-Term Central Valley Project Operations ..., the BO	Cite reference: USFWS 2008 BO and NMFS 2009 BO.
DFW-107								
52	CDFW	SLWRI DEIS	Fisheries	11	11-37	42	If any changes are made...a supplemental report to the SWRCB	The WOMT should also be included here, as per the 2009 NMFS OCAP BO RPA's.

			Page 10	SLWRI DEIS Review by CDFW				
DFW-108								
53	CDFW	SLWRI DEIS	Fisheries	11	11-40	20	...including the elimination of the Survey and Manage ...as the result of a court order	Consider expanding this narrative: The Survey and Manage rules are stringent—not all categories of SM species require predisturbance surveys, but most all require that known sites be managed for persistence of the SM species currently. The management recommendations are here-- http://www.blm.gov/or/plans/surveyandmanage/recommendations/
DFW-109								
54	CDFW	SLWRI DEIS	Fisheries	11	11-41	6	Consultation with USFWS will continue regarding habitat management for threatened and endangered species.	There is land managed by the Mendocino NF near Red Bluff, along the Sacramento River, and BLM also manages lands along the River. The management plans of these agencies/forests should also be included.
DFW-110								
55	CDFW	SLWRI DEIS	Fisheries	11	11-41	8	State Regulations	Here are other codes requiring compliance: Code 1505, regarding Spawning Areas management and protection, from Keswick to Squaw Hill Bridge near Vina, CA; Codes 5900 - 5904, which is related to development of water resources projects; Codes 5930 - 5948, which has to do with dams and impacts to fish resources; Codes 7261 - 7261, regarding trout management; and Code 7370, regarding sturgeon management, and FGC 5650(a)(1).
DFW-111								
56	CDFW	SLWRI DEIS	Fisheries	11	11-44	32	Yolo County's general plan	Cite references of and include a narrative on all of the (affected) county plans.
DFW-112								
57	CDFW	SLWRI DEIS	Fisheries	11	11-45	31	Cantara Trustee Council	The Cantara Trustee Council disbanded in 2007. There are currently only a couple of incomplete/ongoing grants.
DFW-113								
58	CDFW	SLWRI DEIS	Fisheries	11	11-47	13	Sacramento River Conservation Area Program	The correct name is the Sacramento River Conservation Area Forum.
DFW-114								
59	CDFW	SLWRI DEIS	Fisheries	11	11-48	N/A	Other groups	There is also an active entity called the Sacramento River Watershed Program, which originally came into being as a result of water quality issues on the Sacramento River at the north end of the city.
DFW-115								
60	CDFW	SLWRI DEIS	Fisheries	11	11-49	2	Model selection and use for each of the variables were as follows:	Please see our comments on the concerns regarding SALMOD, using monthly flow data, and other issues in the 2006 comment letter from CDFW on SALMOD; our 2008 SLWRI DEIS comment letter; our 2011 SLWRI DEIS comment letter; and our 2012 Feasibility Report comment letter.
DFW-116								
61	CDFW	SLWRI DEIS	Fisheries	11	11-50	30	...as outlined in SWRCB Water Right Order 90-5 and multiple BOs.	This paragraph is confusing in that it does not make any particular point and/or make a conclusion of isolated inaccuracies/real time issues identified in the previous paragraph.

			Page 11	SLWRI DEIS Review by CDFW				
DFW-117								
62	CDFW	SLWRI DEIS	Fisheries	11	11-53	23	However, model outputs should be used as tools for interpretation of anticipated impacts rather than actual projections	Daily information is also critical to the interpretation and analysis of effects. Just one day of fluctuating flow could devastate progeny (developing eggs). Secondly, despite what is stated in this sentence, the models seem to be heavily relied upon when making determinations of benefit of the project and the assessment of impacts.
DFW-118								
63	CDFW	SLWRI DEIS	Fisheries	11	11-56	1	22,178 Spring-run Chinook	CDFW has already commented on the degree to which this is an unrealistic number, and reasons for why the AFRP goal looks the way it is. This document should clearly reflect that information in order to not lead the public astray. Please describe the lack of usefulness (in this case, as it relates to the doubling number) of this figure.
DFW-119								
64	CDFW	SLWRI DEIS	Fisheries	11	11-60	23	Riverine fish, including steelhead and green sturgeon, were evaluated based on differences between monthly mean flows	See earlier comments in the 2008 CDFW comment letter, the 2011 comment letter and the 2013 FR comment letter on the SLWRI for the risk involved with using monthly flow and water termperature data.
DFW-120								
65	CDFW	SLWRI DEIS	Fisheries	11	11-71	29	The following significance criteria were developed...	Critical Habitat, as designated, Primary Constituent Elements, and Essential Habitat also needs to be addressed. Significance criteria as per ESA and CESA also needs to be considered and added into the criteria; on the same page, Appendix G of the CEQA Guidelines is also mentioned; see earlier comment on Appendix G.
DFW-121								
66	CDFW	SLWRI DEIS	Fisheries	11	11-72	20	Causing a reduction in ecologically important geomorphic processes ...to high flows.	This needs to include effects on the tributaries to the Sacramento River. The tributaries play an important role in the health of the Sacramento River fishery and also need to be addressed. Please see the CDFW comments on the Geology chapter. In addition, correct interpretation of direct and indirect effects will be further hampered by using monthly flow and temperature data, which will miss some of the daily, or hourly effects, on a species. Comparable analyses of effects of restoration projects on fish can conclude with an adverse effect determination, for example, if juvenile fish are disturbed even one time by heavy equipment working in the area, or crossing a stream.
DFW-122								
							Above comment cont'd	The magnitude of these effects are then translated into the (direct and indirect) numerical effects (declines) on the population in order for take to be calculated by NMFS. It does not appear that this project and its associated analysis comes close to a comparable numerical (negative effect) of all actions associated with the project of raising Shasta Dam.

Page 12			SLWRI DEIS Review by CDFW					
DFW-123								
67	CDFW	SLWRI DEIS	Fisheries	11	11-86	13	Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.	Impacts on water quality should also be included here in the context of how inundating more old mines may affect reservoir fisheries. The potential for additional mercury contamination, already documented in the Reservoir, should also be assessed, especially as it relates in inreservoir fish.
DFW-124								
68	CDFW	SLWRI DEIS	Fisheries	11	11-86	32	Impact Aqua-4 (CP1): Effects on Special-Status Aquatic Mollusks; impact is potentially significant.	As with other chapters in this EIS (e.g. Wildlife), the conclusions developed on these impacts are essentially based upon nothing. Additional information is needed on the amount of potential habitat inundated, the direct effect on the species impacted, indirect effects, overall effect on the species' population, relative to its distribution, and cumulative effects. There is also no geographical reference by which these impacts can be observed (i.e. where around the lake perimeter are impacts being expected). This comment applies to most of these "Impact AQUA" analyses found in all alternatives.
DFW-125								
69	CDFW	SLWRI DEIS	Fisheries	11	11-88	20	Expansion of the surface area of Shasta Lake could be modestly beneficial...to this species in the lake.	References are needed to assess the degree to which the preparer has researched suitable habitat and the potential effect on this species. This comment holds true for this and other Impact sections in all Alternatives.
DFW-126								
70	CDFW	SLWRI DEIS	Fisheries	11	11-89	21	Therefore, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.	The tributary investigations are believed to be ongoing, so this seems predecisional.
DFW-127								
71	CDFW	SLWRI DEIS	Fisheries	11	11-92	1	High levels of suspended sediments could also cause redistribution...and could diminish the character and quality of the physical habitat...	Impacts on water quality should also include the effects of inundating old mines in Shasta Reservoir and current water quality conditions in the River below Keswick (Sacramento River is TMDL listed). This does not just apply to potential contamination during construction activity. The effect of flow changes on water quality, relative to the health of fish, should be more completely analyzed. See also the ERP milestones and actions as identified in the CALFED EIS (2000) as it relates to water quality contaminants.
DFW-128								
72	CDFW	SLWRI DEIS	Fisheries	11	11-92	33	With implementation of these environmental commitments, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.	This is an erroneous conclusion. The document should assess the impact to each special status species—there are four runs of Chinook salmon on the Sacramento River that spawn in this area, and their life histories are different. The impacts to these species, depending on timing and magnitude of impact, needs to be fully assessed. Similarly, management for one species may affect other species, so this needs to be also fully evaluated. Secondly, other projects, such as gravel augmentation, typically result in a "May Affect not likely to adversely affect" determination as per ESA.

Page 13			SLWRI DEIS Review by CDFW					
DFW-129								
							Above comment cont'd	When this impact is included with other impacts, as a result of the project, the determination may be different. All impacts of the entire project need to be assessed as a whole. This does not appear to have been conducted within this document. This comment applies to other impacts identified, as well as the comparable impact sections that are found in the other alternatives.
DFW-130								
73	CDFW	SLWRI DEIS	Fisheries	11	11-118	9	Impact Aqua-14: This impact would be potentially significant.	Please identify the scale to which is expected to occur. If it is potentially significant, what is being done to offset this impact? This particularly relates to the potential success of anadromous salmonids and other species that are dependent on instream habitat conditions and/or depend on habitat formed by large flow events (e.g. bank swallow).
DFW-131								
74	CDFW	SLWRI DEIS	Fisheries	11	11-121	22	Process-based interpretations suggest that potential project-related changes in flow	Please identify where this information can be found for CDFW and other agencies to review. Please also identify how the proposed flow regime, based on OCAP BO RPA requirements, expectations for certain water types to occur, and other information, is addressing the need for river meander. This should also be addressed in the cumulative effects section, given the DWR mandate for flood management (legislative mandate for developing a flood management plan). This comment can also be applied to the floodplain inundation section below.
DFW-132								
75	CDFW	SLWRI DEIS	Fisheries	11	11-122	17	Aqua-17: ...This impact would be potentially significant.	Please identify is this effect is adverse to the point of requiring a biological opinion, and put the adverse effect in context to the other adverse effects and beneficial effects as a result of project implementation. This needs to be done for each special status species and should also show the results of management for one species and the potential negative impact on another species.
DFW-133								
76	CDFW	SLWRI DEIS	Fisheries	11	11-123	23	This impact would be less than significant for striped bass...Overall, this impact would be potentially significant.	See earlier comment about the degree of significance and the extent to which this would adversely affect special status species. Ther appears to be a contradiction. This comment can be applied to other Impacts in the other 4 alternatives that address the same issue.
DFW-134								
77	CDFW	SLWRI DEIS	Fisheries	11	11-124	30-39	Downcutting of the lower tributaries could result in bank erosion...which in turn could affect riparian recruitment and succession processes.	The loss of these flow events and/or the frequency at which they occur has resulted in an OCAP BO RPA that is mandated to occur on Clear Creek. BOR should be proactive in addressing this need for higher, floodplain inundation flow events before they are potentially mandated by law to implement them. This impact is identified here, yet in the Geology chapter, it is discounted. Please also see CDFW's comments on this in the Geology comment spreadsheet.

Page 14			SLWRI DEIS Review by CDFW					
DFW-135								
78	CDFW	SLWRI DEIS	Fisheries	11	11-144	4	Mitigation for this impact is not proposed because operations ...to reduce any impacts to listed fish species.	This is incorrect. The current RPA's are developed and/or are being refined but are based upon a current dam size and CVP operations as of 2009. This document needs to address changes in actions and its impact on listed fish. We assume that new Reasonable Measures or RPA's may be developed upon consultation on this project. BOR will have to write the Biological Assessment and make a determination on the effect to these species.
DFW-136								
79	CDFW	SLWRI DEIS	Fisheries	11	11-147	12	The predicted increase in potential entrainment risk...does not allow the predicted losses to be evaluated at the population level.	As per ESA, the consultation will require the impact to the species at a population level in order to make a determination on the effect of the project. CESA will also require this kind of analysis.
DFW-137								
80	CDFW	SLWRI DEIS	Fisheries	11	11-148	6	However, these changes are unlikely to result in substantial effects ...in the CVP and SWP service areas.	This is an unsubstantiated comment. Please elaborate on and defend the conclusion that is drawn.
DFW-138								
81	CDFW	SLWRI DEIS	Fisheries	11	11-197	28	Impacts to inreservoir water quality	The Fisheries and Water Quality sections inadequately address water quality concerns related to newly inundated old and/or abandoned toxic mines, and the effect of reservoir changes on the mercury levels. Fish in the lake are already documented to have elevated mercury levels. THe DEIS needs to evaluate these impacts adequately.
DFW-139								
82	CDFW	SLWRI DEIS	Fisheries	11	11-251	41	A total of 11 miles of low-gradient reaches that could potentially provide some spawning and rearing habitat for adfluvial salmonids (estimated as 40,103 square feet for all tributaries) would be affected by CP4.	Because the tributary investigations are ongoing and incomplete, and because the document fails to state the condition or quality of this habitat, it is currently impossible to assess the impact on adfluvial salmonids. It is similarly difficult to determine mitigation measures with the analysis still in progress and the effects on special status mollusks. Please rectify. CDFW is also available to discuss this issue further, given our responsibilities as it relates specifically to the trout fishery and other natural resources in these areas.
DFW-140								
83	CDFW	SLWRI DEIS	Fisheries	11	11-253	3	As under CP4, environmental commitments for all actions would be in place to reduce effects.	Please identify where to find info on "environmental commitments". If effects are reduced, they may still need to be mitigated for to reduce it to below a level of significance. The same comment is to be used wherever "environmental commitments" is used (e.g. Impact Aqua 11 below). A determination has not been made by the permitting and/or regulatory agencies as to the effectiveness of "environmental commitments", nor does BOR know, at this point, what may be required under the permits.

Page 15			SLWRI DEIS Review by CDFW					
DFW-141								
84	CDFW	SLWRI DEIS	Fisheries	11	11-266	4	...and because of the additional volume of cold water that would be available for anadromous fish.	Management of the additional dedicated pool has not yet been defined, so it is impossible to determine the effects of that action on the fishery, or other species, below Keswick. The conclusions in this section are therefore unsubstantiated. The additional dedicated water may be used for other things than additional cold water, as was discussed in 2008. There has not been a meeting since that time to discuss management of the dedicated pool, despite numerous requests to do so.
DFW-142								
85	CDFW	SLWRI DEIS	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-108	18 et ff.	The only MSCS species known to occur...	Discussion of impacts to Neviusia with a 6.5 foot dam dam raise should discuss the range of environmental effects that occur with the increase water level and how these will change the surrounding micro-climate of any populations not fully flooded by the higher water level. Precise computations should be presented on the populations that will be completely flooded (exterminated) from those that are suggested as only having a portion of the population destroyed. The reasons the populations are postulated as being partially destroyed must be described for each population as assumptions about ground water, local micro-climate, winds, temperatures, etc. may be correct or in error and need specification for proper evaluation for full impacts and potential for survival or extermination.
DFW-143								
86	CDFW	SLWRI DEIS	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-125	40 et ff.	Impact Bot-2 (CP2): Loss of MSCS Covered Species	The discussion of impacts with the raise of 6.5 feet on Neviusia was projected to occur on 10 of 23 populations with some having undocumented and unspecified portions of the populations effected. This section contains minimal discussion of the increasing level of population destruction to Neviusia with the additional raise of 6 feet to 12.5 feet; and omits discussion of the effects of the loss of these populations on the composition of the species and what will be the remaining populations and how new water levels or changing land use may affect them. Further omitted are additional impacts to Vaccinium sp. and the other MSCS plant species and how these impacts would increase relative to the initial 6.5 ft. increase. This information is needed to properly evaluate the proposed alternatives and to determine if the mitigation has been properly scaled to meet the increasing level of impact with increasing losses to populations, acreage affected, and the species.

Page 16			SLWRI DEIS Review by CDFW					
DFW-144								
87	CDFW	SLWRI DEIS	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-134	29 et ff.	Impact Bot-2 (CP3): Loss of MSCS Covered Species	The increase of the dam to 18.5 feet omits an adequate discussion of the increase in effects from the 12.5 ft level which was inadequately described and evaluated in CP2. The discussion of impacts with the raise to 18.5 feet on Neviusia is completely unknown as presented in the impact assessment. The impact is stated to be significant with no further description as to how much more significant it would be and how these increasing raises in the dam would increase the level of damage and destruction to the various species. This section omits discussion of the increasing level of population destruction to Neviusia with the additional raise of 6 feet as additional to the 12.5 ft. raise.
DFW-145							Above comment cont'd	All MSCS species should be discussed individually with the increasing impacts to the populations and how (particularly with regard to Neviusia and Vaccinium sp.) these increasing impacts will effect the species as a whole in terms of surviving intact populations, genetic and phenotypic diversity and other factors affecting species survival with some having undocumented and unspecified portions of the populations effected. Also omitted are discussions of whether additional populations would be impacted. This information is needed to properly evaluate the proposed alternatives and to determine if the mitigation has been properly scaled to meet the increasing level of impact with increasing losses to populations, acreage affected, and the species.
DFW-146								
88	CDFW	SLWRI DEIS	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-143	1 et ff.	Impact Bot-2 (CP4): Loss of MSCS Covered Species	This impact would be similar to that discussed in CP3, which was inadequately discussed and described immediately above for CP3.
DFW-147								
89	CDFW	SLWRI DEIS	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-161	11 et ff.	Mitigation Measure Bot-2 (CP1):...	Second bullet: "When feasible, Reclamation will relocate populations of MSCS plants..." This would primarily pertain to Neviusia cliftonii and would involve approximately 50% of the known populations of the species. There have been no studies conducted that have attempted to reestablish this species in other locations. Studies to date have not been able to determine what factors are important for the species to survive. It apparently is not a species that can easily occupy other habitat as it has limited isolated populations. Most efforts at translocating or relocating native plants have not been successful over the long term (> 25 years).

Page 17			SLWRI DEIS Review by CDFW					
DFW-148								
							Above comment cont'd	This bullet mentions "when feasible" yet does not indicate how feasibility will be determined and assessed. For most native plants there are no critieria to determine if such a project would be feasible in the sense that it also has a good chance of success. This mitigation measure is highly unlikely to succeed and needs to be fully described for each species that would be involved. Fifth Bullet: Development of mitigation and monitoring plan, states that this plan will identify suitable sites for mitigation, species to be planted, etc.; however, in the second paragraph following the sixth bullet it is written that potential mitigation lands containing comparable habitat have been identified adjacent to the project.
DFW-149								
							Above comment cont'd	These sites that have been identified should be listed now for each species and each population of each species that would be affected by the dam raise height being addressed. Missing from the discussion of the mitigation measures is what ratio of off site planting would occur for each population destroyed. For instance a starting point would be to consider that any given new mitigation population may have a 5-10% chance of success for survival of one, over the next 100 years. Therefore for each population destroyed 10-20 or more off site populations should be established. In the case of Neviusia, with the potential to destroy 12 populations, it would necessitate to establish 120-240 populations that would require monitoring for at least 50 years. For the other species and populations similar calculations would be required.
DFW-150								
							Above comment cont'd	Chance of survival should also be estimated for 500 and 1000 years or more, which may require the establishment of many more hundreds of populations for each species affected. In the case of Neviusia, which could incur 50% destruction just with the 6.5 ft. dam increas,e additional calculations for threats and long term survival in the face of climate change would be required.
DFW-151								
90	CDFW	SLWRI DEIS	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-167	32 et ff.	Mitigation Measure Bot-2 (CP2):...	This measure is the same as for MM Bot-2 (CP1), thus the comments on this mitigation measure apply here also. In addition, there should be identification for the increase of damage to species and populations with the increase in dam height. This is absent here. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms of threats to each species and the increased costs and potential for success with increase in mitigation required.

Page 18			SLWRI DEIS Review by CDFW					
DFW-152								
91	CDFW	SLWRI DEIS	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-170	17 et ff.	Mitigation Measure Bot-2 (CP3):...	This measure is the same as for MM Bot-2 (CP1) and for MM Bot-2 (CP2), thus the comments on these mitigation measures apply here as well and require further data. In addition, there should be identification for the increase of damage to species and populations with the increase in dam height. This is absent here. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms of threats to each species and the increased costs and potential for success with increase in mitigation required.
DFW-153								
92	CDFW	SLWRI DEIS	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-173	6 et ff.	Mitigation Measure Bot-2 (CP4):...	This measure is the same as for MM Bot-2 (CP1) and for MM Bot-2 (CP2), and MM Bot-2 (CP3), thus the comments on these previous mitigation measures apply here also and need expansion. There should be identification for the increase of damage to species and populations with the increase in dam height. This is absent here. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms of threats to each species and the increased costs and potential for success with increase in mitigation required.
DFW-154								
93	CDFW	SLWRI DEIS	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-178	29 et ff.	Mitigation Measure Bot-2 (CP5):...	This measure is the same as for MM Bot-2 (CP1), MM Bot-2 (CP2), MM Bot-2 (CP3), and MM Bot-2 (CP4) thus the comments on these previous mitigation measures apply here also and need expansion. There should be identification for the increase of damage to species and populations with the increase in dam height. Although this section discusses the acquisition and preservation of mitigation lands no lands are identified. In the case of Neviusia cliftonii, there are no lands with this species outside the study area that exist, if lands can be acquired for mitigation they should be listed. Lands for other species should be discussed and listed as well.
DFW-155								
							Above comment cont'd	Without identification and discussion of the mitigation lands, it is impossible to assess whether whether mitigation is being achieved. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms of threats to each species and the increased costs and potential for success with increase in mitigation required.

Page 19			SLWRI DEIS Review by CDFW					
DFW-156								
94	CDFW	SLWRI DEIS	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-181	1 et ff.	Cumulative Effects	The cumulative effects section remains inadequate in addressing all special status species, habitats, and various effects that have occurred from the dam in the past and what could be expected in the future. This sections that discuss the cumulative effects that will occur with each proposed level of dam height do so in a very cursory manner and do not discuss the changes in significant detail that can be quantified and evaluated. Unfortunately, the lack of detail in the cumulative effects section is direct effect of the lack of detail and analysis in the direct effects sections that preceded this section. For example, there will be cumulative effects from implementing proposed mitigation, but because none of the mitigation lands have been identified, there is can be no discussion of what these possible effects will be.
DFW-157								
							Above comment cont'd	This is repeated throughtout the document. Besides Neviusia cliftonii, other plant species will incur direct and cumulative effects that will be different effects from Neviusia cliftonii a perennial shrub. Still more detail and discussion is needed for the individual special status organims will be effected and then further analysis on how these potential effects may be exacerbated by other confounding factors such as climate change, population growth and the continuing demand for water.
DFW-158								
95	CDFW	SLWRI DEIS	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-182	1 et ff.	Although causing similar effects CP1-CP5 differ in magnitude	This sentence correctly identifies that fact that CP1-CP5 would differ in the magnitude in their effects. Unfortunately the botanical effects section does not fully disclose, identify, and quantify the increasing effects on the botanical resources. Essentially they are identified as "significant" with little additional detail. The quantification of the effects are vital to assessing the actual costs and losses, so this data can be used to accurately and effectively mitigate the true impacts. The mitigation section is weak, vague and inaccurate because the determination of effects is vague, imprecise, overly-general and mostly repetitive of the vague determinations made previously. Even the large degree of mitigation that may be required for all the resources involved may themselves have cumulative effects that should be properly quantified and may require further mitigation.
DFW-159								
96	CDFW	SLWRI DEIS	Wildlife	13	13-6	Tables 12-1 and 12-2	Table 31-1; total acres	Total acreage is useful but does not reflect the complete picture in terms of impacts. The analysis area size should be of sufficient size to evaluate the direct, indirect, and cumulative effects by life stage and species. Polygon/habitat size is also important when assessing impacts to certain species (e.g. the minimum size of a nest stand for goshawks).

Page 20			SLWRI DEIS Review by CDFW					
DFW-160								
97	CDFW	SLWRI DEIS	Wildlife	13	13-26	38	and those designated as Multi-Species Conservation Strategy (MSCS) covered species...	As per ASIP direction, the action agency (Reclamation) needs to request a species list of MSCS species and Special Habitats potentially affected by the project. This request needs to be sent to CDFW, who will provide the list. This has not happened to the best of our knowledge, so the MSCS species identified in this document may be incomplete.
DFW-161								
98	CDFW	SLWRI DEIS	Wildlife	13	13-28	Table 13-3	Table 13-4; MSCS species	As per ASIP guidelines, a list of species and special habitats potentially affected by the project must be requested. CDFW will provide this list. This has not occurred, so the MSCS species list shown may be incomplete.
DFW-162								
99	CDFW	SLWRI DEIS	Wildlife	13	13-94	21	(Shasta salamander) This impact would be significant .	These impacts need to also be related to how this loss not only affects individuals, but also how it affects the population overall. This comment also applies to all other species address in this document, and in the various alternatives.
DFW-163								
100	CDFW	SLWRI EIS	Wildlife	13	94	Section CP1	Mitigation Measure Wild-1 (CP1) Take and Loss of Habitat for the Shasta Salamander	The Mitigation measure states that 38 Shasta salamander (SS) sites are known which differs from the Wildlife Technical report that identifies 39 sites. Acres of habitat are divided in limestone and non-limestone, but no further efforts to quantify quality of habitat or probable density of SS in habitat types has been attempted and no surrogate measures have been proposed or attempted to be calculated for mitigation. Estimates can be made based upon area of habitat, estimated quality of habitat, habitat complexity in terms of moisture, vegetation diversity, and through collecting efforts stratified and allocated among sites.
DFW-164								
							Above comment cont'd	These efforts would yield figures that would allow accurate computation of mitigation needed. Direct loss of individuals can be estimated based upon the factors discussed above and others when properly applied. The mitigation measure states that surveys are on-going, but does not identify the level of survey effort, what data are being collected, nor how these data will be used to determine sufficient mitigation for the level of impact being proposed.
DFW-165								
101	CDFW	SLWRI DEIS	Wildlife	13	13-96	40	Additional analysis of impacts will be conducted ... or in the species range (if appropriate).	This is an odd statement. The preparer should know what analyses need to be conducted and include them into the EIS, not only because it is require by law but to also inform the reviewers of the extent of the impact(s).

Page 21			SLWRI DEIS Review by CDFW					
DFW-166								
102	CDFW	SLWRI DEIS	Wildlife	13	13-96 13-98	36 21	33 acres of habitat for the foothill yellow-legged frog and tailed 35 frog. Approximately 9 acres of suitable habitat would be lost... ...approximately 33 acres of suitable habitat for the northwestern pond turtle.	The definition of suitable habitat for foothill yellow-legged frogs and tailed frogs is not the same; similarly suitable habitat for the northwestern pond turtle is not clearly defined. That does not allow CDFW or anyone else to see if suitable habitat was correctly evaluated and defined. Suitable habitat includes both aquatic habitat for turtles, as well as upland/terrestrial areas that are suitable for nesting. Please clarity.
DFW-167								
103	CDFW	SLWRI DEIS	Wildlife	13	13-99	13	Construction or vegetation removal related to relocation areas is not anticipated to occur in suitable cliff habitat.	Please identify what the effect of the project is on the prey base, especially as it relates to peregrine falcons whose eyries are in near proximity to the project area. Suitable habitat includes all of those elements a species needs: Foraging, nesting/reproduction, roosting, migration.
DFW-168								
104	CDFW	SLWRI DEIS	Wildlife	13	13-100	25	Between three and six nest trees may be impacted (bald eagle)	The previous EIS identified between eight and 14 nest trees that would be impacted. This is a large change to the current predicted impact. In any case, of the total nests found around the lake, the potential impact is very significant. This is a state listed species and is also Fully Protected, as well as protected by federal law. CDFW cannot issue take on Fully Protected Species. Additional discussions are needed with CDFW and the USFWS on this significant impact. Analysis of effects on all life history elements needs to be completed (see peregrine falcon comment), including a population level analysis of effect.
DFW-169								
105	CDFW	SLWRI EIS	Wildlife	13	135	Section CP2	Mitigation Measure Wild-1 (CP2) Take and Loss of Habitat for the Shasta Salamander	The Mitigation measure identifies additional acreage of limestone and non-limestone habitat to be affected by the 12.5 ft. dam raise, but no further efforts to quantify quality of habitat or probable density of SS in habitat types has been attempted and no surrogate measures have been proposed or attempted to be calculated for mitigation. Estimates can be made based upon area of habitat, estimated quality of habitat, habitat complexity in terms of moisture, vegetation diversity, and through collecting efforts stratified and allocated among sites. These efforts would yield figures that would allow accurate computation of mitigation needed. Direct loss of individuals can be estimated based upon the factors discussed above and others when properly applied.

DFW-170							Above comment cont'd	The mitigation measure states that surveys are on-going, but does not identify the level of survey effort, what data are being collected, nor how these data will be used to determine sufficient mitigation for the level of impact being proposed. Because Wild-1 (CP1) is inadequate to assess impacts to the speces based upon the 6.5 ft. dam raise, this measure is also inadequate. Neither of these assessments provide any substantial data beyond acreage of limestone and non-limestone that is useful to identify and quantify the deleterious effects to the SS and its habitat.

Page 22		SLWRI DEIS Review by CDFW						
DFW-171 106	CDFW	SLWRI DEIS	Wildlife	13	13-139	7	Reclamation is currently working with the USFS...Indirect and temporary impacts will be analyzed in the Final EIS.	CDFW highly recommends that Reclamation contact CDFW and USFWS to discuss the impacts to bald eagle. This is a public draft EIS and should fully disclose the potential effects to the reviewing agencies and the public to garner the best informed comments. In addition, waiting for an analysis of effects in the final EIS does not meet the intent or directives of the Fish and Wildlife Coordination Act. The same comment holds true for the next section on northern spotted owl.
DFW-172 107	CDFW	SLWRI DEIS	Wildlife	13	13-148	4	An analysis of indirect impacts and temporary impacts will be completed in the Final EIS .	See earlier comments about having to wait for the final EIS to assess impacts. This is not conducive to compliance with FWCA.
DFW-173 108	CDFW	SLWRI DEIS	Wildlife	13	13-148	7	Impact Wild-13 (CP1): Permanent Loss of General Wildlife Habitat	Please identify what is meant by "general" wildlife habitat. Please also identify why the HEP analysis data is not available.
DFW-174 109	CDFW	SLWRI DEIS	Wildlife	13	13-122 13-150	32	Impact Wild-17 (CP1): Impacts on Riparian-Associated Special-Status Wildlife	See Botanical section for information on the potential miscounting of riparian acres affected. In addition, the impact cannot be completely assessed by just reporting total acres. Impacts to a riparian stand can increase edge, induce fragmentation, and expose certain bird species to parasitism by brown-headed cowbirds or predation.
DFW-175 110	CDFW	SLWRI DEIS	Wildlife	13	13-128	14	and therefore bank swallows themselves, would be less than significant.	CDFW does not agree. The flow data used is on an monthly basis. One day of fluctuating flow could destroy a nesting colony, which has been documented to occur. In addition, there does not appear to be adequate river meander analysis done to assess the change in flow conditions and how that may affect the rate of river meander. Consider using the TNC Sac EFT information, which used bank swallow as a indicator species for cut banks, and the work of the Bank Swallow Working Group, which is developing a conservation plan for this species. CDFW's contact person for the working group in Region 1 is Scott Hill.
DFW-176 111	CDFW	SLWRI DEIS	Wildlife	13	13-128	34	...therefore bank swallows themselves, would be less than significant.	See previous comment (above) on bank swallow.
DFW-177 112	CDFW	SLWRI DEIS	Wildlife	13	13-150	32	... this impact would be potentially significant.	Consider using the models developed by TNC (e.g. the TUGS model and the Sac EFT) to assess these impacts more effectively.

Page 23			SLWRI DEIS Review by CDFW					
DFW-178								
113	CDFW	SLWRI EIS	Wildlife	13	157	Section CP3	Mitigation Measure Wild-1 (CP3) Take and Loss of Habitat for the Shasta Salamander	The Mitigation measure identifies additional acreage of limestone and non-limestone habitat to be affected by the 18.5 ft. dam raise, but no further efforts to quantify quality of habitat or probable density of SS in habitat types has been attempted and no surrogate measures have been proposed or attempted to be calculated for mitigation. Estimates can be made based upon area of habitat, estimated quality of habitat, habitat complexity in terms of moisture, vegetation diversity, and through collecting efforts stratified and allocated among sites. These efforts would yield figures that would allow accurate computation of mitigation needed. Direct loss of individuals can be estimated based upon the factors discussed above and others when properly applied.
DFW-179								
							Above comment cont'd	The mitigation measure states that surveys are on-going, but does not identify the level of survey effort, what data are being collected, nor how these data will be used to determine sufficient mitigation for the level of impact being proposed. Because Wild-1 (CP1) and Wild-1 (CP2) are both inadequate to assess impacts to the speces based upon the 6.5 ft., and 12.5 ft. dam raise, this measure is also inadequate. Neither of these assessments provide any substantial data beyond acreage of limestone and non-limestone that is useful to identify and quantify the deleterious effects to the SS and its habitat.
DFW-180								
114	CDFW	SLWRI EIS	Wildlife	13	209	Table 13-46	Impact Wild-1 Take and Loss of habitat for the Shasta salamander	Mitigation Measure Wild-1 is avoid, relocate, and acquire migitation lands for Shasta Salamander (SS), yet no description or quantitative assessment has been provided of the exact impacts of the proposed dam raises on the habitat of SS within the footprint of the project and no discussion of how this would effect the species as a whole has been provided. Because of the large size of the project, there may be insufficient off site land to mitigate for this species in any kind of manner that would mitigate for the full damage to the species.
DFW-181								
							Above comment cont'd	Discussion of feasibility to implement the mitigation measure needs to be provided within the context of the species distribution and abundance. Without such information any efforts or suggestions that mitigation can be accomplished are impossible. on the species biology and ecology that can be used for such mitigation actions. Delay of these until will result in the determination that the data is not available and no opportunities can be located for such actions.

Page 24			SLWRI DEIS Review by CDFW					
DFW-182								
115	CDFW	SLWRI DEIS	Wildlife	13	13-223	26	Conduct a Preconstruction Survey for the Willow Flycatcher, Vaux's Swift, Yellow Warbler, and Yellow-Breasted Chat and Establish Buffers	The scale of these impacts have not been fully disclosed upon these species, esp. the listed ones. The impacts may be beyond what the population can endure (i.e. a jeopardy situation). This needs to be evaluated in order to assess the true impacts of the project to these species; to rely on mitigation as the sole solution and/or assume it will bring the effects to a level below significance is erroneous. There is also a difference between temporal disturbance (e.g. noise, when a buffer may be used to minimize effects) and actual habitat loss, and these effects are not fully evaluated and/or disclosed. This comment applies to all of the alternatives and the species being evaluated in the document.
DFW-183								
116	CDFW	SLWRI DEIS	Wild and Scenic River--McCloud River	25	25-26	20	Within the expanded transition reach, flow conditions and fisheries would periodically be affected…	The effect would be permanent. Sites currently acting as impediments and/or barriers to upstream fish passage from the reservoir would potentially become non-barriers for periods, thereby affecting the trout fishery for some distance above the new inundation line. This comment should be applied to all alternatives where this is discussed.
DFW-184								
117	CDFW	SLWRI DEIS	Wild and Scenic River--McCloud River	25	25-30	24	…this entire area would be inundated only during peak water levels in the spring of wet years.	This sentence is misleading. The effects of inundation would be permanent, despite occurrence of "only" seasonal peak water levels. The comment should be applied to all alternatives where this is discussed.
DFW-185								
118	CDFW	SLWRI DEIS	Wild and Scenic River--McCloud River	25	25-30	36	Since mitigation for this impact is currently under development, the significance after mitigation has not yet been determined.	The determination of adverse effect is the responsibility of the Secretary of the Natural Resources Agency. The idea of mitigation for an adverse effect to a state Wild and Scenic River has not been fully vetted with the State to see if this is even an option. In addition, by not having those conversations/meetings and assessing the effect, BOR may be unnecessarily expending federal funds on this project should the potential adverse effect to the McCloud River be insurmountable.
DFW-186								
119	CDFW	SLWRI DEIS	Wild and Scenic River--McCloud River	25	25-31	6	…would not be adversely affected beyond the upstream extension of the transition reach .	While the free flowing condition may not be affected above the upstream extension, the fact remains that the free-flowing conditions of the river would be (permanently) adversely affected by the upstream extension of the transition reach.

DFW-187 120	CDFW	SLWRI DEIS	Wild and Scenic River--McCloud River	25	25-41	13	The 2009 NMFS Biological Opinion described...the details of this project are ill-defined...result in benefits 12 to some of the values and resources of the lower McCloud River.	Due to the 2012 Bagley Fire, plans are underway for salvage logging and post fire vegetation within the McCloud River watershed. This should also be mentioned and included, particularly due to the potential for fire-related erosion to occur. The cumulative effects also does not appear to be complete, as per NEPA and CEQA guidelines on what should be included in a cumulative effects analysis. In addition, scoping and NEPA document preparation has started on the pilot reintroduction project; this should be updated. Finally, the potential loss of habitat due to an inundation, potential effects from salvage logging, and the lack of information on other cumulative effects should not lead to a conclusion of beneficial effects.

Page 25			SLWRI DEIS Review by CDFW					
DFW-188 121	CDFW	SLWRI DEIS	Wild and Scenic River--McCloud River	25			General comment	The Secretary of the Natural Resource Agency is responsible for making an adverse effect determination on a river that is identified within the State Wild and Scenic Rivers Act. Until that time, the conclusions drawn in the draft document are pre-decisional.
DFW-189 122	CDFW	SLWRI DEIS	Other Required Disclosures	26	26-12	1	This EIS provides ...necessary for USACE to determine the LEDPA consistent with Section 404(b)(1) guidelines.	This conclusion is questionable. Section 404 requires detailed information that is not readily found within the draft EIS. ACOE also requires a letter identifying lead agency, and ESA consultation prior to obtaining permit request to comply with Section 404, as well as a wetland delineation.
DFW-190 123	CDFW	SLWRI DEIS	Other Required Disclosures	26	26-12	22	This EIS provides a substantive portion of the environmental information necessary for Reclamation to determine the Environmentally Preferable Alternative.	The DEIS has identified that analyses are ongoing and are not complete. Therefore, this statement is seriously questionable. Full disclosure has not occurred on the effects, particularly on the effect to listed species. Public release of this draft is similarly questionable. See also the CDFW letter to BOR on the subject of the preferred alternative and environmentally superior alternative sent in April 2013.
DFW-191 124	CDFW	SLWRI DEIS	Other Required Disclosures	26	26-12	28	...the environmentally preferable alternative will be identified in the in the Final EIS and Record of Decision.	CDFW disagrees with this approach. It is not consistent with CEQA Guidelines and is also contrary to directives and intent of the Fish and Wildlife Coordination Act. See our cover letter and the April 2013 letter to BOR for more information on this topic/issue.
DFW-192 125	CDFW	SLWRI DEIS	Power and Energy	23	23-1	14	Pit 7 Powerhouse	There would be an impact to PG&E's Pit 7 powerhouse. It is anticipated that the higher water level result in turbines being below the water level. Some engineering solutions (if feasible) would have to occur for that powerhouse to continue operations. An additional impact would be the potential (because of the higher water level) for boaters and houseboat to move further up the Pit River than what is currently open. CDFW would appreciate participating in additional discussions on this particular project element, given our role in reviewing FERC licenses.

Attachment 2	Shasta Lake Water Resources Investigation Draft Environmental Impact Statement Comment Form						
Reviewer Name:	Andrew Jensen, Monty Currier, and Patricia Bratcher						Draft Fisheries and Aquatic Ecosystems Technical Report
Reviewer Email: andrew.jensen@wildlife.ca.gov; monty.currier@wildlife.ca.gov, patricia.bratcher@wildlife.ca.gov							
Reviewer Agency: CA Dept. of Fish and Wildlife							
601 Locust St., Redding, CA 96001							
Date: August 2013							
ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
DFW-193							
1	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report - June 2013	1	1-3	2nd Paragraph	Increased storage and the corresponding increase ...because available habitat area is increased.	Broad statement that is unsubstantiated, and does not take into account the loss of biomass that currently exists within the footprint of the increased storage area.
DFW-194							
2	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report - June 2013	1	1-3	2nd Paragraph	Riffle habitat with gravel substrates and...habitats are still insufficient to support healthy salmonid populations.	This is not necessarily true. Provide supporting documentation/sources.
DFW-195							
3	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-4		This reach provides much of ...though the amount of gravel available is insufficient.	Paragraph info seems contradictory. It first says it contains gravel needed for spawning, but then says the amount of gravel is insufficient.
DFW-196							
4	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-5	2nd Paragraph	The channel takes on varying widths...and shallow vegetated floodplain areas that become inundated during high flows.	IN the Red Bluff to Colusa reach, there are several substantial levees and/or riprapped areas that have affected river meander. See the bank swallow study information, the TNC Sacramento River study, NODOS studies, and the Army Corps of Engineers Phase II Sacramento River Project for more information.
DFW-197							
5	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-8	1st Paragraph	Sacramento-San Joaquin Delta	To whatever extent it may be needed, this section and other sections discussing the lower Sacramento River should be updated to reflect existing conditions within the BDCP documents.
DFW-198							
6	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-15	21	Increased storage and the corresponding...and a greater abundance of plankton and fish...	This has already been commented on above. This is not necessarily true. Additional modeling of the cold water pool and possible changes in stratification, as a result of different dam raises and water outflow management, should be conducted to truly assess quantifiable changes to habitat and population response within the reservoir.
DFW-199							
7	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report - June 2013	1	1-19	2nd Paragraph	Most of the lower gradient, potentially fish-bearing reaches of tributary streams to Shasta Lake are near their confluence with the reservoir.	Increased storage height will likely result in the loss of the currently available lower gradient habitat. fish bearing reaches within the tributary streams.

Page 7		Shasta Lake Water Resources Investigation DEIS--Fisheries and Aquatic Ecosystems Technical Report					
DFW-200							
8	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report		1 21	3rd paragraph	Increased storage (line 20-23)	As far as the sport fishery this statement is true. The raising of the reservoir level would increased nutrient load, increased surface area. Additional habitats would be available for reservoir fishes, as well as other aquatic organisms (ie plankton/zooplankton) which would benefit.
DFW-201							
9	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report		1 22	2- and 6th paragraph	line 14-42	The effects of sport fishing are minimal on the black bass fishery due to the majority of anglers practice catch and release, unlike the majority of cold water anglers whom harvest their catch. Additionally Largemouth and sunfish reproduction is reduced due to the annual drawdown of the reservoir during these fishes spawn season. Survival of fry is also effected due to the lack of beneficial habitat, which often leads to predation and loss of warm water fish recruitment to the reservoir.
DFW-202							
10	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report – June 2013	1	1-32	3rd Paragraph	Juvenile winter-run Chinook salmon rear in the Sacramento River from July ... and smolts pass the RBDD by March (Martin et al., as cited in NMFS 2009).	Likely not "ALL" winter-run (WR) Chinook fry and/or emigrating pre-smolts and smolts are past the RBDD by Oct and March, respectively. The minimum size of WR in early Nov (in the high 30's mm) is probably still fry sized, thus the statement that all fry are past RBDD by Oct is too inclusive. Department staff have observed that they continue to emigrate out and grow and rear all winter in the mainstem. The USFWS has charts describing WR and other run emigration from RBDD over the past decade or so, which illustrates that MOST WR are out by end of March but there are always a few left coming out so the "ALL" term used is not accurate.
DFW-203							
11	CDFW	Aqua Tech Rept	Fisheries	1-32	15	All winter-run Chinook salmon fry 17 pass the RBPP by October;	In the last two years, some winter-run adults have "delayed" spawning until August, which means that not all fry will be hatching and passing RBPP by October. Consider contacting Doug Killam, CDFW, for more info.
DFW-204							
12	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report - June 2013	1	4	[illegible]	[illegible]	The Department previously commented on the issue of Spring-run Chinook salmon in our 2008 comment letter, stating that Region 1 has determined that due to the question of genetic integrity of spring-run in the upper Sacramento River, it is not worth including them in the analysis for this project. The extent of spring-run Chinook salmon spawning in the mainstem of the upper Sac River remains unclear. As previously stated, due to geographic overlap of ESU's and resultant hybridization since the construction of Shasta Dam, Chinook salmon that spawn in the mainstem during September are more likely to be early fall-run Chinook rather than spring-run Chinook salmon.
DFW-205							
13	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report		[illegible]	[illegible]	[illegible]	Butte Creek is also a key spring-run Chinook stream. The document should possibly also mention the presence of spring-run Chinook on Clear Creek, which is a significant tributary in the upper Sacramento River system and a CVP stream.
DFW-206							
14	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report				Indirect evidence indicates that green sturgeon... reported in the mainstem as far north as Red Bluff.	[illegible]
DFW-207							
15	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report				New Zealand Mud Snail and Quagga Mussel	Discussion of the mud snail and quagga mussel needs to be updated to reflect current data and/or reports on their presence and level of threat, including within the reservoir footprint.

Page 3		Shasta Lake Water Resources Investigation DEIS Comment Form – Fisheries and Aquatic Ecosystems Technical Report					
DFW-208							
16	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report				General comment	The Department has provided numerous comments that have not been sufficiently addressed, specifically from a fisheries perspective including but not limited to the need for clarification on Alternative CP4, use of SALMOD and ongoing concerns the Department has with the use of SALMOD, the discussion and inclusion of spring-run in the project documents, and impacts to the fishery habitat below Shasta Dam. Until these comments are adequately addressed, they will remain valid and the Department will look forward to an adequate response.
DFW-209							
17	CDFW	Draft Fisheries and Aquatic Ecosystems Technical Report				Gen comment	As described in the Environmental Impact Statement (EIS) Chapter 11, the SALMOD was used to support technical analysis. SALMOD is not designed to be used to address a variety of fisheries-related issues and/or impacts, such as whether or not changes in operation, with a dam raise, would affect the spread of quagga mussels, or the tradeoff in managing for one Chinook run over another. It also mentions the potential effect of redd dewatering but does not quantify or analyze its effect. Please also see our previous letter on the Department's concern about use of SALMOD.

Attachment 3		Shasta Lake Water Resources Investigation Draft Environmental Impact Statement June 2013					CDFW Water Branch Comments
Reviewer Name:		Jason Roberts (JDR), Chad Dibble (CSD)					
Reviewer Email:		Jason.Roberts@wildlife.ca.gov, Chad.Dibble@wildlife.ca.gov					
Reviewer Agency:		California Department of Fish and Wildlife					
Reviewer Mailing Address:		830 S Street, Sacramento, CA 95811					
Date:		August 2013					
ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
DFW-210							
1	CDFW	Executive Summary		ES26	Table S-2	see comment	The listed increase in outmigrating chinook salmon should be qualified by a date
DFW-211							
2	CDFW	Plan Formulation	2	2-49	35	see comment	*"This alternative may also include development... impacts to water supply reliabil*
DFW-212							
3	CDFW	Plan Formulation	3	Various	unknown	see comment	*"The majority of increased farm yield...would be for south-of-Delta agricultural or*
DFW-213							
4	CDFW	Global	Global	Global	Global	see comment	When discussing SOD deliveries, CVPIA refuge water supply Section 3406(d) mus
DFW-214							
5	CDFW	Various	ES, Chapters 3 and 6	ES-28, 3-6, 3-24, 6-13	18, 3, 29, and 24 re	see comment	Analysis and inclusion of 2008 USFWS and 2009 BO RPA. Judge Wanger issued hi
DFW-215							
6	CDFW	Modeling Appendix	Modeling Appendix	2-9	unknown	see comment	CVPIA refuge water supply assumptions and associated notes in Table 2-1 are not accurate. Please correct. Additionally, this table needs to include full allocations of incremental level 4 refuge water supply.

Attachment 4	Shasta Lake Water Resources Investigation Draft Environmental Impact Statement - June 2013						
Reviewer Name:	Jennifer Carlson, Patricia Bratcher, and Richard Lis					Wildlife Resources Technical Report Comments	
Reviewer Email:	Patricia.Bratcher@wildlife.ca.gov ; Richard.Lis@wildlife.ca.gov						
Reviewer Agency:	CDFW						
Reviewer Mailing:	601 Locust St , Redding, CA 96001						
Date:	August 2013						
ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
DFW-216							
1	CDFW	Wildlife Resources Technical Report	1	1-5	15	The California Natural Diversity Database	Info from both the CNDDB and the USFWS ES Database (ESA Species List) needs to be requested, as the species presence list is over 5 years old.
DFW-217							
2	CDFW	Wildlife Resources Technical Report	1	1-6	Table 1-1	Table 1-1	Table 4.7 of the MSCS identifies vernal pools as a habitat type within the Natural Seasonal Wetland Habitat Type. Vernal pools occur within the primary study area (in and near Redding, for example) and should be included within this table.
DFW-218							
3	CDFW	Wildlife Resources Technical Report	1	1-6	Table 1-1	Table 1-1	There is very little description about what purpose Table 1-1 serves or how it will be used or interpreted. Clarification needed.
DFW-219							
4	CDFW	Wildlife Resources Technical Report	1	1-9	Tables 1-2 and 1-3	Table 1-2 and 1-3	These tables show summary of wildlife habitat in the impoundment area as well as the relocation areas. Does this also reflect the acres of habitat that would be inundated? If so, specifying that would be helpful because it is not evident to me. It would be useful to include a total acreage value by habitat type. The totals of acres by lake arms isn't all that useful from a wildlife perspective.
DFW-220							
5	CDFW	Wildlife Resources Technical Report	1	1-11	Figure 1-2a	Figure 1-2a to 1-2f	These maps are very hard to read due to the scale. Perhaps breaking up the maps into more sections and zooming in would be better. Shouldn't there be more "affected" habitat in the inundation zone that what is shown?
DFW-221							
6	CDFW	Wildlife Resources Technical Report	1	1-30	15	Oak woodlands	The habitat section is very sparse in terms of details on this habitat type, including a little more detail would be preferable including species occupying this habitat.
DFW-222							
7	CDFW	Wildlife Resources Technical Report	1	1-38	Table 1-4	Northern goshawk	The potential for occurrence states that it is known to occur in the upper McCloud arm but does not specify if this is in the primary study area or not. Please clarify.
DFW-223							
8	CDFW	Wildlife Resources Technical Report	1	1-41	37	Shasta salamander	Take and loss of Shasta salamander (SS) is discussed and known from 39 sites surveyed to date. The survey methods were not discusseed in detail and the information about the size of the populations at the site is not given presented, thus it is not possible to calculate the actual take and loss of the SS. This species may be quite limited in its ability to migrate and thus the genetic diversity of the species throughout the study area should be investigated. There may be unique genetic populations dispersed within the impact area that would guide the design of mitigation options. It is likely that this species incurred significant habitat losses when Shasta Dam was built and filled. Further enlargement of the dam will cause further decline in the species habitat that needs to be estimated and included in full assessment of impacts to the species. SS habitat includes subterranean habitat to which access is important during the dry summer months. Therefore the inundation and destruction of habitat must account for the loss of subterranean habitat even if the water level does not completely submerge the habitat.
DFW-224						Comment #8 cont'd	All sites must be enumerated and sites that may be above full pool elevations must be identified as to whether subterranean habitat would be destroyed such that survival of the site is reduced or rendered impossible. These sites must also be included in mitigation calculations.

Page 2		Shasta Lake Water Resources Investigation DEIS Comment Form--Wildlife Resources Technical Report					
DFW-225							
9	CDFW	Wildlife Technical Report	1	1-41		Terrestrial Mollusks	Impacts to the terrestrial mollusks are presented in terms of CWHR habitats and acreage yet there is no discussion about the actual sites where these mollusks were located and what microhabitat conditions exist on site to allow there existence. These mollusks are not equally and evenly distributed across within the habitat of any of the habitat types. They will undoubtedly be found in varying distribution and abundance within and between habitats. Analysis of these variables is needed both to identify complete impacts to the species and for determination of complete mitigation. Additional discussion must include the range of each species and the fraction of destruction to the totality of known populations of each species. These species also would have incurred extirpation of populations with the original construction of Shasta Dam. Estimates of the original destruction of species and the likely remaining is needed to accurately assess the cumulative effects of proposed future actions. Additional analysis should include assessment of what limits may exist for each species,
						Comment #9 cont'd	such as elevation, because certain species may not be able to be exist at the same densities at higher elevations where temperatures and moisture would be subject to greater variation. All of this information is needed to develop complete and species specific mitigation plans.
DFW-226							
10	CDFW	Wildlife Resources Technical Report	1	1-67	16	Pacific fisher	The statement is made that the carnivore surveys and detections of fisher for this project are the southeastern-most occurrences. This is an untrue statement and needs to be removed. Fishers have been detected south of the Fountain Fire area. Detections were both on public and private land, south of Burney and north of Shingletown. Several detections of fisher have been recorded in this area.
DFW-227							
11	CDFW	Wildlife Resources Technical Report	1	1-68	Table 1-5	Table 1-5	The effects to this and other species needs to be re-evaluated once a project footprint is finalized. To date, the location of sites to be mined for minerals to create cement is not completed, nor are the footprint of relocated facilities, roads, etc. In addition, due to the potential change in water management (including CP4, which includes a dedicated pool for natural resource uses), the potential for effect is largely incomplete. Upon completion of the actual project footprint and management plan, this an other documents that assess effects to species and special habitats needs to be redone. Similarly, using water to manage for one species (e.g. winter-run Chinook) may have negative effects on another species (e.g. bank swallow). This also needs to be analyzed.
DFW-228							
12	CDFW	Wildlife Resources Technical Report	1	1-68	Table 1-5	Table 1-5, California Red-legged Frog (CARLF)	For the CARLF, only protocol surveys can determine presence/absence as per ESA, so this determination is pre-decisional. Foothill yellow-legged frogs are know to occur in the valley section of tributaries on the west side of the Sacramento River, so this determination is wrong.
DFW-229							
13	CDFW	Wildlife Resources Technical Report	1	1-69	29	Swainson's Hawk	The species range of this species, as per DFW mapping websites, shows it extending up into the middle of Tehama County, which is just below Shasta County. In addition, migratory patterns should be taken into account, since this species is known to occur (nest) in the Klamath Basin.
DFW-230							
14	CDFW	Wildlife Resources Technical Report	1	1-107	25	Land Management	The BLM Land and Resource Management Plan for the Redding Field Office should also be included on this list. BLM manages land on Clear Creek and along the Sacramento River, in addition to inholdings near and/or around Shasta Lake. Similarly, the USFS Mendocino National Forest manages a piece of property adjacent to Red Bluff Diversion Dam. Reference to its Land Management Plan should also be included. Similarly, there are extensive areas of land managed along the River by the Department of Water Resources, the Department, and State Parks.

DFW-231 15	CDFW	Wildlife Resources Technical Report: Attachments 1-7	Attachment 2	A5-1		Table A1-1	See comments below. This table is incomplete and needs to be updated to include additional species, particularly MSCS species. The CNDDB search is over 5 years old. See also comment about relying on just CNDDB for presence/absence determinations. As per MSCS, special habitats also need to be addressed. A list of special habitats can be requested and provided by the CDFW.

Page 3		Shasta Lake Water Resources Investigation DEIS Comment Form--Wildlife Resources Technical Report					
DFW-232 16	CDFW	Wildlife Resources Technical Report: Attachments 1-7	Attachment 2	A2-6		Purple martin	The statement is made that 14-51% of the known nesting colonies for purple martin is along the Shasta Lake shoreline. That seems like a significant part of the nesting habitat for a species that is state-listed Species of Special Concern.
DFW-233 17	CDFW	Wildlife Resources Technical Report: Attachments 1-7	Attachment 2	A2-7		Shasta salamander	It is not Clear! specified in the species life history, like for the other species, the extent of the locations or numbers of the shasta salamander detections. Please elaborate on the extent of the detections that would be inundated.
DFW-234 18	CDFW	Wildlife Resources Technical Report: Attachments 1-7	Attachment 4	Attachment 5		General Comment	CNDDB should not be the only source of info to determine whether or not a species is present. It is only as good as what is reported by people. USFS records, Audubon studies, Christmas Bird count data, and WHR should also be investigated to determine potential presence. I have personally seen black-crowned night herons in the Redding vicinity, and it is a species identified in the MSCS, as are several others below.
DFW-235 19	CDFW	Wildlife Resources Technical Report: Attachments 1-7	Attachment 5	Attachment 5		State and Federal lists of Special-status wildlife species	The lists in the referenced attachment for both state and federal species are outdated. These lists expired in 2007, which is at least 4 years out of date. Please include an updated list within the last year.
DFW-236 20	CDFW					General Comment	They have not adequately addressed the effects on wildlife as far as quantification of the effect and lack of detail on impacts.
DFW-237 21	CDFW					General Comment	As far as I can tell, they have not adequately addressed the species in DFW's 2008 letter including: Shasta salamander, peregrine falcon, purple martin, bald eagle, and bank swallow. They did address additional species, i.e. deer range, but could include a map showing these special habitats that will be impacted.
DFW-238 22	CDFW	General	Throughout			Maps	It would be easier to understand what is going on if the maps were not broken up into 10 different smaller maps. One large map would be more helpful when looking at the project at least for the Shasta Lake and vicinity area.
DFW-239 23	CDFW	General	Throughout				The wildlife habitat description section could be improved. There are some major inconsistencies among the habitat types described as far as some that include species occupying the habitat, and others do not. Some of the habitat descriptions list the vegetation species that make up the habitat type and others do not. Habitat descriptions at a minimum should include an extensive description of what features make it the habitat it is.
DFW-240 24	CDFW	Wildlife Resources Technical Report	General Comment			Shasta salamander	Take and loss of Shasta salamander is discussed and known from 39 sites surveyed to date. The survey methods were not discussed in detail, and the information about the size of the populations at the sites is not presented. Therefore, it is not possible to calculate the actual take and loss of the species.
DFW-241 25	CDFW	Wildlife Resources Technical Report	General Comment			Shasta salamander	This species may be quite limited in its ability to migrate, so the genetic diversity of the species throughout the study area should be investigated. There may be unique genetic populations dispersed within the impact area that would guide the design of mitigation options. It is likely that this species incurred significant habitat losses when Shasta Dam was built and filled. Enlargement of the dam will cause further decline in the species habitat that needs to be estimated and included in full assessment of impacts to the species.
DFW-242 26	CDFW	Wildlife Resources Technical Report	General Comment			Shasta salamander	Shasta salamander habitat includes subterranean habitat to which access is important during the dry summer months. Therefore, the inundation and destruction of habitat must account for the loss of subterranean habitat even if the water level does not completely submerge the habitat. All sites must be enumerated and sites that may be above full-pool elevations must be identified as to whether subterranean habitat would be destroyed such that survival of the site is reduced or rendered impossible. These sites must also be included in mitigation calculations.

Page 4		Shasta Lake Water Resources Investigation DEIS Comment Form--Wildlife Resources Technical Report					
DFW-243	27 CDFW	Wildlife Resources Technical Report	General Comment			Peregrine Falcon	Effects to this species and other raptors were not clearly identified. This includes the potential for effect by construction-related impacts during the nesting season. Mitigation measures should include at least one preconstruction survey for this species within the disturbance area boundary and a buffer sufficient to address the potential for disturbance, as supported by scientific literature and/or in accepted peregrine falcon management plans. Clarification is needed on when this preconstruction survey would occur.
DFW-244	28 CDFW	Wildlife Resources Technical Report	General Comment			Bald Eagle	Although the bald eagle is no longer listed under ESA, it remains listed as Endangered pursuant to CESA. It is also a fully protected species pursuant to FGC Section 3511 and is provided protection pursuant to the federal Bald and Golden Eagle Protection Act (16 U.S.C. 668a-d). The FR, Technical Reports/Attachments, and future environmental documents need to fully analyze the effect of a loss of habitat and nest trees on individuals and on the population in general, and analyze the entire project footprint (primary study area and extended area combined) to make an overall determination of effects of the project on bald eagle.
DFW-245	29 CDFW	Wildlife Resources Technical Report	General Comment			Purple martin	Purple martin could be similarly affected by inundation. The total inundation of snags used by purple martin would result in a temporary, if not permanent, loss of nesting habitat for purple martin, although new habitat could eventually be created after trees are inundated and die. There are very few colonies within Shasta County; Shasta Reservoir represents 14% to 51% of the total interior Northern California population of western purple martin (Williams 1998). No mitigation seems to be proposed for the direct loss of nest trees that will be inundated by Alternatives CP1-CP5. If feasible, mitigation measures must be implemented to offset this impact (which is identified as significant).
DFW-246	30 CDFW	Wildlife Resources Technical Report	General Comment			Bank Swallow	The FR and Technical Reports/Attachments contain contradictions and relies upon improper information with regard to the potential impact on listed species. An example of this is the impact to the State-listed Threatened bank swallow (Riparia riparia). Use of monthly flow models cannot reflect the daily or hourly flow fluctuations caused by dam releases that can destroy a nesting colony. The 2008 Administrative Draft Environmental Impact Statement/Environmental Impact Report (ADEIS/R) (Reclamation 2008) identified a potentially significant impact.
DFW-247	31 CDFW	Wildlife Resources Technical Report	General Comment			Bank Swallow	The Sacramento River is estimated to support about 75% of the State's bank swallow population (Garrison 1998). The Department considers the combination of a loss of high flows, which encourage bank erosion, and daily flow fluctuations caused by dam releases during nesting, a potentially significant impact.

Attachment 5 Shasta Lake Water Resources Investigation DEIS Comment Form- CDFW Version June 2013

Reviewer Name: Jeffrey Shu **CDFW Water Quality Technical Report Comments**
Reviewer Email: jeffrey.shu@wildlife.ca.gov
Reviewer Agency: CA Dept. of Fish and Wildlife
Reviewer Mailing Address: 830 S Street., Sacramento, CA 95814
Date: Sept 2013

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
DFW-248	1 CDFW	Water Quality Technical Report Abbreviations and Aconyms	0	iii	N/A	OCAP Operations and Criteria Plan	OCAP Operations, Criteria and Plan
DFW-249	2 CDFW	Water Quality Technical Report Abbreviations and Aconyms	0	iv	N/A	X2 estuarine habitat	X2 location of 2 psu salinity isohaline
DFW-250	3 CDFW	Water Quality Technical Report Chapter 1 Affected Environment	1	1-4	24	trace metals and heavy metals	To make it more clear that the same thing is being talk about throughout the document, the document should refer metals as either trace metals, heavy metals or simply "metals".
DFW-251	4 CDFW	Water Quality Technical Report Chapter 1 Affected Environment	1	1-4	41	The quality of water in the Sacramento River is relatively good.	There is no context what "relatively good" means. 2010 303(d) list say that the Sacramento River is impaired for unkwown toxicity. CALFED 2000a states that acute toxicity from acidic drainage water from abandoned mine tailing have resulted in fish kills and contribute to long-term growth and reproduction impacts to fish.
DFW-252	5 CDFW	Water Quality Technical Report Chapter 1 Affected Environment	1	1-5	10	Table 1-1	The water quality objectives are still not correct per Table III-1 and Table III-2 from the 2009 Basin Plan. The footnote for the metal objectives should state they are measured as dissolved concentrations and are hardness-based criteria. Would be nice to cite data that is more current.
DFW-253	6 CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-6	Table 1-1 footnote b	Basin Plan Water Quality Objective	The applicable Basin Plan objective for the Sacramento River at Red Bluff is what is described as "Sacramento River from Keswick Dam to Hamilton City". The dissolved oxygen objective from June 1st to August 31st for this specific water body is 9.0 mg/l. The dissolved oxygen saturation objective is 95% or above saturation when natural conditions are lower than 9.0 mg/l during the same time period.

Page 2			SLWRI DEIS Comments by CDFW - Water Quality				
DFW-254							
7	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-7	20-21	RBPP to Knights Landing is listed as an impaired water body under the EPA's Section 303(d) list for mercury and unknown toxicity.	Tthe 2010 303(d) list for RBPP to Knights Landing now includes DDT, dieldrin, mercury, PCBs, and unknown toxicity.
DFW-255							
8	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-7	23-25	The parameters of concern in the Sacramento River from Knights Landing to the Delta include diazinon, mercury, and unknown sources of toxicity.	The 2010 303(d) list for Knights Landing to Delta now includes chlordane, DDT, dieldrin, mercury, PCBs, and unknown toxicity. It no longer includes diazinon. Also, it's not listed for "unknown sources of toxicity" although it does state the source of the unknown (water) toxicity is unknown.
DFW-256							
9	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-14	13-15	Table 1-2	The estimated area, if summing Horse Creek, Town Creek, and Little Backbone Creek, should add up to 2.38 miles, Shasta Lake is 27335 acres. If you are assessing potential pollutant sources to Shasta Lake, you should include Pit River which contributes sources of agricultural pollutants. The citation should be updated to SWRCB 2010.
DFW-257							
10	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-15	17	West Straw Creek	Typo. Should be "West Squaw Creek".
DFW-258							
11	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-16	12-18	CVRWQCB determination	This is an outdated determination. The 2010 303(d) list has removed cadmium, copper, and zinc as impairments but added unknown toxicity as an impairment of the upper Sacramento River between Keswick Dam and Cottonwood Creek. Only the upper Sacramento River between Cottonwood Creek and Red Bluff is listed for mercury as this was the part of the upper Sacramento River where fish tissue samples were collected.
DFW-259							
12	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-17	2	mercury (CVRWQCB 2002)	"chlordane, DDT, dieldrin, mercury, PCBs, and unknown toxicity (SWRCB 2010)."

Page 3			SLWRI DEIS Comments by CDFW - Water Quality				
DFW-260							
13	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-17	3-11	Delta waterways	All of the Delta waterways, including the western Delta, fall under the CVRWQCB jurisdiction. There are also other pollutants of concern that impair the Delta waterways. There are no sources of mercury from agriculture; they are primarily from abandoned mines. Agriculture is the primary source of pesticide pollution. The Delta is also impaired by invasive species.
DFW-261							
14	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-17	12	CVP/SWP Service Areas	Influences on the south Delta water quality should also include, tidal influences, island innudation, from operations of diversion facilities and water storage facilities, in addition to the mentioned sources in the previous sections. Selenium in the CVP/SWP Service Areas is affected by agricultural uses of groundwater which is then drained into the San Joaquin River The document should be careful with interchanging the terms water quality with salinity. Also, not sure if this section is supposed to only discuss metal pollution or is to include pesticide and nutrient pollution.
DFW-262							
15	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-23	4-13	Two agencies with key planning roles...	CALFED doesn't exist any more. The state legislation SB X7 1 enacted the Sacramento-San Joaquin Delta Reform Act of 2009 and replaced CALFED with new co-equal goals of more reliable water supply and a healthy ecosystem and new implementing agencies. The primary Delta planning agencies are the Delta Protection Commission, Sacramento-San Joaquin Delta Conservancy, and the Delta Stewardship Council. The Delta Stewardship Council's Delta Plan is the primary planning document. Delta Vision Strategic Plan is the framework for the planning documents and implementing Delta agencies.
DFW-263						Comment 15 cont'd	Other Delta documents include: o The Delta Protection Commission's Land Use and Resource Management Plan for the Primary Zone of the Delta ("RMP") o The Delta Protection Commission's Land Use and Resource Management Plan for the Primary Zone of the Delta ("RMP") o The 2012 Central Valley Flood Protection Plan ("CVFPP") o The 2011 Habitat Management, Preservation and Restoration Plan for the Suisun Marsh ("Suisun Marsh Plan"); and o The Suisun Marsh Preservation Act of 1977.

Page 4				SLWRI DEIS Comments by CDFW - Water Quality			
DFW-264 16	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-25	34	control of nonpoint source pollution	Should be "control of point source pollution". Runoff from construction and industrial activites is classified as a point source as the discharge goes into a strom drain or man-made ditch that discharges to a water body. These activites require a 402 NPDES permit. If the activity moved dredge or fill material into a water of ths US, it would require a 404 permit and 401 certification. A 401 certification would be required regardless of, dredge or fill, as long as a project has hydromodification impacts or modification to a FERC hydropower facility, which would be the primary result of this project.
DFW-265 17	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-28	18-19	The most prevalent contaminants in the Sacramento River basin are for organophosphate pesticides (agricultural runoff) and trace metals (acid mine drainage), for which TMDLs currently are being considered.	The Upper Sacramento River TMDL for Metals has been in place since April 2002 and some contaminants have been removed form the 303(d) list. The Sacramento and Feather Rivers TMDL for diazinon and chlorpyrifos (organophosphate pesticides) has been in place since August 2008.
DFW-266 18	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-32	6	September 2009	Last revision was October 2011 http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr.pdf
DFW-267 19	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-32	15-31	list of beneficial uses	Should make the beneficial uses terms consistent between the two water bodies to make the list of uses more comparable. Shasta Lake is: municipal and domestic supply, irrigation, hydropower generation, water contact recreation, noncontact recreation, freshwater habitat (warm and cold), spawning habitat (warm and cold), wildlife habitat Sacramento River is: municipal and domestic supply, irrigation and stock watering, industrial service supply, hydropower generation, water contact recreation and canoeing and rafting, noncontact recreation, freshwater habitat (warm and cold), migratory habitat (warm and cold), spawning habitat (warm and cold), wildlife habitat, navigation

Page 5				SLWRI DEIS Comments by CDFW - Water Quality			
DFW-268 20	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-34	1-8	Primary Study Area	The 15-mile reach of the Sacramento River from Keswick Dam downstream to Cottonwood Creek is impaired for unknown toxicity. It is no longer impaired by cadmium, copper, and zinc. The 16-mile reach of the Sacramento River from Cottonwood Creek to Red Bluff is impaired by mercury and unkonwn toxicity. See comment 17.
DFW-269 21	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-34	9-16	Extended Study Area	The Sacramento River downstream from RBPP is impaired by DDT, dieldrin, mercury, PCBs, unknown toxicity, and chlordane. It is not impaired by diazinon.
DFW-270 22	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-34,35	26-40,1-27	beneficial use description	This section is essentially duplicative of page 1-32 lines 5-31 and page 1-33 lines 1-4 but with more detail.
DFW-271 23	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-34	28-29	The most recent edition, the fourth edition, was adopted in 1998 and amended in 2004.	"The most recent edition, the fourth edition, was adopted in 1998 and amended in 2011."
DFW-272 24	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-35,36	32-40,1-2	Clean Water Act Section 401 Water Quality Certification	This section cites Clean Water Act which is federal law and is already mentioned at page 1-25 lines 14-27. The more appropriate citation for state law would be Porter-Cologne Act and Chapter 28 Certifications. Under subsection 3855, applications for water quality certificatinos shall be filed with the State Water Board Executive Director, who will forward copies to the appropriate Regional Water Board Executive Officer.
DFW-273 25	CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-36	3-8	Waste Discharge Permit	Under California law, waste discharge requirements (WDRs) are requried for some discharges in addition to those subject to NPDES permits. Discharges, such as those affecting groundwater or in a diffused manner (e.g., erosion from soil disturbance or waste discharges to land), must file a Report of Waste Discharge with the Regional Water Board in order to obtain WDRs. The Regional Water Board may waive filing of a Report of Waste Discharge but once a report is filed it must either waive or adopt WDRs.

26	DFW-274 CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-36	9-19	Industrial Storm Water General Permit. Storm Water Pollution Pervention Plan.	Since these are part of NPDES permits, they are better explained in the Federal section.

Page 6		SLWRI DEIS Comments by CDFW - Water Quality					
27	DFW-275 CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-37	3	Missing header	The paragraph starting on line 3 should have a header of "Water Right Decision 1275".
28	DFW-276 CDFW	Water Quality Technical Report Chapter 1 affected Environment	1	1-37	13	1995 Water Quality Control Plan	Explanation of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary Water Quality Control Plan should revolve around the current 2006 version which incorporates D-1641 as part of the implementation plan. This section should also mention the current update process to revise flow criteria to improve water quality.

Attachment 7	Shasta Lake Water Resources Investigation DEIS Comment Form- CDFW August 2013						
Reviewer Name:	Mark Smelser					Geologic Technical Report Comments	
Reviewer Email:	Mark.Smelser@wildlife.ca.gov						
Reviewer Agency:	California Department of Fish and Wildlife						
Reviewer Mailing Address:	601 Locust St., Redding, CA 96001						
Date:	Aug 2013						
ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
DFW-277 1	CDFW	Geologic Technical Report	General	N/A	N/A		A geologist licensed in the State of California is not identified as being responsible for the preparation of the Geologic Technical Report. In particular, the Appendix that describes shoreline erosion. Both the report and appendix includes interpretations and opinions regarding slope stability, geologic hazards, and future erosion. Such interpretations and opinions fall under the professional responsibilities of a state licensed geologist or geotechnical engineer. Consequently, such an individual should be formally identified.
DFW-278 2	CDFW	Geologic Technical Report	General	1-9	18-26		The Geologic Technical Report erroneously attributes geologic data to Hackel (1966) when the true reference should be Irwin (1966, p. 23). The reliance on the 1966 reference and the use of outdated terms (e.g., Eastern Klamath Belt instead of Eastern Klamath Terrane) demonstrates that limited research was conducted in the preparation of the report. There has been a significant amount of geologic work conducted within the Klamath Mountains Geomorphic Province over the past several decades, which should be incorporated in this document. Please see USGS Open File Report 2003-306 (Irwin 2003) for an excellent bibliography on geologic research in the Klamath Mountains.
DFW-279 3	CDFW	Geologic Technical Report	General	1-19 to 1-20	39-40; 1-2		The Geologic Technical Report states that the nearest "active" fault to Shasta Dam is the Battle Creek fault zone and they use the term "active" as defined by the Alquist-Priolo Earthquake Fault Zoning Act (AP Act). Review of California's fault activity map (Jennings and Bryant 2010) shows the Battle Creek Fault zone as not exhibiting evidence of surface rupture within the last 11,000 years. Therefore, the Battle Creek fault is not an "active" fault as defined by the Act. The "active fault" declaration in the report again demonstrates limited research and a lack of oversight in the report preparation by a state licensed geologist. Moreover, to state that this fault zone is active and therefore imply the necessity for specific regulatory actions as defined in the AP Act could create undue concern in the inhabitants of the Red Bluff area.
DFW-280 4	CDFW	Geologic Technical Report	General	1-20	1-9		This discussion does not make sense, and additional clarification is required. Specifically, how does a 6.5 moment magnitude earthquake on the Battle Creek fault result in a 7.3 moment magnitude earthquake at Shasta Dam?
DFW-281 5	CDFW	Geologic Technical Report	General	1-22	19-24		The discussion of mass wasting etc. is important and comes up again in the shoreline erosion attachment. While Figure 1-4 and Tables 1-6 and 1-78 document the presence of the landslides and related features, the information provided does not allow for an evaluation of these features as potentially significant environmental impacts that may be triggered, or exacerbated by a higher lake level. More specifically, the first step in assessing whether or not such features represent a potentially significant environmental impact is to document the spatial relationship between these features and resources of value (i.e., natural environments or infrastructure). This does not appear to have been completed.
DFW-282 6	CDFW	Geologic Technical Report	General	1-26	1		Strictly speaking, the Alquist-Priolo Act does not show areas of faulting. The A-P Act requires that the State Geologist establish regulatory earthquake fault zones and those zones are depicted on maps known as Earthquake Fault Zones (after 1994) or Special Studies Zones (prior to 1994). The zones are plotted on standard USGS 1:24,000 scale 7.5-minute quadrangle maps, and individual maps are referenced by the name of the particular USGS 7.5 minute quadrangle map.

	Page 2		CDFW Comments on SLWRI DEIS - Geologic Report				
DFW-283							
7	CDFW	Geologic Technical Report	General	1-27	3-4	N/A	The Geologic Technical Report references a "Great Valley thrust fault system". Such a "system" is not formally documented within California's fault activity map (Jennings and Bryant 2010), but is recognized in the database of potential earthquakes (USGS OFR 96-705). This system is generally considered to be a zone of folds and "blind" thrust faults that while capable of slipping and causing seismic shaking are typically not associated with ground surface rupture. Therefore, a few additional clarifying statements should be included with this discussion of the Great Valley thrust fault system.
DFW-284							
8	CDFW	Geologic Technical Report	General	1-29	34-35	N/A	The Foothills fault system is not "active" (i.e., demonstrated surface displacement within the last 11,000 years). In order to avoid confusion, please use the term active only when referring to faults that are designated by the California Geological Survey (i.e., Alquist-Priolo Act) as having surface displacement within the Holocene (last 11,000 years). The term *potentially active* is used to define faults that exhibit evidence of surface displacement during the last two or three million years. Please review the Fault Activity Map of California (CGS, Geologic Data Map No. 6, 2010) for more on this.
DFW-285							
9	CDFW	Geologic Technical Report	General	1-45	3		Please define the term "droughty"
DFW-286							
10	CDFW	Geologic Technical Report-Appendix 1	General	N/A		Shoreline Erosion	This report should identify the professional individuals who are responsible for the preparation of this report.
DFW-287							
11	CDFW	Geologic Technical Report-Appendix 1	General			Shoreline Erosion	Montgomery, Sidle; references are missing
DFW-288							
12	CDFW	Geologic Technical Report-Appendix 1		2-5	31	Shoreline Erosion	There are awkward or incomplete sentence regarding impacts and soil productivity, please rewrite.
DFW-289							
13	CDFW	Geologic Technical Report-Appendix 1		2-5	32-33	Shoreline Erosion	This sentence is awkward and does not appear to make sense; please review. More importantly, "large landslides" destabilized by both mining and shoreline erosion represent a potentially significant impact. Sediment input into the lake is an obvious concern, but we need more information regarding whether or not reactivation of the landslides would adversely impact mines, roads, and other infrastructure elements. While Figure 1-4 of the main report shows the areas of mass wasting, the scale of that maps is too small to adequately show the spatial relationship between mass wasting and infrastructure which is necessary to best understand landsliding as a potential significant environmental impact.
DFW-290							
14	CDFW	Geologic Technical Report-Appendix 1		3-5	24-26	Shoreline Erosion	The historic shoreline erosion rate is stated to be approximately 90 cubic yards per acre per year. Using a few assumptions related to the stated dimensions of the measured sites, my rudimentary calculations reduce that figure down to roughly 0.7-inch per square foot of shoreline per year, and that value appears reasonable. Using the acres as the spatial unit is a bit confusing in that it does not appear that any of the measured sites were that large. Additionally, it is difficult to intuitively contemplate shorelines in terms of acres given that they are typically perceived as relatively narrow bands around the lake. Please consider using a more intuitively obvious set of units, and perhaps add a little bit more detail to the dimensions used in the areal volume calculations.

Attachment 7 Shasta Lake Water Resources Investigation DEIS Comments–CDFW–Version June 2013

Reviewer Name: Richard Lis, Brad Henderson
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Reviewer Agency: CA Dept. of Fish and Wildlife
Reviewer Mailing Address: 601 Locust St., Redding, CA 96001
Date: Sept 2013

Botanical Resources and Wetlands Technical Report Comments

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
DFW-291							
1	CDFW	Botanical Resources and Wetlands Technical Report: Affected Environment	1	1-1		This area is referred to as the "impoundment area"	The total acreage of the 1,090-foot impoundment area (i.e., the new lake) should be provided here along with the total acreage of existing terrestrial areas proposed to be inundated (3,000 acres inundated and 3,338 acres of relocation areas?).
DFW-292							
2	CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-1		"relocation areas"	Total acreage of relocation areas should be provided here.
DFW-293							
3	CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-1		Subsequently, botany studies have been expanded into select areas.	Please identify number of acres. Identify what percentage of existing terrestrial areas was surveyed. Please identify why the entire area was not surveyed? Surveys should be comprehensive over the entire site, including areas that will be directly or indirectly impacted by the project. Refer to CDFW's protocols for vegetation and plant surveys (2009) and incorporate by reference.
DFW-294							
4	CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-7		Table 1-1	Impacts: MB 456.59, BBA 91.67, SA 719.61, MCA 435.32, SCA 242.49, Int A 527.54 Total 3000.76
DFW-295							
5	CDFW	"	1	1-8		Text including Barren and other types	This discussion and all following discussions for each land coverage/MCV type would be much more useful if the following information is included: 1. total acreage within the primary project area, 2. total acreage proposed to be altered or impacted via construction, inundation, etc., 3. Whether the plant community is considered to be sensitive by any state or federal agency (could be denoted in the tables as well).
DFW-296							
6	CDFW	"	1	1-24		Gray Pine	Include the scientific name the first time a species is mentioned in the body of the text.
DFW-297							
7	CDFW	"	1	1-27		Upper Sacramento River	Please identify if there is some definition for this portion of the project area – i.e., how far beyond the banks of the Sacramento River is the assessment area???
DFW-298							
8	CDFW	"	1	1-29		Sensitive natural communities may be of special concern to these agencies and conservation organizations for a variety of reasons.	The document should include vegetation communities declining on a statewide level considered special concern (S1-S3 rank). For example, guidance on assessing sensitive plant communities can be found at: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_comm_background.asp
DFW-299							
9	CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-29		Figures 1-3a through 1-3j map the potential locations of sensitive plant communities along the Sacramento River.	What about sensitive plant communities in the impoundment area??? Why have they not been mentioned? The maps below show an excessive amount of detail for species locations completely outside of the Sacramento River. Life histories for many species depicted are completely unrelated to the River and to this project. Furthermore, The CNDDB is NOT a public dataset, and should not be included on maps that will be made public in reports and other documents. The "Data Use Guidelines" document outlines appropriate ways to put the CNDDB data on maps, and provides details on the symbology: http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp.
DFW-300							
						Comment con'd	These maps need to be substantially cleaned up to depict important resources within a narrowly defined area subject to project effects. This report should not depict tadpole shrimp locations for a project on the Sacramento River. The lack of detail for sensitive species occurrences within the impoundment area, where project impacts will be direct and substantial, is a major omission. Including so much unrelated information is a distraction. Focus on the real issues and the impacts.
DFW-301							
10	CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-30		Locator Map	Please state why off-site animal occurrences being mapped in a plant report.
DFW-302							
11	CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-51		These habitat types are tracked in the CNDDB.	This is not necessarily true. Please read the following link which provides more accurate information regarding jurisdictional determinations and rare natural communities: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_comm_background.asp

Page 2		SLWRI DEIS Comment Form--CDFW--Botanical Resources and Wetlands Technical Report					
DFW-303	12 CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-72	22 et ff.	In 2004, botanical surveys were conducted	What about sensitive plant communities in the impoundment area??? Why have they not been mentioned? The maps below show an excessive amount of detail for species locations completely outside of the Sacramento River. Life histories for many species depicted are completely unrelated to the River and to this project. Furthermore, The CNDDB is NOT a public dataset, and should not be included on maps that will be made public in reports and other documents. The "Data Use Guidelines" document outlines appropriate ways to put the CNDDB data on maps, and provides details on the symbology. http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp. These maps need to be substantially cleaned up to depict important resources within a narrowly defined area subject to project effects. This report should not depict tadpole shrimp locations for a project on the Sacramento River.
DFW-304	13 CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-72	35 et ff.	Based upon previous surveys resulting in....	Specific survey reports are mentioned for surveys conducted in 2009 and 2010 on Neviusa cliftonii and Vaccinium sp., however, these reports are not cited and appear to be unavailable and, these survey reports are cited here as reference to Vaccinium sp., but not discussed above in reference to Neviusa cliftonii. These reports and data sets from these reports must be made available and summaries of these reports should be added to the EIR/EIS to validate claims and assertions based upon them.
DFW-305	14 B. Henderson	"	1	1-72		NSR conducted several botanical survey	Please identify how many total acres have been surveyed to date and what percentage of the direct impact area this represents.
DFW-306	15 CDFW	"	1	1-72		Special-status plant species detected during the surveys...in Attachment 3.	Why are they not discussed here? Sensitive plants detected within the proposed inundation area will suffer a direct loss and should be a primary focus of this report. To put different effects analyses and discussion in different documents makes a complete review of the effects difficult to do.
DFW-307	16 CDFW	"	1	1-72		Based on previous surveys....	This sentence does not make sense --what is meant by "based on"?
DFW-308	17 CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-72		...these species outside of the proposed project area...	Please identify why surveys were conducted outside the project area? Why not inside the project area? This discussion should start with whether these species are known from the project area and whether would they be impacted. Secondly, this section should state whether in the opinion of NSR the project area supports potential habitat. The off-site survey and genetic analysis should come later.
DFW-309	18 CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-73		In 2010, botanical surveys were conducted in all relocation areas...	Please identify what species were observed during these surveys.
DFW-310	19 CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-74	14 et ff.	Shasta snow-wreath is currently known from 23 locations	Discussion of Neviusa cliftonii in this section should include discussion of the fact that it is likely that the current distribution of populations of N. cliftonii is some reduced fraction of the original population distribution that existed prior to the completion of Shasta Dam and the filling of Shasta Lake. (Although this is briefly mentioned in the Cumulative Effects section of the Draft EIS, p. 12-171, where the brevity may be appropriate, it needs to be more thoroughly discussed in the sections discussing the species and remnant populations as they exist today.) The filling of Shasta Lake very likely exterminated many populations of N. cliftonii. Of significance is that most of the 23 extant populations occur near the periphery of Shasta Lake, suggesting that its distribution was not historically at much higher elevations and that the remaining populations have may be near some environment limits that are reflected in the observed elevational limits. Discussion of these issues should be included in the affected environment as they are important for assessing levels of significant deleterious effects and for evaluation of any proposed mitigation measures.
DFW-311	20 CDFW	"	1	1-74		Shasta snow-wreath is currently known from 23 locations	Please clarify if these were previously known or were identified during project-related surveys.
DFW-312	21 CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-74		Of these, 13 Shasta snow-wreath populations were discovered	Please identify who conducted the surveys.
DFW-313	22 CDFW	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-100		Acreage totals for relocation areas will be provided in the FEIS.	It would be useful to provide an acreage figure for the impoundment and relocation areas outside of the existing lake here. Again, it would differentiate between areas of permanent loss versus temporary impacts to the existing Shasta Lake.
DFW-314	23 CDFW	"	1	1-100		The National List of Plant Species That Occur in Wetlands: California Region 0.	This reference was updated in 2012.
DFW-315	24 CDFW	"	1	1-112		Fish and Game Code authorizes DFG to accept a Federal biological opinion...both the ESA and the CESA.	This can be done only IF the federal BO is consistent with the provisions of CESA.

Page 3		SLWRI DEIS Comment Form--CDFW--Botanical Resources and Wetlands Technical Report					
DFW-316	25 CDFW	"	1	1-112		Project impact on these species are not considered significant.	Reword as "impacts to these species are considered significant."
DFW-317	26 CDFW	"	1	1-112		Paragraph, California Department of Fish and Game Designations	Much of the discussion in this paragraph is incorrect. For example, plants are not included. Refer here for the correct information: http://www.dfg.ca.gov/wildlife/nongame/ssc/
DFW-318	27 CDFW	"	2	2-1		Attachment 2, "List of Plant Species Observed in the Shasta Lake and Vicinity Portion of the Primary Study Area"	Move attachment 2 to the body of the text.

Responses to Comments from Department of Fish and Wildlife

DFW-1: Comment noted.

DFW-2: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

DFW-3: Please refer to Master Comment Response ALTD-2, "Alternatives Development – Anadromous Fish Survival"; Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest"; Master Comment Response DSFISH-3, "Fish Habitat Restoration"; and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

DFW-4: Please refer to Master Comment Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits."

DFW-5: Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

DFW-6: Please refer to Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival."

DFW-7: Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

DFW-8: As described in the EIS, all action alternatives would generally result in improved flow and water temperature conditions for Chinook salmon in the upper Sacramento River downstream from Shasta Dam. Effects to Chinook salmon, including beneficial effects, are discussed in EIS Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects." This would benefit anadromous fish survival in the upper Sacramento River. Potential benefits of SLWRI action alternatives are described in EIS Chapter 2, "Alternatives," Section 2.3, "Action Alternatives," and Section 2.5, "Summary of Potential Benefits of Action Alternatives."

DFW-9: All DEIS action alternatives would benefit both anadromous fish survival and water supply reliability. Chapter 2 "Alternatives," Section 2.3 "Action Alternatives," describes estimated benefits for both primary and secondary objectives under the SLWRI action alternatives. A detailed evaluation of direct and indirect effects to fisheries, including beneficial effects to anadromous fish, is outlined in Chapter 11 "Fisheries and Aquatic Ecosystems," Section in 11.3.3 "Direct and Indirect Effects," which shows that all action alternatives would result in improved water temperatures, as well as reliable flows in dry and critical water years, and thus provide overall benefits for fish in the upper Sacramento River. As described in Chapter 6 "Hydrology, Hydraulics, and Water Management," Section 6.3.3 "Direct and Indirect Effects," all action alternatives would result in increased CVP and SWP deliveries, thus increasing water supply reliability.

Please refer to Master Comment Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits"; Master Comment Response WSR-12 "Increasing Water Supply Reliability under Action Alternatives"; Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival"; Master Comment Response DSFISH-3, "Fish Habitat Restoration"; Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report"; and Master Comment Response DSFISH-8, "National Marine Fisheries Service

Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

DFW-10: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. The existing Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability.

Please refer to Master Comment Response P&N-1, "Purpose and Need and Objectives"; Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival"; Master Comment Response DSFISH-3, "Fish Habitat Restoration"; Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report"; Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions"; and Master Comment Response NEPA-2, "Cumulative Impacts."

DFW-11: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. The existing Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability or vice versa.

Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability."

DFW-12: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. The existing Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability.

Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability"; Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival"; Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions"; and Master Comment Response DSFISH-3, "Fish Habitat Restoration."

DFW-13: Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," and Master Comment Response DSFISH-8, "National Marine Fisheries Service

Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

DFW-14: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. Shasta Dam and Reservoir are currently operated to meet existing regulations, including the 2008 and 2009 BOs. The existing Shasta Dam and Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability.

Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival."

DFW-15: It is unclear whether the commenter is referring to the 2008 USFWS Coordination Act Report which was attached to the DEIS. For information related to the Coordination Act Report, please see Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

Please refer to Master Comment Response ALTR-1, "Range of Alternatives General"; Master Comment Response ALTS-1, "Alternative Selection"; and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

DFW-16: While some sensitivity analyses were conducted in 2008 with SALMOD using a modified TCD placement on Shasta Dam, it was also made clear to USFWS and CDFW at the July 31, 2008 meeting that the modifications were theoretical at best, and were not to be considered based on reality until engineers could identify a valid structural modification of the TCD. This option did not provide the overall benefits to both primary and secondary goals that the action alternatives provided, and was not moved forward under the revised alternatives established with the 2008 and 2009 BO operational RPA requirements.

DFW-17: While some sensitivity analyses were conducted in 2008 with SALMOD using a modified TCD placement on Shasta Dam, it was also made clear to USFWS and CDFW at the July 31, 2008 meeting that the modifications were theoretical at best, and were not to be considered based on reality until engineers could identify a valid structural modification of the TCD. This option did not provide the overall benefits to both primary and secondary goals that the action alternatives provided, and was not moved forward under the revised alternatives established with the 2008 and 2009 BO operational RPA requirements.

DFW-18: While some sensitivity analyses were conducted in 2008 with SALMOD using a modified TCD placement on Shasta Dam, it was also made clear to USFWS and CDFW at the July 31, 2008 meeting that the modifications were theoretical at best, and were not to be considered based on reality until engineers could identify a valid structural modification of the TCD. This option did not provide the overall benefits to both primary and secondary goals that the action alternatives provided, and was not moved forward under the revised alternatives established with the 2008 and 2009 BO operational RPA requirements.

DFW-19: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. The existing Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability.

Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," and Master Comment Response ALTR-1, "Range of Alternatives – General."

DFW-20: Please refer to Master Comment Response FISHPASS-1, "Fish Passage Above Shasta Dam."

DFW-21: Chapter 2 "Alternatives," Section 2.4, "Alternatives Considered and Eliminated from Further Analysis," describes alternatives considered but eliminated from further development and consideration during formulation of initial alternatives and comprehensive plans. Acreages of impacts for relocation areas used conservative estimates in the DEIS based on preliminary engineering and planning information. The precise footprint of buildings, campgrounds, etc. within the relocation areas was uncertain; therefore a larger footprint area was identified. Currently, the footprint of these areas has been updated to reflect a "maximum area of impact" and a "likely area of impact." Mitigation for compensation will be calculated based on the "likely area of impact."

Please refer to Master Comment Response CMS-1, "EIS Mitigation Plan."

DFW-22: Efforts were made to simplify the document as much as feasible while meeting the needs to disclose environmental effects to the extent required to meet current legal requirements for full disclosure, including documenting the absence of significant effects on sensitive resources. To allow the document to be searched quickly, the DEIS is available in electronic format. It also includes a table of contents and

index to allow the reader to find certain chapters or specific information in the DEIS.

Please refer to Master Comment Response ALTR-1, "Range of Alternatives – General," and Master Comment Response ALTS-1, "Alternative Selection."

DFW-23: The SLWRI EIS is written in plain language. Efforts were made to simplify the document as much as feasible while meeting the needs to disclose environmental effects to the extent required to meet current legal requirements for full disclosure, including documenting the absence of significant effects on sensitive resources. The document includes a table of contents and index as well as being available in electronic format to makes searches of the entire document quick and easy.

Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

DFW-24: Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

DFW-25: Please refer to Master Comment Response ALTS-1, "Alternative Selection."

DFW-26: Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

DFW-27: The DEIS provides quantitative information on relative impacts across all the alternatives. This information was presented in tabular formation whenever possible. The commenter does not provide a specific reference to respond to in terms of what impact acreage was not provided.

Please refer to Master Comment Response NEPA-2, "Cumulative Impacts," and Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts."

DFW-28: Please refer to Master Comment Response CEQA-2, "CEQA Mitigation," And Master Comment Response CMS-1, "EIS Mitigation Plan."

DFW-29: Please refer to Master Comment Response CEQA-2, "CEQA Mitigation," And Master Comment Response CMS-1, "EIS Mitigation Plan."

DFW-30: Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

DFW-31: With regards to responding to the comment letter submitted for the Draft Feasibility Report, there have been previous review and comment opportunities on documents related to the SLWRI. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

DFW-32: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

DFW-33: SALMOD is not a restoration program, rather a tool. It is unclear if the commenter is referring to the SALMOD output or the SALMOD input values. However, SALMOD is not being used as a population model in the context of SLWRI, but is being used to compare the effects of each alternative on fish survival between Keswick Dam and RBPP under the conditions that would occur each year when Shasta is operated under each action alternative scenario. The starting number of adult spawning Chinook salmon (each run) input into SALMOD was based on 2 scenarios: (1) the 1999-2006 average population of each run calculated from the Grand Tab Table (http://www.calfish.org/LinkClick.aspx?fileticket=wXbihOvQ7JU%3d&tabid=213&mid=524), and (2) the AFRP Sacramento River doubling goals, per the request of the USFWS and CDFW during SLWRI fisheries technical team meetings. These AFRP targets are for the river between the confluence with the Feather River and Keswick Dam, therefore the number of adult spawners were adjusted for our analysis to cover Keswick Dam down to RBPP. The numbers in our analysis may be readjusted for the ESA Section 7 consultation. The AFRP goals are based on naturally spawning fish, not hatchery fish. The text within Chapter 11, "Fisheries and Aquatic Resources," explaining the AFRP goals defined natural production to be that portion of production not produced in hatcheries, and defined total production to be the sum total of harvest and escapement. The production goals include adult fish removed from the system due to both sport and commercial fishing in both freshwater and marine environments.

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon."

DFW-34: The project is primarily intended to improve Chinook salmon survival in critical and dry years, particularly in a drought condition, when they are likely to be most at risk of significant population declines or even extinction. While overall benefits to production when all water year types are combined are insignificant, benefits in dry and critical years are significant. With the added risks of climate change, the benefit of an increased source of cold water adds to the reliability of suitable habitat available for Chinook salmon and other listed fish in the Sacramento River. Adding to that, the habitat restoration components provides an additional amount of available habitat necessary to improve conditions that can help increase the number of Chinook salmon and other listed fish in the Sacramento River.

While the juvenile to adult return rates for all runs but winter-run Chinook salmon in the Sacramento River are unknown, the increase in juvenile production during critical and dry water years would increase the likelihood of increased adult returns. This shows a significant benefit of the project because these are the years in which the Chinook salmon populations, as well as steelhead, are at the greatest risk, as described by NMFS in their Draft Recovery Plan (2009) and in their Final Recovery Plan (2014).

Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

DFW-35: The methods used for the NEPA analysis used the best tools available. If required through the ESA consultation, additional tools will be considered.

Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

DFW-36: A detailed discussion on management of the cold-water pool for anadromous fish is presented in Chapter 2, "Alternatives," Section 2.3.6, "Operations and Maintenance for CP4 and CP4A." It is explained that Reclamation would work cooperatively with the Sacramento River Temperature Task Group (SRTTG), of which CDFW is a participant, to determine the best use of the cold-water pool each year under an adaptive cold water management plan. Reclamation would manage the cold-water pool and operate Shasta Dam each year based on recommendations from the SRTTG. Because adaptive management is predicated on using best available science and new information to make decisions, a monitoring program would be implemented as part of the adaptive management plan. SRTTG members would conduct

monitoring, develop monitoring protocols, and set performance standards to determine the success of adaptive management actions.

DFW-37: The commenter is mistaken in that no potentially significant impacts were identified to fish based on Old and Middle River reverse flows, however the DEIS did disclosed minor increases in entrainment levels to Delta fish. However, due to the low population levels, Reclamation felt that even a less than 1 percent increase in entrainment could be considered a significant impact to the overall population, even if that entrainment level is below the Take Limits established by the USFWS and NMFS in their respective BOS. As specified in the DEIS, no mitigation could be proposed because these levels of entrainment are still below the levels designated by USFWS and NMFS for the Take Limits defined in the BOs, and as such, the SLWRI would remain in compliance with all regulations and requirements established under the Endangered Species Act.

DFW-38: Please refer to Master Comment Response DSFISH-9, "Flow-Related Effects on Fish Species of Concern."

DFW-39: Comment noted. The EIS was revised to enhance the discussion of biological resources, impacts to biological resources, and mitigation measures for impacted biological resources. CP4, CP4A and CP5 are alternatives that includes actions to restore ecological processes in the Sacramento River (i.e., augmenting spawning gravel), but these actions are not mitigation measures for CVPIA or for the SLWRI project. CP4, CP4A and CP5 would further enhance spawning gravels in addition to the mitigation actions that have been and are being completed for CVPIA.

Please refer to Master Comment Response CMS-1, "EIS Mitigation Plan."

DFW-40: Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," of the EIS provides a discussion of those programs and projects that are considered for cumulative effects, including those described by the commenter. SALMOD was not used to evaluate the effects of these past present and foreseeable programs and projects. The EIS does evaluate the downstream effects of reservoir storage and discharge on both the Sacramento River above and below Red Bluff and the Delta in Chapter 11, "Fisheries and Aquatic Ecosystems," Chapter 7, "Water Quality," Chapter 8, "Botany Resources and Wetlands," and Chapter 13, "Wildlife Resources."

Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," Master Comment

Response FISHPASS-1, “Fish Passage Above Shasta Dam,” and Master Comment Response NEPA-2, “Cumulative Impacts.”

DFW-41: Please refer to Master Comment Response CEQA-1, “CEQA Compliance”; Master Comment Response CEQA-2, “CEQA Mitigation”; and Master Comment Response CMS-1, “EIS Mitigation Plan.”

DFW-42: Effects analyses for anadromous fish were conducted for the upper Sacramento River, the lower Sacramento River and tributaries, the Trinity River, and the Delta. Multiple environmental and population level variables were used to assess potential effects to anadromous fish from project implementation. A full description of the variables and methodologies used for the analysis of effects to anadromous fish can be found in Chapter 11, “Fisheries and Aquatic Ecosystems.” The Significance criteria used for the anadromous fish effects analysis are based on the checklist presented in Appendix G of the State CEQA Guidelines; factual or scientific information and data; and regulatory standards of Federal, State, and local agencies. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects. A full discussion of significance criteria development can be found in Chapter 11, “Fisheries and Aquatic Ecosystems,” Section 11.3.2, “Criteria for Determining Significance of Effects.”

NEPA requires that agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements. They shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement. Reclamation, through the scoping process and discussions with agencies (including CDWF) and stakeholders, has performed information gathering and focused studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The tools used to evaluate impacts of the alternatives were selected based upon Reclamations standard practices and input from agencies and subject matter experts.

This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

Please refer to Master Comment Response EI-1, “Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts”; Master Comment Response ALTR-1, “Range of Alternatives General”; Master Comment Response ESA-1, “Compliance with the Endangered Species Act”; and Master Comment

Response COST/BEN-1, “Intent of EIS and Process to Determine Federal Interest.”

DFW-43: The Final EIS was revised to enhance the discussion of resources and mitigation measures in Chapter 11, “Fisheries and Aquatic Ecosystems”; Chapter 12, “Botanical Resources and Wetlands”; and Chapter 13, “Wildlife Resources.” The Final EIS will provide an enhanced discussion of project impacts and mitigation actions with a level of specificity and detail consistent with Reclamation's planning process.

Please refer to Master Comment Response CMS-1, “EIS Mitigation Plan.”

DFW-44: Where surveys for special status species have not been completed to meet established protocols, Reclamation's approach is to assume presence of these species within areas of potential habitat. The EIS was revised to include an enhanced discussion of environmental commitments in Chapter 2, “Alternatives,” a number of resource chapters have been revised and enhanced with respect to affected environment, impact analysis, and mitigation measure sections based on additional studies, investigations and analysis.

Please refer to Master Comment Response CMS-1, “EIS Mitigation Plan.”

DFW-45: Where surveys for special status species have not been completed to meet established protocols, Reclamation's approach is to assume presence of these species within areas of potential habitat. The EIS was revised to include an enhanced discussion of environmental commitments in Chapter 2, “Alternatives,” a number of resource chapters have been revised and enhanced with respect to affected environment, impact analysis, and mitigation measure sections based on additional studies, investigations and analysis.

Please refer to Master Comment Response CMS-1, “EIS Mitigation Plan.”

DFW-46: Subsequent to publication of the DEIS, additional investigations were performed specific to these species. The EIS has been revised to incorporate best available science. Impact Wild-1, “Take and Loss of Habitat for the Shasta Salamander,” in Chapter 13, “Wildlife Resources,” addresses impacts to Shasta Salamander. Impact Bot-3, “Loss of USFS Sensitive, BLM Sensitive, or CRPR Species,” in Chapter 12, “Botanical Resources and Wetlands,” addresses impacts to Shasta snow-wreath. In the EIS, mitigation measures were enhanced to reduce impacts to Shasta salamander and Shasta snow-wreath, however

the EIS acknowledges that impacts to these species remains significant, even with mitigation.

DFW-47: A number of chapters of the EIS have been revised to address a wide array of comments similar to those described by CDFW.

DFW-48: NEPA requires that the lead agency--in this case, Reclamation--determine and disclose the impacts of an action. While the McCloud River is protected under state statute, is not clear how the referenced statute supports the commenters claim that Reclamation should request an effects determination from the California Natural Resources Agency.

Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

DFW-49: There have been previous review and comment opportunities on documents related to the SLWRI. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

DFW-50: Reclamation has gathered information and performed focused studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The methods used to evaluate the impacts of the alternatives were based upon Reclamation's standard practices and input from agencies and subject matter experts. A response is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulation 40 CFR Part 1503.4). This comment will, however, be included as a part of the record and made available to decision makers before a final decision on the proposed project.

Please refer to Master Comment Response WQ-1, "Remediation of Abandoned Mines in the Shasta Lake Area."

DFW-51: This EIS does not evaluate the effects of channel incision and bank erosion that may have occurred historically as a result of construction of Shasta Dam, in the main channel and tributaries. The evaluation conducted for this EIS considers the action alternatives in comparison to the No Action Alternative. Under the No-Action Alternative, Shasta Dam operations would not change. Under the action alternatives, operational changes would be minimal, such that the

probability of exceedance of flows being exceeded on the Sacramento River during a given year is nearly indistinguishable from curves under the No-Action Alternative. Chapter 4, "Geology, Geomorphology, Minerals, and Soils," Section 4.3.4 presents the probability of exceedance curves to demonstrate that minimal changes in energy associated with the difference in flows between the No-Action Alternative and the action alternatives would limit any significant additional channel incision or bank erosion in tributary streams below Keswick Dam. Because it is not anticipated that fluvial geomorphology or downstream tributary fluvial geomorphology would be altered, no mitigation measures is necessary. However, mitigation measure Geo-9 was developed to implement coordination on an annual basis with relevant river management and habitat restoration efforts between Keswick Dam and Red Bluff, including but not limited to the members of the Sacramento River Temperature Task Group. The purpose of this coordination will be to discuss how releases from Shasta and Keswick Dams could be managed to best enhance downstream objectives, such as ramping rates or temperature targets, that are consistent with the CVP's capabilities and primary operating objectives.

DFW-52: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

DFW-53: The DEIS identifies and evaluates six comprehensive plans (CP) that have been developed to meet the project purpose and need and objectives, analyzes the potential environmental effects, and identifies measures to reduce or avoid potential environmental effects resulting from the action alternatives (i.e., mitigation measures).

Please refer to Master Comment Response ALTS-1, "Alternative Selection."

DFW-54: Information related to the status of existing resources is presented in Chapters 4 through 25 of the DEIS. The Executive Summary does not include all of the background information found in the individual resource chapters.

DFW-55: Please refer to Master Comment Response ALTS-1, "Alternative Selection," and Master Comment Response CEQA-1, "CEQA Compliance."

DFW-56: The Summary is not meant for detailed descriptions of these issues. Specific needs, habitat descriptions, management and regulatory requirements and actions, and fisheries impacts and benefits are further described in Chapter 11, "Fisheries and Aquatic Ecosystems."

DFW-57: The Summary is not meant for detailed descriptions of these issues. Specific needs, habitat descriptions, management and regulatory requirements and actions, and fisheries impacts and benefits are further described in Chapter 11 "Fisheries and Aquatic Ecosystems." Additionally, the SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. The existing Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability.

Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability," and Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival."

DFW-58: The Executive Summary is not meant for detailed descriptions of these issues. Specific needs, habitat descriptions, management and regulatory requirements and actions, and fisheries impacts and benefits are further described in Chapter 11, "Fisheries and Aquatic Ecosystems."

DFW-59: The Executive Summary is not meant for detailed descriptions of these issues. Specific needs, habitat descriptions, management and regulatory requirements and actions, and fisheries impacts and benefits are further described in Chapter 11, "Fisheries and Aquatic Ecosystems."

DFW-60: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the best way and most efficient way to meet both primary objectives is to implement the SLWRI. The existing Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability.

Please refer to Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival"; Master Comment Response P&N-1, "Purpose and Need and Objectives"; and Master Comment Response GEN-2, "Unsubstantiated Information."

DFW-61: Please refer to Master Comment Response RAH-2, "Reservoir Surface Area with Reservoir Enlargement."

DFW-62: Please refer to Master Comment Response RAH-2, "Reservoir Surface Area with Reservoir Enlargement."

DFW-63: Please refer to Master Comment Response RAH-2, "Reservoir Surface Area with Reservoir Enlargement."

DFW-64: Please refer to Master Comment Response RAH-2, "Reservoir Surface Area with Reservoir Enlargement."

DFW-65: Please refer to Master Comment Response RAH-2, "Reservoir Surface Area with Reservoir Enlargement."

DFW-66: Please refer to Master Comment Response RAH-2, "Reservoir Surface Area with Reservoir Enlargement."

DFW-67: The Summary Chapter is not meant for detailed information, but a summary of the findings. For detailed information, refer to Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.3, "Direct and Indirect Effects."

DFW-68: Chapter 7, "Water Quality," and the associated Water Quality Technical Report provide a comprehensive discussion of the nature and location of historic mining activities and existing features as they relate to heavy metals and other water quality constituents. Under the No-Action Alternative, the existing mine drainage issues will continue consistent with abatement efforts of land owners and managers. With the exception of an isolated area near the Bully Hill mine complex, there are no abandoned or active mines that would be subject to inundation or disturbance if the SLWRI project is authorized.

The discussion of fisheries impacts in Chapter 11, "Fisheries and Aquatic Ecosystems," referenced by the commenter is specific to impacts to cold water habitat. Discussion of water quality impacts on beneficial uses (e.g., cold water habitat) is provided in Chapter 7, "Water Quality," specifically impacts WQ-3 and WQ-6.

Please refer to Master Comment Response WQ-1, "Remediation of Abandoned Mines in the Shasta Lake Area."

DFW-69: Mitigation measures were enhanced in the Final EIS.

DFW-70: Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

DFW-71: The purpose of the Executive Summary is to summarize the contents of the Final EIS. The Executive Summary does not provide the level of detail and analysis that is included in the body of the EIS. The Impact Analysis and Mitigation Measures are discussed in Chapter 11, "Fisheries and Aquatic Ecosystems," of the Final EIS. The impact call for Impact Aqua-7: Effects on Spawning and Rearing Habitat of

Adfluvial Salmonids in Low-Gradient Tributaries to Shasta Lake was changed and mitigation for this impact was revised in the Final EIS.

DFW-72: There are no ESA or CESA listed plants in that portion of the primary study area that would be impacted. The impact statement is specific to ESA and CESA to facilitate any consultation requirements. Please refer to Impact Bot-3 in the Executive Summary, which specifically addresses sensitive plants, including rare plants.

Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

DFW-73: The purpose of the Executive Summary is to summarize the contents of the EIS. The Executive Summary does not provide the level of detail and analysis that is included in the body of the EIS. The impacts were quantified and updated in Chapter 12, "Botanical Resources and Wetlands," and Chapter 13, "Wildlife Resources," of the EIS.

DFW-74: The purpose of the Executive Summary is to summarize the contents of the EIS. The Executive Summary does not provide the level of detail and analysis that is included in the body of the EIS. The impacts were quantified and updated in Chapter 13, "Wildlife Resources," of the EIS.

DFW-75: The text about which the commenter refers is a discussion of background and project need. There is no claim in the DEIS that the NMFS Recovery Plan, or the NMFS RPA include nor suggest raising Shasta Dam as an option for increasing the cold water pool or balancing carryover storage with instream flow needs for winter-run Chinook salmon. However, this DEIS does provide a viable option for increasing water supply reliability as well as increase the cold water pool and meet the NMFS 2009 RPA carryover storage requirements and improve conditions for Chinook salmon in the Sacramento River downstream from Keswick Dam. This is particularly important as climate change occurs and water needs increase.

DFW-76: Text in the DEIS was revised. With regards to responding to the comment letter submitted for the Draft Feasibility Report, there have been previous review and comment opportunities on documents related to the SLWRI. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

DFW-77: Please refer to Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations."

DFW-78: Mitigation Measure BOT-7 in Chapter 12, "Botanical Resources and Wetlands," requires implementation of a riverine ecosystem mitigation and adaptive management plan to avoid and compensate for the impact of altered flow regimes on riparian and wetland communities. The plan will be developed through a multi-agency collaborative effort before the beginning of project construction. The plan will address potential impacts to riparian and wetland habitat and associated effects to fisheries resources resulting from project operations, identify specific strategies to eliminate these impacts, and implement programs and operational strategies to benefit riparian and wetland habitat. This adaptive management plan has been described in the Final EIS. See Master Comment Response CMS-1, "EIS Mitigation Plan."

DFW-79: With regards to responding to the comment letter submitted for the Draft Feasibility Report, there have been previous review and comment opportunities on documents related to the SLWRI. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

DFW-80: Occurrences of "California Resources Agency" in the EIS have been replaced with "California Natural Resources Agency," with the exception of references where the agency name remains consistent with the date of publication. Chapter 1, "Introduction," Section 1.5.1, "Intended Use of Final EIS" of the EIS has been updated to include the California Wild and Scenic River Act as a responsibility of the California Natural Resources Agency.

DFW-81: The commenter is correct with respect to referencing management direction for survey and manage species. Chapter 17, "Land Use," specifically Impact LU-2 has been revised to acknowledge potentially significant impacts and corresponding mitigation measures that may be required. As part of the Biological Evaluation that will be prepared in support of this planning effort, a persistence evaluation will be included. Subsequently, the USFS and/or BLM will make a consistency determination which may trigger the need to amend the respective agency's LRMP.

DFW-82: This text is located on page 2-46, Line Number 23, in Chapter 11, "Fisheries and Aquatic Ecosystems," Section 2.3.5, "Increase

Anadromous Fish Survival." CP3 is compared to the No-Action Alternative, from which there is an increase of 207,400 juvenile Chinook salmon. While other action alternatives may provide larger benefits, each action alternative does provide benefits relative to the No-Action Alternative, and therefore, the title of this alternative reflects a true statement.

DFW-83: Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration."

DFW-84: The SRTTG was called out in the NMFS 2009 BO Section 11.2.1.1 identifying it as one of the 4 Fisheries and Operation Technical Teams responsible for adjusting operations to meet contractual obligations for water deliveries and to minimize adverse effects on listed anadromous fish species. This group is further called out in Action I.1.2.4 of the NMFS RPA. The SRTTG is made up of members from Reclamation, USFWS, CDFW, NMFS, SWRCB, Hoopa Tribe, Yurok Tribe, and the Western Area Power Administration.

With respect to responding to the 2008 PAM letter and comment letter on the SLWRI Feasibility Report, there have been previous review and comment opportunities on documents related to the SLWRI. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

DFW-85: As stated further down in the same section of the DEIS Chapter 2 "Alternatives," Section 2.3.7, "CP5 – 18.5-Foot Dam Raise, Combination Plan," subsection "Restore Riparian, Floodplain, and Side Channel Habitat," the riparian, floodplain, and side channel habitat restoration measure is identical to that proposed under CP4.

DFW-86: Within Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities Section," the vegetation treatments sections were enhanced to acknowledge the value of forest patches for Bald eagle and other sensitive species. Complete vegetation removal will not occur in areas that contain habitat (i.e., nest trees) for bald eagle or other special-status species. Design measures were developed to avoid these areas as feasible. Bald eagle life history is described in detail in Attachment 2 of the Wildlife Resources Technical Report. Chapter 13, "Wildlife Resources," in the EIS includes details within Section 13.1.2, "Affected Environment," regarding bald eagle surveys, and number of nests in the primary study area between 2007 and 2010. Within the "Direct and Indirect Effects," Section 13.3.4,

Impact Wild-5: Take and Loss of Habitat for the Bald Eagle details impacts to bald eagle. Mitigation measures for Bald Eagle were enhanced in Section 13.3.4. In addition, a Bald and Golden Eagle Management Plan will be developed if warranted. In Chapter 11, "Fisheries and Aquatic Ecosystems," Impact Aqua-1: Effects on Nearshore, Warm-Water Habitat in Shasta Lake from Project Operations and Impact Aqua-2: Effects on Nearshore, Warm-Water Habitat in Shasta Lake from Project Construction addresses impacts related to cover habitat for reservoir fish species.

DFW-87: Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

DFW-88: Please refer to Master Comment Response CEQA-1, "CEQA Compliance"; Master Comment Response NEPA-1, "Sufficiency of the EIS"; and Master Comment Response NEPA-2, "Cumulative Impacts."

DFW-89: Reclamation has gathered information and performed focused studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The methods used to evaluate the impacts of the alternatives were based upon Reclamation's standard practices and input from agencies and subject matter experts.

DFW-90: The SLWRI does not cumulatively negatively impact any of the actions identified in the species recovery plans produced for species impacted by the project, or actions identified for species recovery plans for species not impacted by the project in or near the primary and extended study area.

The criteria for the inclusion of a species recovery plan in the SLWRI cumulative effects analysis was whether or not the species recovery plan had past, present, or reasonably foreseeable actions being implemented on the ground in or near the primary or extended study area. Additionally, the SLWRI cumulative effects analysis assesses actions which could potentially have negative cumulative impacts, not those that may be beneficial. Revisions to the text of the Final EIS were made in response to this comment.

The 1992 DFG Bank Swallow Recovery Plan has actions identified for set-back levees (meander belt concept) on page 11, provisions for impact avoidance on page 12, and a habitat preserve concept on page 13 of the document. However, none of the actions identified fit the criteria for inclusion in the SLWRI cumulative effects analysis, nor would they be negatively impacted cumulatively by implementation of any of the project alternatives. Therefore, the 1992 DFG Bank Swallow Recovery Plan is not included in the SLWRI cumulative effects analysis.

The 2002 Region 1 USFWS California Red-legged Frog Recovery Plan identifies a number of management and prescriptive actions, none of which have been specifically identified as occurring in or near the primary or extended study area and are not expected to be cumulatively affected by the SLWRI project alternatives. Any potential direct impacts to the Red-legged frog are addressed in Chapter 13, “Wildlife Resources,” and through environmental commitments and mitigation plans. Therefore, the 2002 Region 1 USFWS California Red-legged Frog Recovery Plan is not included in the SLWRI cumulative effects analysis.

The 2009 NMFS Draft Recovery Plan and the 2014 Final Recovery Plan for Sacramento River winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and The Distinct Population segment of Central Valley Steelhead are not included in the SLWRI cumulative effects analysis on the same premise as the 1992 DFG Bank Swallow Recovery Plan. At this time, actions have not been identified for on-the-ground implementation in the regions identified in the plan encompassing the primary and extended study area. It should be noted that the 2009 NMFS Biological Opinion and Sacramento River Habitat Restoration and Enhancement and Fish Passage Actions are included in the cumulative effects analysis because they fit the criteria for the analysis.

DFW-91: Text amended to remove the Invasive Non-Native Plant (Weed) Management Plan for the Mouth of Cottonwood Creek Wildlife Area project from the qualitative cumulative effects analysis in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," due to the project no longer being active. A formal update of the South Fork Cottonwood Creek Nonnative Plant Management and Control Project the project is not available at this time. This project has not been added to the cumulative effects analysis for lack of updated information. The cumulative effects analysis only considers projects which “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions” (40 CFR 1508.7).

DFW-92: Information for an update to the project description for the cumulative effects analysis is not available at this time. The project website has not been updated since 2010. Project removed from cumulative effects analysis.

Please refer to Master Comment Response GEN-4, “Best Available Information.”

DFW-93: A formal update of the project is not available at this time. The project has been removed from the cumulative effects analysis for lack of updated information.

DFW-94: The Natomas Central Mutual Water Company completed the American Basin Fish Screen and Habitat Improvement Project as part of CVPIA 3406(b)(21). This project was implied in the cumulative effects analysis as an action under CVPIA 3406(b)(21). Text has been amended as per this comment to include an explicit description of the American Basin Fish Screen and Habitat Improvement Project as follows: American Basin Fish Screen and Habitat Improvement Project The American Basin Fish Screen and Habitat Improvement Project is a river intake facility, including the fish screen, 434 cfs pumping plant, access bridges, canal connection, irrigation canal, connections to existing canals, and hibernacula and wetlands plantings on and near the Sacramento River completed by the Natomas Central Mutual Water Company as part of CVPIA 3406(b)(21).

DFW-95: The text was revised to reflect the understanding of potential geomorphic conditions at the major tributaries under the action alternatives.

DFW-96: The text was revised to reflect the understanding of potential geomorphic conditions on the upper Sacramento River within the primary study area under the action alternatives.

DFW-97: The text was revised to reflect the understanding of potential geomorphic conditions on the upper Sacramento River within the primary study area under the action alternatives.

DFW-98: This EIS does not evaluate the effects of geomorphic changes at major tributaries that may have occurred historically as a result of construction of Shasta Dam. The evaluation conducted for this EIS considers the action alternatives in comparison to the No Action Alternative. Under the No-Action Alternative, Shasta Dam operations would not change. Under the Action Alternatives, operational changes would be minimal, such that Sacramento River water surface elevations would be very similar from conditions under the No-Action Alternative. Minimal changes in water surface elevations between the No-Action Alternative and the action alternatives would limit gravel removal via downcutting at the confluence with the Sacramento River. Because it is not anticipated that fluvial geomorphology or downstream tributary fluvial geomorphology would be altered significantly, no mitigation measures is necessary. However, mitigation measure Geo-9 was developed to implement coordination on an annual basis with relevant river management and habitat restoration efforts between Keswick Dam and Red Bluff, including but not limited to the members of the

Sacramento River Temperature Task Group. The purpose of this coordination will be to discuss how releases from Shasta and Keswick Dams could be managed to best enhance downstream objectives, such as ramping rates or temperature targets, that are consistent with the CVP's capabilities and primary operating objectives.

DFW-99: See response to comment DFW-98.

DFW-100: See response to comment DFW-98.

DFW-101: See response to comment DFW-98.

DFW-102: Table has been updated to reflect the status of this species.

DFW-103: Table 11-1 has been updated to include River lamprey (Lampetra ayresi). Little information exists for this species in California, and most sources suggest it does not occur in the primary study area but does occur in the extended study area and tributaries.

DFW-104: Text has been revised to include critical habitat.

DFW-105: The referenced text has been revised to reflect that the program name is now "Ecosystem Restoration Program."

DFW-106: The text to which this comment refers is the NMFS 1993 BO which is cited in the text. No change was made.

DFW-107: This section describes the Fisheries Technical Teams. The Water Operations Technical Team (WOMT) is not among that group. Text was not revised.

DFW-108: See response to DFW-81.

DFW-109: Chapter 17, "Land Use," has been revised to include a discussion of USFS lands along the upper Sacramento River near the Red Bluff Pumping Plant. The DEIS included a discussion of BLM lands within the primary study area; this discussion has been enhanced in the Final EIS.

DFW-110: Text revised to reflect comment.

DFW-111: Additional details on the plan were not added as it is does not add additional information on fisheries resources beneficial for the SLWRI. However, the Yolo County citation was added to the document, and the reference included in Chapter 30, "References." Chapter 17, "Land Use," provides information on the general plans (City and County) that Reclamation has deemed applicable for consideration in the EIS.

DFW-112: Comment noted. Revisions were made to Chapter 11, "Fisheries and Aquatic Ecosystems."

DFW-113: Text revised to reflect comment.

DFW-114: The Sacramento River Watershed Program is discussed in Chapter 12, "Botanical Resources and Wetlands," Section 12.2.4, "Federal, State, and Local Programs and Projects," and in Chapter 13, "Wildlife Resources," Section 13.2.4, "Federal, State, and Local Programs and Projects."

DFW-115: There have been previous review and comment opportunities on documents related to the SLWRI. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

DFW-116: Text revised to provide clarification.

DFW-117: Text revised to clarify model limitations. Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," and Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

DFW-118: The starting number of adult spawning Chinook salmon (each run) input into SALMOD was based on the AFRP Sacramento River doubling goals, per the request of the USFWS and CDFW during SLWRI fisheries technical team meetings. These AFRP targets are for the river between the confluence with the Feather River and Keswick Dam, so the number of adult spawners were adjusted to cover the reach between RBPP and Keswick Dam. The numbers in the table presented in the DEIS are likely underrepresented of what the true AFRP goal likely is for each run in the evaluated reach of river.

While the spring-run Chinook salmon in that spawn in the Sacramento River between Keswick Dam and Red Bluff Pumping Plant may be of questionable genetic integrity, they are still considered as spring-run Chinook salmon by CDFW and other resource agencies while conducting annual spawner estimates (see Grand Tab Table at http://www.calfish.org/LinkClick.aspx?fileticket=wXbihOvQ7JU%3d&tabid=213&mid=524). Also, the Sacramento River within this reach is included in the designated critical habitat for spring-run Chinook salmon. In a Fisheries Technical Team meeting in Red Bluff on July 5, 2007, NMFS stated that regardless of the actual number of spring-run present in the Sacramento River, the Recovery Plan, critical habitat, and

AFRP goals require that Reclamation must include protective measures for spring-run Chinook salmon, and therefore need to include spring-run Chinook salmon in the analysis.

DFW-119: There have been previous review and comment opportunities on documents related to the SLWRI. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

DFW-120: The significance criteria are listed here per the requirements of CEQA. However, whenever specific regulatory such as ESA or other legal requirements dictate specific metrics to determine significance, they have been described in further detail in Section 11.3.1, "Methods and Assumptions," in Chapter 11, "Fisheries and Aquatic Ecosystems."

Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

DFW-121: Implementation of Mitigation Measure Aqua-15 will maintain flows in the Feather, American, and Trinity Rivers pursuant to existing operational agreements, BOs, and standards that are protective of fisheries resources.

Please refer to Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts."

DFW-122: Please refer to Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts."

DFW-123: Chapter 7, "Water Quality," and the associated Water Quality Technical Report provide a comprehensive discussion of the nature and location of historic mining activities and existing features as they relate to heavy metals and other water quality constituents. Under the No-Action Alternative, the existing mine drainage issues will continue consistent with abatement efforts of land owners and managers. With the exception of an isolated area near the Bully Hill mine complex, there are no abandoned or active mines that would be subject to inundation or disturbance if the SLWRI project is authorized.

The discussion of fisheries impacts in Chapter 11, "Fisheries and Aquatic Ecosystems," referenced by the commenter is specific to impacts to cold water habitat. Discussion of water quality impacts on beneficial uses (e.g., cold water habitat) is provided in Chapter 7, "Water Quality," specifically Impacts WQ-3 and WQ-6.

DFW-124: The EIS was revised to enhance the discussion of Fisheries and Aquatic Resources, impacts to fisheries and aquatic resources, and mitigation measures for impacted fisheries and aquatic resources. As part of a detailed technical study of the tributaries to Shasta Lake, field surveys and sampling efforts of the lower reaches of representative tributaries to the lake did not detect any special-status mollusks. One special-status aquatic mollusk does occur in Shasta Lake, while limited information is known on this species specific to Shasta Lake, this discussion does take a conservative approach and presume impacts.

DFW-125: Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3, "Environmental Consequences" describe the Reservoir Fisheries Analyses and models used to determine that the expansion of the surface area of Shasta Lake could be beneficial. This analysis considered and incorporated local knowledge from agency biologist and relevant scientific literature.

DFW-126: Comment noted. The tributary investigations were completed. This information is included in Chapter 11, "Fisheries and Aquatic Ecosystems," of the Final EIS. The report documenting this investigation is cited as Reclamation 2014 in Chapter 11.

DFW-127: Chapter 7, "Water Quality," and the associated Water Quality Technical; Report provide a comprehensive discussion of water quality in the upper Sacramento River; specifically Impacts WQ-7 through WQ-12. Of these impacts, only one (WQ-12) was deemed significant for action alternatives. Mitigation Measure WQ-12 would be implemented to address these impacts.

Please refer to Master Comment Response WQ-1, "Remediation of Abandoned Mines in the Shasta Lake Area."

DFW-128: Please see Biological Resources Appendix, Fisheries and Aquatic Resources Technical Report for the full analysis for each of the Chinook Salmon runs. This information was used and summarized in the DEIS Chapter 11, "Fisheries and Aquatic Ecosystems."

Please refer to Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts."

DFW-129: Please refer to Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Effects."

DFW-130: Please refer to Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts," And Master Comment Response CMS-1, "EIS Mitigation Plan."

DFW-131: Chapter 11, "Fisheries and Aquatic Resources," of the DEIS acknowledges the potential adverse effects of altered flow regimes on river sinuosity. Reduced flow can decrease sinuosity, thus potential project impacts to sinuosity are reflected in the effects analyses for potential changes to flow for each alternative. Analyses for direct and indirect effects to flow among alternatives is found throughout Section 11.3.3, "Direct and Indirect Effects," of the DEIS. Impact Geo-9: Substantial Increase in Channel Erosion and Meander Migration in Chapter 4, "Geology, Geomorphology, Minerals, and Soils," Section 4.3.3, "Direct and Indirect Effects," describes the characteristics of peak flows, including the duration, magnitude and rate at which flows change downstream from Shasta Dam. In Chapter 3 "Considerations for Describing Affected Environment and Environmental Consequences," within Table 3-1, there is a subheader entitled "Qualitative Assessment of Actions Related to Flood Management" which covers numerous programs related to flood management, including the DWR program. Therefore, the DWR flood management program was included in the cumulative effects analysis.

DFW-132: Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

DFW-133: Please refer to Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts."

DFW-134: See responses to comments DFW-51, DFW-95, DFW-98, and DFW-99.

DFW-135: Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

DFW-136: Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

DFW-137: Impact Aqua-24 in Chapter 11, "Fisheries and Aquatic Resources," Section 11.3.3, "Direct and Indirect Effects" has been revised.

DFW-138: The EIS, Chapter 7, "Water Quality," includes a discussion of heavy metals and the associated impacts, including a discussion of beneficial uses (e.g., cold water fishery). No known sources of mercury are within the immediate vicinity of Shasta Lake, although the EIS does disclose the fact that Shasta Lake is an impaired water body due to historic mining and smelting activity in the watershed.

Please refer to Master Comment Response WQ-1, "Remediation of Abandoned Mines in the Shasta Lake Area."

DFW-139: Comment noted. The tributary investigations were completed. This information is included in Chapter 11, "Fisheries and Aquatic Ecosystems," of the Final EIS. The report documenting this investigation is cited as Reclamation 2014 in Chapter 11.

DFW-140: Information concerning environmental commitments for CP4 can be found in Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.5, "Mitigation Measures." Resource and Regulatory agencies will determine whether the mitigation commitments will be sufficient for regulatory purposes.

Please refer to Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts."

DFW-141: The additional storage created by the 18.5-foot dam raise under alternative CP4 and CP4A would be used to improve the ability to meet water temperature objectives and habitat requirements for anadromous fish during drought years and increase water supply reliability.

DFW-142: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to this species from the dam raise and lake inundation. In Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to *Neviusia cliftonii*. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS.

DFW-143: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to this species from the dam raise and lake inundation. In Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to *Neviusia cliftonii*. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS.

DFW-144: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to this species from the dam raise and lake inundation. In Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to *Neviusia cliftonii*. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS.

DFW-145: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to this species from the dam raise and lake inundation. In Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Effects Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to *Neviusia cliftonii*. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS.

DFW-146: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to this species from the dam raise and lake inundation. In Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Effects Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to *Neviusia cliftonii*. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS.

DFW-147: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on *Neviusia cliftonii*. Surveys were completed to map population sizes and locations

to accurately quantify the impacts to this species from the dam raise and lake inundation. In Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to *Neviusia cliftonii*. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS.

DFW-148: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to this species from the dam raise and lake inundation. In Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to *Neviusia cliftonii*. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS.

DFW-149: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to this species from the dam raise and lake inundation. In Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to *Neviusia cliftonii*. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS.

DFW-150: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to this species from the dam raise and lake inundation. In Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to

Neviusia cliftonii. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS.

DFW-151: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on Shasta snow-wreath and *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to MSCS plant species from the dam raise and lake inundation. In Chapter 12, "Water Quality," of the EIS, Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to Shasta snow-wreath. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in the mitigation measures Section 12.3.5 of the EIS.

DFW-152: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on Shasta snow-wreath and *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to MSCS plant species from the dam raise and lake inundation. In Chapter 12, "Water Quality," of the EIS, Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to Shasta snow-wreath. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in the mitigation measures Section 12.3.5 of the EIS.

DFW-153: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on Shasta snow-wreath and *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to MSCS plant species from the dam raise and lake inundation. In Chapter 12, "Water Quality," of the EIS, Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to Shasta snow-wreath. Mitigation measures were developed in cooperation with the USFWS, USFS, and

BLM, and were updated in the mitigation measures Section 12.3.5 of the EIS.

DFW-154: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on *Neviusia cliftonii*. Surveys were completed to map population sizes and locations to accurately quantify the impacts to this species from the dam raise and lake inundation. In Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to *Neviusia cliftonii*. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS. There are private lands outside the study area that contain *Neviusia cliftonii* populations that were discovered following the release of the DEIS.

DFW-155: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. The Botanical Resources and Wetlands Technical Report and EIS include updated information on Shasta snow-wreath. Surveys were completed to map population sizes and locations to accurately quantify the impacts to Shasta snow-wreath populations from the dam raise and lake inundation In Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2, "Loss of MSCS Covered Species," and Impact BOT-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species" include the analysis of impacts to *Neviusia cliftonii*. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS.

DFW-156: In addition to enhanced impact analyses and mitigation measures within Chapter 12, "Botanical Resources and Wetlands," Section 12.3.6, "Cumulative Effects," was revised.

DFW-157: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. In addition to enhanced impact analyses and mitigation measures within Chapter 12, "Botanical Resources and Wetlands," Section 12.3.6, "Cumulative Effects," was revised.

DFW-158: The comment refers to a preliminary draft EIS issued in 2012, not the June 2013 DEIS. The DEIS did include additional information on this topic. Chapter 12, "Botanical Resources and

Wetlands," of the EIS includes updated impacts discussions, revised impact analyses, and enhanced mitigation measures.

DFW-159: For species that are relatively widespread (i.e., foothill yellow-legged frog and pacific fisher), a habitat-based impact analysis was used. However, for endemics or species with a more narrow range (i.e., purple martin nesting habitat) the impact analysis was more detailed and not based on habitat alone.

DFW-160: As stated in Section 2.2 of the ASIP Guidebook, the ASIP should "[i]dentify species and habitats that are present or may be present in the Action Area including: (1) MSCS species covered under CALFED Programmatic BOs and NCCP Determination. To develop the species list, it is recommended that the Implementing Entities: (a) Include species lists from the Fishery Agencies as described under Section 1.3 for the Action Area; (b) Conduct a search of DFG's Natural Diversity Database to identify known occurrences of special-status species within the Action Area: http://www.dfg.ca.gov/whdab/html/cnddb.html; (c) Conduct a search of the California Native Plant Society's Inventory of Rare and Endangered Plants; and (d) Submit a request in writing to DFG for information about any recent observations of special-status species within or near the geographic scope of the project that are not included in the special-status species occurrence databases available to the public..." Reclamation evaluated all species evaluated under the MSCS (as identified in MSCS Table 2-2) and augmented this list with information obtained from USFWS, CNPS, and CDNNB. Reclamation will submit a written request to CDFW.

DFW-161: See response to comment DFW-160.

DFW-162: Within Chapter 13, "Wildlife Resources," of the Final EIS, Section 13.1, "Affected Environment," and Section 13.3.4, "Direct and Indirect Effects," were revised.

DFW-163: The EIS and Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area" was updated to include the correct number of Shasta salamander sites. The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report," contains information on Shasta salamander survey results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander" includes the analysis of impacts to Shasta salamander. The EIS was revised to enhance Section 13.3.5, "Mitigation Measures," for the Shasta salamander.

DFW-164: The EIS and Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area" was updated to include the correct number of Shasta salamander sites. The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report," contains information on Shasta salamander survey results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander" includes the analysis of impacts to Shasta salamander. The EIS was revised to enhance Section 13.3.5, "Mitigation Measures," for the Shasta salamander.

DFW-165: The EIS and Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area" was updated to include the correct number of Shasta salamander sites. The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report," contains information on Shasta salamander survey results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander" includes the analysis of impacts to Shasta salamander. The EIS was revised to enhance Section 13.3.5, "Mitigation Measures," for the Shasta salamander.

DFW-166: The EIS and Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area" includes enhanced discussions on foothill yellow-legged frog and tailed frog habitat. Northwestern pond turtle habitat is also discussed in Attachment 2. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-2, "Impact on the Foothill Yellow-Legged Frog and Tailed Frog and Their Habitat" includes the analysis of impacts to foothill yellow-legged frog and tailed frog. Impact Wild-3: Impact on the Northwestern Pond Turtle and Its Habitat includes the analysis of impacts to northwestern pond turtle.

DFW-167: The EIS and Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area" includes discussion on peregrine falcon and its habitat. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-4, "Impact on American Peregrine Falcon" includes the analysis of impacts to peregrine falcon. The EIS was revised to enhance Section 13.3.5, "Mitigation Measures," for peregrine falcon.

DFW-168: The EIS and Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the

Shasta Lake and Vicinity Portion of the Primary Study Area" includes discussion on bald eagle and its habitat. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-5, "Take and Loss of Habitat for the Bald Eagle" includes the analysis of impacts to bald eagle and its habitat. The EIS was revised to enhance Section 13.3.5, "Mitigation Measures," for bald eagle. In addition, a Bald and Golden Eagle Management Plan will be developed if warranted.

DFW-169: The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report" contains information on Shasta salamander surveys including the level of survey effort, methods, and results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander," includes the analysis of impacts to Shasta salamander. The Wildlife Resources Technical Report - Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the discussion of Shasta salamander. In addition, the EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for Shasta salamander.

DFW-170: The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report" contains information on Shasta salamander surveys including the level of survey effort, methods, and results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander," includes the analysis of impacts to Shasta salamander. The Wildlife Resources Technical Report - Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the discussion of Shasta salamander. In addition, the EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for Shasta salamander.

DFW-171: The Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," includes discussion on bald eagle and its habitat. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-5, "Take and Loss of Habitat for the Bald Eagle" includes the analysis of impacts to bald eagle and its habitat. The EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for bald eagle. In addition, a Bald and Golden Eagle Management Plan will be developed if warranted with input from CDFW and USFWS.

DFW-172: The Wildlife Resources Technical Report - Attachment 10, "Terrestrial Mollusk Survey Report," contains information on terrestrial mollusk surveys including the level of effort, methods, and results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-12, "Impacts on Special-Status Mollusks (Shasta Sideband, Wintu Sideband, Shasta Chaparral, and Shasta Hesperian) and Their Habitat" includes the analysis of impacts to special-status terrestrial mollusks. In addition, the EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for special-status terrestrial mollusks.

DFW-173: General Wildlife Habitat is based on the California Wildlife Habitat Relationship system including those habitats not linked to a specific species. This is defined in Section 13.1, "Affected Environment," in Chapter 13, "Wildlife Resources," of the EIS. The HEP analysis was used in the USFWS CAR to characterize existing conditions and was considered in the impacts analysis and mitigation development.

DFW-174: Chapter 12, "Botany," indicates that "acreage values are approximate." As noted in Impact Wild-17 (CP1), "the total amount of riparian vegetation would not decline substantially, [but] the portion in early successional stages would be reduced." Thus, the overall amount of riparian habitat (measured in acres) is less affected than the composition of this this habitat (e.g., early successional versus late successional). Therefore, the impact is adequately analyzed in terms of how the composition change (not an acreage change) affect various species.

DFW-175: Please refer to Master Comment Response EI-2, "Potential Impacts to Bank Swallow and Bank Swallow Habitat," and Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

DFW-176: Please refer to Master Comment Response EI-2, "Potential Impacts to Bank Swallow and Bank Swallow Habitat."

DFW-177: Please refer to Master Comment Response EI-2, "Potential Impacts to Bank Swallow and Bank Swallow Habitat."

DFW-178: The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report," contains information on Shasta salamander surveys including the level of survey effort, methods, and results. The Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the discussion of Shasta salamander. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects Section," Impact

Wild-1, "Take and Loss of Habitat for the Shasta salamander," includes the analysis of impacts to Shasta salamander. In addition, the EIS was revised to enhance the impact analysis and mitigation measures Section 13.3.5 for Shasta salamander.

DFW-179: The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report," contains information on Shasta salamander surveys including the level of survey effort, methods, and results. The Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the discussion of Shasta salamander. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects Section," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander," includes the analysis of impacts to Shasta salamander. In addition, the EIS was revised to enhance the impact analysis and mitigation measures Section 13.3.5 for Shasta salamander.

DFW-180: The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report" contains information on Shasta salamander surveys including the level of survey effort, methods, and results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander," includes the analysis of impacts to Shasta salamander. The Wildlife Resources Technical Report - Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the discussion of Shasta salamander. In addition, the EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for Shasta salamander.

DFW-181: The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report" contains information on Shasta salamander surveys including the level of survey effort, methods, and results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander," includes the analysis of impacts to Shasta salamander. The Wildlife Resources Technical Report - Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the discussion of Shasta salamander. In addition, the EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for Shasta salamander.

DFW-182: The Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the

discussion of willow flycatcher, Vaux's swift, yellow warbler, and yellow-breasted chat. Impact Wild-8: Impacts on the Willow Flycatcher, Vaux's Swift, Yellow Warbler, and Yellow-Breasted Chat and Their Foraging and Nesting Habitat includes the analysis of impacts to these species. In addition, the EIS was revised to enhance Section 13.3.4, "Impact Analysis," and Section 13.3.5, "Mitigation Measures," for these species.

DFW-183: The EIS contains additional information from technical studies completed after the DEIS was circulated; specifically, a detailed discussion of barriers to aquatic organisms (upstream and downstream) has been included. The EIS includes an environmental commitment to monitor a potential barrier in the transition reach of Squaw Creek and develop a management plan to address this site if a barrier is documented post-authorization.

The EIS also acknowledges that the creation of transition reaches is a permanent, albeit periodic process.

DFW-184: Chapter 25, "Wild and Scenic River Considerations for McCloud River," of the EIS has been revised to acknowledge the permanent but periodic fluctuations of water levels (Impact WASR-3).

DFW-185: NEPA requires that the lead agency--in this case, Reclamation--determine and disclose the impacts of an action. While the McCloud River is protected under state statute, is not clear what section of the Public Resources Code supports the commenters claim that Reclamation should request an effects determination from the California Natural Resources Agency.

Comments received on the DEIS related to Impacts WASR- 3 and WASR-4 resulted in developing mitigation measures intended to evaluate opportunities available to Reclamation that could potentially mitigate, these impacts to some degree if the SLWRI is authorized.

Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

DFW-186: Chapter 25, "Wild and Scenic River Considerations for McCloud River," discusses both the temporary and permanent impacts on the McCloud River. It discloses that, without mitigation, the impact is significant and unavoidable.

DFW-187: During the preparation of the cumulative impact assessment of the SLWRI DEIS, Reclamation carefully considered how to treat various potential future actions and programs consistent with CEQ NEPA Regulations 40 CFR Section 1508.7. Projects which are included

in the SLWRI cumulative effects analysis quantitatively are those that are reasonably foreseeable projects defined as including those with current authorization, secured funding for design and construction, and environmental permitting and compliance activities that are substantially complete (Chapter 2, "Alternatives," Section 2, "No Action"). The actions of the 2009 NMFS Biological Opinion which qualify for inclusion in the SLWRI cumulative effects analysis, the Sacramento River Habitat Restoration and Enhancement and Fish Passage Actions, are described and included in Section 3.2.9, "Cumulative Effects," of Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences." The 2009 Biological Opinion, and any actions associated with the 2009 Biological Opinion which do not qualify are not included in the cumulative effects analysis, although elements of both are included in the modeling for impacts analysis within the SLWRI DEIS. At present, the USFS does not have any post-Bagley Fire formal plans for salvage logging or soils remediation which qualify for inclusion the cumulative effects analysis; however considerations for post-fire recovery were prescribed by the USFS in the Comprehensive Mitigation Strategy (CMS), included in the SLWRI Final EIS.

DFW-188: NEPA requires that the lead agency--in this case, Reclamation--determine and disclose the impacts of an action. While the McCloud River is protected under state statute, is not clear what section of the Public Resources Code supports the commenters claim that Reclamation should request an effects determination from the California Natural Resources Agency.

Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

DFW-189: Please refer to Master Comment Response ALTS-1, "Alternative Selection."

DFW-190: The analysis for the DEIS is complete. Consistent with NEPA, environmentally preferable alternative will be identified in the ROD. It is unclear why public release of the public draft would be questionable. The release of the DEIS is consistent with the NEPA regulations (40 CFR Section 1502.19) for release and notification of a draft statement.

Please refer to Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts"; Master Comment Response NEPA-1, "Sufficiency of the EIS"; Master Comment Response CEQA-1, "CEQA Compliance"; Master Comment Response ALTS-1, "Alternative

Selection"; Master Comment Response CMS-1, "EIS Mitigation Plan"; and Master Comment Response GEN-8 "Public Outreach and Involvement."

DFW-191: The Fish and Wildlife Coordination Act (Public Law 85-624) does not require the identification of the environmentally preferable alterative. The act states "for the purpose of determining the possible damage to wildlife resources and for the purpose of determining means and measures that should be adopted to prevent the loss of damage to such wildlife resources, as well as to provide concurrently for the development and improvement of such resources, shall be made an integral part of any report prepared or submitted by any agency of the Federal Government..." The Draft Fish and Wildlife Coordination Act Report, prepared by the USFWS, was included in the DEIS. Per the act, Reclamation gave "full consideration to the report..."

Please refer to Master Comment Response CEQA-1, "CEQA Compliance," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

DFW-192: As stated in the Engineering Summary Appendix, the Pit 7 Afterbay Dam may require the placement of rock dowels and rip rap for slope stability to meet the necessary safety standards. Ancillary facilities will need to be addressed near the Pit 7 Afterbay Dam including relocating the gaging station and cableway that would be inundated by the new high water line, extending the boat barriers, relocating security fences and signs, rehabbing the existing boat ramp, and relocating the warning siren.

After Congressional authorization of an action alternative further planning and design refinements will be required. During that time the appropriate stakeholders will be included where necessary.

DFW-193: This general comment in the introduction of the Fisheries and Aquatic Resources Technical Report was intended to provide background information. It is not a statement specific to the SLWRI Project. The impact discussion in Impact Aqua-1, "Effects on Nearshore, Warm-Water Habitat in Shasta Lake from Project Operations," provided a detailed discussion of these issues in Chapter 11, "Fisheries and Aquatic Ecosystems," of the EIS. This chapter and related technical report have been updated to respond to wide array of comments and to incorporate new information and analysis.

DFW-194: The editorial recommendations submitted by the comment author have been incorporated into the Fisheries and Aquatic Ecosystems Technical Report, Section 1.1.1, "Aquatic Habitat."

DFW-195: Text has been revised to reflect comment.

DFW-196: The editorial recommendations submitted by the comment author have been incorporated into the Fisheries and Aquatic Ecosystems Technical Report, Section 1.1.1, "Aquatic Habitat."

DFW-197: As the SLWRI has progressed, descriptions of affected environment, as well as other sections in the EIS (e.g., regulatory settings, cumulative effects) and related evaluations have been updated as appropriate to reflect changes in SLWRI baseline assumptions. These changes include, among others, changes in regulatory conditions and CVP and SWP facilities and operations and updates to related projects/programs. This documentation has also been updated, as appropriate for the SLWRI, for the Final EIS. The commenter has not provided any specifics on resource topics that are considered as not reflecting existing conditions.

DFW-198: The Draft Fisheries and Aquatic Ecosystems Technical Report do not contain impact analyses. Section 11.3, "Environmental Consequences and Mitigation Measures," in Chapter 11, "Fisheries and Aquatic Ecosystems," describes the Reservoir Fisheries Analyses and models used to determine that the expansion of the surface area of Shasta Lake could be beneficial. The EIS has been updated in response to comments, new information ad revisions to mitigation measures.

DFW-199: The Fisheries and Aquatic Ecosystems Technical Report does not include an analysis of impacts; impacts analysis and mitigation measures were presented in the DEIS. For the impact analysis regarding lower gradient, fish bearing reaches of the tributaries to Shasta Lake see Impact Geo-2 in Chapter 4, "Geology," Chapter 11, "Fisheries and Aquatic Ecosystems," Impact Aqua-1, "Effects on Nearshore, Warm-Water Habitat in Shasta Lake from Project Operations"; Impact Aqua-6, "Creation or Removal of Barriers to Fish Between Tributaries and Shasta Lake"; and Impact Aqua-7, "Effects on Spawning and Rearing Habitat of Adfluvial Salmonids in Low-Gradient Tributaries to Shasta Lake." The EIS has been updated in response to comments, new information and revisions to mitigation measures.

DFW-200: Comment noted. The Technical Report does not include impact analyses; they are in Chapter 11, "Fisheries and Aquatic Ecosystems."

DFW-201: Comment noted. The EIS Chapter 11, "Fisheries and Aquatic Ecosystems," has been revised to acknowledge that the effects of sport fishing are minimal.

DFW-202: Text has been revised to reflect comment.

DFW-203: Text has been revised to reflect comment.

DFW-204: While the spring-run Chinook salmon in that spawn in the Sacramento River between Keswick Dam and Red Bluff Pumping Plant may be of questionable genetic integrity, they are still considered as spring-run Chinook salmon by DFW and other resource agencies while conducting annual spawner estimates (see Grand Tab Table at http://www.calfish.org/LinkClick.aspx?fileticket=wXbihOvQ7JU%3d&tabid=213&mid=524). Also, the Sacramento River within this reach is included in the designated critical habitat for spring-run Chinook salmon. In a Fisheries Technical Team meeting in Red Bluff on July 5, 2007, NMFS stated that regardless of the actual number of spring-run present in the Sacramento River, the Recovery Plan, critical habitat, and AFRP goals require that Reclamation must include protective measures for spring-run Chinook salmon, and therefore need to include spring-run Chinook salmon in the analysis.

DFW-205: Both Butte and Clear creeks were identified as supporting spring-run Chinook salmon, and as being included as critical habitat 3 paragraphs above the text in the DEIS to which the commenter refers.

DFW-206: Both the DEIS and the Final EIS are based upon best available information existing at the time of the preparation of these documents. Information will be updated during subsequent phases of the project, should an alternative be authorized by Congress. Text has not been revised.

DFW-207: Discussion of the New Zealand mud snail and Quagga mussel was updated in the Fisheries and Aquatic Ecosystems Technical Report and included in the EIS Chapter 11, “Fisheries and Aquatic Ecosystems.”

DFW-208: There have been previous review and comment opportunities on documents related to the SLWRI. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

Additionally, while the spring-run Chinook salmon in that spawn in the Sacramento River between Keswick Dam and Red Bluff Pumping Plant may be of questionable genetic integrity, they are still considered as spring-run Chinook salmon by DFW and other resource agencies while conducting annual spawner estimates (see Grand Tab Table at http://www.calfish.org/LinkClick.aspx?fileticket=wXbihOvQ7JU%3d&tabid=213&mid=524). Also, the Sacramento River within this reach is

included in the designated critical habitat for spring-run Chinook salmon. In a Fisheries Technical Team meeting in Red Bluff on July 5, 2007, NMFS stated that regardless of the actual number of spring-run present in the Sacramento River, the Recovery Plan, critical habitat, and AFRP goals require that Reclamation must include protective measures for spring-run Chinook salmon, and therefore need to include spring-run Chinook salmon in the analysis.

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon."

DFW-209: Reclamation concurs that SALMOD is only used to support technical analyses of anadromous fish populations in the SLWRI planning process. SALMOD is not appropriate for addressing other environmental concerns, such as quagga mussels. Additionally, redd dewatering is one of the mortality factors calculated and quantified in SALMOD as Incubation Mortality. SALMOD can, however, be useful in providing information useful in managing each run, whether individually or together by showing which conditions benefit or impact each run.

With respect to responding to the Departments previous letter, there have been previous review and comment opportunities on documents related to the SLWRI. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

DFW-210: These results are based on a modeling exercise to show the general increase of each alternative based on simulated data. Putting a date in the Executive Summary table is inappropriate because other factors have strong influence over Chinook salmon populations as well, as shown by the fact that the AFRP goals still have not been met.

DFW-211: Reclamation will respond when the full text of the comment is provided by the commenter.

DFW-212: The commenter asserts that the statement "the majority of increased firm yield…would be for south-of-Delta agricultural and M&I deliveries" should be reworded to include refuge water supplies per CVPIA Section 3406 (d).

As shown in Chapter 6, "Hydrology, Hydraulics, and Water Management," Sections 6.3.3, "Direct and Indirect Effects" and 6.3.4, "Mitigation Measures" of the DEIS, while the impacts of the action

alternatives on south-of-Delta refuge water supplies would be either less than significant or beneficial so no mitigation would be needed, the majority of the average annual increase in firm (dry and critical year) water supplies would be for agricultural and M&I deliveries. The referenced statements in the DEIS are correct as written.

DFW-213: Please refer to Master Comment Response CVPIA-1, "Central Valley Project Improvement Act Firm Level 2 and Incremental Level 4 Refuge Water Supplies."

DFW-214: Text has been revised to reflect the recent developments in the 2008 USFWS and 2009 NMFS Biological Opinions in the Executive Summary, Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," and Chapter 11, "Fisheries and Aquatic Ecosystems."

Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

DFW-215: Please refer to Master Comment Response CVPIA-1, "Central Valley Project Improvement Act Firm Level 2 and Incremental Level 4 Refuge Water Supplies."

DFW-216: The CNDDB and USFWS ES Database queries were updated in 2012 and 2011, respectively. This update is identified throughout the EIS and the Wildlife Resources Technical Report. The one reference in the text to a 2007 query was an inadvertent error in the text. Therefore, the queries are within the 5-year window and reflect current information.

DFW-217: Vernal pool habitat is discussed under Annual Grassland on page 1-30 of the Wildlife Resources Technical Report and is not mapped as a separate habitat type in the study area. There is no vernal pool habitat within, or adjacent to any of the inundation, relocation or restoration areas identified in Chapter 2, "Alternatives," of the EIS.

DFW-218: In the DEIS, this table displays the plant community and habitat types as classified in the CWHR and references those habitat types to an MSCS Habitat Type as part of the overall affected environment discussion.

DFW-219: In the DEIS, the acres in Table 1-2 and Table 1-3 in Chapter 1 of the Wildlife Resources Technical Report reflect the number of acres of habitat that would be inundated in the impoundment area and relocation areas, respectively. The impoundment area is the same as the inundation area. In the EIS, the size of relocation areas was revised and

the tables were updated. In addition, a total acreage value for each habitat type was added to these tables.

DFW-220: The current small scale map is adequate for the purposes of the Wildlife Resources Technical Report and Final EIS. If the SLWRI is authorized, additional planning documents would be prepared; at that point, additional graphics may be required to support various permitting and consultation efforts.

DFW-221: Revised oak woodland description on page 1-30 of the Draft Wildlife Resources Technical Report to add additional detail including associated plant and animal species.

DFW-222: While the upper McCloud arm is within the area subject to inundation and part of the project footprint, there are no known northern goshawk nest sites located within the area subject to inundation, relocation or restoration actions.

DFW-223: The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report," contains information on Shasta salamander surveys including the level of survey effort, methods, and results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander," includes the analysis of impacts to Shasta salamander. The Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the discussion of Shasta salamander. In addition, The EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for Shasta salamander.

DFW-224: The technical report does not include any discussion of impacts or mitigation; this is provided in the respective EIS chapters.

The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report," contains information on Shasta salamander surveys including the level of survey effort, methods, and results. The Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the discussion of Shasta salamander. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander," includes the analysis of impacts to Shasta salamander. In addition, The EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for Shasta salamander.

DFW-225: The technical report does not include any discussion of impacts or mitigation; this is provided in the respective EIS chapters.

The Wildlife Resources Technical Report - Attachment 10, "Terrestrial Mollusk Survey Report," contains information on terrestrial mollusk surveys including the level of survey effort, methods, and results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-12, "Impacts to Special-Status Mollusks (Shasta Sideband, Wintu Sideband, Shasta Chaparral, and Shasta Hesperian) and their habitat," includes the analysis of impacts to special-status terrestrial mollusks. In addition, the EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for special-status terrestrial mollusks.

DFW-226: The Wildlife Resources Technical Report was revised to include this updated information on the distribution of Pacific fisher.

DFW-227: Chapter 2, "Alternatives," has been revised with respect to the project footprint. All resource chapters have been revised as applicable to reflect these revisions.

Potential effects of the alternatives on special-status wildlife species are discussed in Chapter 13, "Wildlife Resources."

DFW-228: Revised Table 1-5 to state that California Red-Legged Frog and Foothill yellow-legged frog could occur along the Sacramento River if suitable habitat is present. Additional California Red-Legged Frog site assessments were conducted for the river restoration sites under the technical guidance of the USFWS and in accordance with the USFWS Revised Guidance on Site Assessments and Field Surveys for the California Red-Legged Frog (U.S. Fish and Wildlife Service 2005). Due to the shelf life of protocol-level surveys for these species, USFWS has acknowledged that surveys would not be required at this point in the SLWRI planning process.

DFW-229: As discussed in Table 1-5 and on page 1-96 of the Wildlife Resources Technical Report, Swainson's hawk have the potential to occur within the study area and are known to occur within the Klamath Basin.

DFW-230: This section of the referenced technical report is titled Regulatory Framework and is intended to provide the basis for developing issues and addressing impacts considered in the EIS. The exclusion of the BLM and Mendocino National Forest land management plan sections in this section do not inhibit Reclamation from addressing impacts on lands managed by those agencies where appropriate. Several chapters of the EIS (e.g., Chapter 17, "Land Use") do incorporate

direction form these management plans as appropriate based on input and coordination from these federal agencies throughout the SLWRI planning process. Reclamation is unaware of similar plan guidance and direction for the other agencies identified in this comment; both DWR and CDFW have been participants in the SLWRI project coordination team for a number of years and this issue has not been raised previously to Reclamation.

DFW-231: The Wildlife Resources Technical Report Table A1-1 was updated and includes the correct MSCS species and special habitats.

DFW-232: As stated in the Wildlife Resources Technical Report: Attachment 2, "Species Accounts for Special-Status Species Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study area," the Shasta Lake purple martin population represents between 14-51 percent of the interior northern California population. The Wildlife Resources Technical Report- Attachment 3, "Breeding Bird Survey Results – Breeding Bird Surveys 2007-2014," includes information on purple martin surveys including the level of survey effort, methods, and results. The Wildlife Resources Technical Report was revised to enhance the discussion of purple martin. However, the Wildlife Resources Technical Report does not include an analysis of impacts to purple martin. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-7, "Impact on the Purple Martin and Its Nesting Habitat" includes the analysis of impacts to purple martin. In addition, The EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for purple martin.

DFW-233: The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report," contains information on Shasta salamander surveys including the level of survey effort, methods, and results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander" includes the analysis of impacts to Shasta salamander. The Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area" was revised to enhance the discussion of Shasta salamander. In addition, the EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for Shasta salamander.

DFW-234: As discussed on page 1-5 of the Wildlife Technical Report, descriptions of biological resources were derived primarily from the following sources:

- Shasta Lake Water Resources Investigation Mission Statement Milestone Report (Reclamation 2003)

- Shasta Lake Water Resources Investigation Initial Alternatives Information Report (Reclamation 2004)

- Chapter 3, "Biological Environment," in the Draft Shasta Lake Water Resources Investigation Plan Formulation Report (Reclamation 2007)

- U.S. Fish and Wildlife Service (USFWS) Endangered Species Database (USFWS 2011)

- The California Natural Diversity Database (CNDDB) (2012)

In addition, as discussed on page A4-1 of Attachment 4 to the Wildlife Technical Report, Black-crowned night heron is a MSCS species and is likely to breed along the Sacramento River corridor.

DFW-235: The state and federal lists of special-status species were updated as of March 2014.

DFW-236: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

DFW-237: In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," the following impacts to species are addressed: Impact Wild-1, "Take and Loss of Habitat for the Shasta Salamander"; Impact Wild-4, "Impact on the American Peregrine Falcon"; Impact Wild-7, "Impact on the Purple Martin and Its Nesting Habitat"; Impact Wild-5, "Take and Loss of Habitat for the Bald Eagle"; and Impact Wild-18, "Impacts on Bank Swallow in the Primary Study Area Resulting from Modifications of Geomorphic Processes." The EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for these species.

DFW-238: A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR Part 1503.4). Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

Throughout the DEIS, single maps were used wherever possible. In some instances, the study area was divided into multiple maps to show specific features and details that would not have been visible on a single map of the study area. Chapter 12, "Botanical Resources and Wetlands" of the DEIS is an example of an instance in which multiple maps were necessary. The EIS was not revised with respect to graphic scales.

DFW-239: The Wildlife Technical Report provides a description of each habitat type identified and analyzed in the EIS, including a description of the plants and animals that are typically associated with these habitat types.

Please refer to Master Comment Response GEN-4, "Best Available Information."

DFW-240: The technical report does not include any discussion of impacts or mitigation; this is provided in the respective EIS chapters.

The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report," contains information on Shasta salamander surveys including the level of survey effort, methods, and results. The Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the discussion of Shasta salamander. However, the Wildlife Resources Technical Report does not include an analysis of impacts to Shasta salamander. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander," includes the analysis of impacts to Shasta salamander. In addition, The EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for Shasta salamander.

DFW-241: The technical report does not include any discussion of impacts or mitigation; this is provided in the respective EIS chapters.

The Wildlife Resources Technical Report – Attachment 9 (Shasta Salamander Survey Report) contains information on Shasta salamander surveys including the level of survey effort, methods, and results. Recent genetic studies have been incorporated in the technical memorandum. The Wildlife Resources Technical Report Attachment 2 Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area was revised to enhance the discussion of Shasta salamander. However, the Wildlife Resources Technical Report does not include an analysis of impacts to Shasta salamander. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander," includes the analysis of impacts to Shasta salamander. In addition, the EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for Shasta salamander.

DFW-242: The technical report does not include any discussion of impacts or mitigation; this is provided in the respective EIS chapters.

The Wildlife Resources Technical Report – Attachment 9, "Shasta Salamander Survey Report," contains information on Shasta salamander surveys including the level of survey effort, methods, and results. The Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the discussion of Shasta salamander. However, the Wildlife Resources Technical Report does not include an analysis of impacts to Shasta salamander. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-1, "Take and Loss of Habitat for the Shasta salamander," includes the analysis of impacts to Shasta salamander. In addition, the EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for Shasta salamander. In coordination with the USFS, Reclamation conducted extensive reviews of subterranean habitat (known caves) in close proximity to Shasta Lake to assess impacts to cave resources. While there are several caves and other subterranean habitats currently subject to inundation, no additional caves or known subterranean habitat would be impacted by an action alternative.

DFW-243: The technical report does not include any discussion of impacts or mitigation; this is provided in the respective EIS chapters.

The Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," was revised to enhance the discussion of peregrine falcon. However, the Wildlife Resources Technical Report does not include an impact analysis for peregrine falcon or other birds of prey. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-4, "Impacts on the American Peregrine Falcon," and "Impact Wild-14, Impacts on Other Birds of Prey (i.e., red-tailed hawk and red-shouldered hawk)," includes the analysis of impacts to peregrine falcon and other birds of prey, respectively. In addition, the EIS was revised to enhance the mitigation measures in Section 13.3.5 for peregrine falcon and other birds of prey.

DFW-244: The technical report does not include any discussion of impacts or mitigation; this is provided in the respective EIS chapters.

The Wildlife Resources Technical Report Attachment 2, "Species Accounts for Special-Status Wildlife in the Shasta Lake and Vicinity Portion of the Primary Study Area," includes discussion of bald eagle and bald eagle habitat. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-5, "Take and Loss of Habitat for the Bald Eagle," includes the analysis of impacts to bald eagle and it habitat. The EIS was revised to enhance the impact

analysis and mitigation measures in Section 13.3.5 for bald eagle. In addition, a Bald and Golden Eagle Management Plan will be developed if warranted with coordination from CDFW and USFWS.

DFW-245: The technical report does not include any discussion of impacts or mitigation; this is provided in the respective EIS chapters.

The Wildlife Resources Technical Report Attachment 3, "Breeding Bird Survey Results – Breeding Bird Surveys 2007-2014," includes information on purple martin surveys including the level of survey effort, methods, and results. The Wildlife Resources Technical report was revised to enhance the discussion of purple martin, In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-7, "Impact on the Purple Martin and its Nesting Habitat," includes the revised analysis of impacts to purple martin. In addition, the EIS was revised to enhance the mitigation measures in Section 13.3.5 for purple martin and its nesting habitat.

DFW-246: Potential impacts to resource areas are not discussed in the Draft Feasibility Report, nor are they discussed in the Technical Reports/Attachments.

The commenter is referring to the ADEIS which was released in 2008. At this time we are responding to questions submitted specifically for the public DEIS. Many modifications to the SLWRI have been made pursuant to previous reviews of the various documents related to the project formulation process and Reclamation is not required as part of the NEPA process to review all previous comments on project related documents.

Please refer to Master Comment Response EI-2, "Potential Impacts to Bank Swallow and Bank Swallow Habitat."

DFW-247: Comment noted.

Please refer to Master Comment Response EI-2, "Potential Impacts to Bank Swallow and Bank Swallow Habitat."

DFW-248: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-249: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-250: A response is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulation 40 CFR Part 1503.4). This comment will, however, be

included as a part of the record and made available to decision makers before a final decision on the proposed project.

DFW-251: Please refer to Master Comment Response WQ-1, "Remediation of Abandoned Mines in the Shasta Lake Area."

DFW-252: The EIS has been updated to reflect information in the Basin Plan (as revised in 2011 by the CVRWQCB).

DFW-253: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-254: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-255: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-256: Reclamation has acknowledged and made the appropriate correction.

DFW-257: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-258: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-259: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-260: Reclamation determined that there were no abandoned mine features beyond the area associated with the Bully Hill mining complex that will be inundated.

DFW-261: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-262: Text not revised, per 2014 Omnibus Appropriations Bill, Public Law 113-76, signed on January 17, 2014, CALFED is authorized through 2015.

DFW-263: Text not revised, per 2014 Omnibus Appropriations Bill, Public Law 113-76, signed on January 17, 2014, CALFED is authorized through 2015.

DFW-264: Reclamation has acknowledged and made the appropriate correction with respect to suggested edit. At this point in the SLWRI planning process, it is premature to specifically discuss permitting

efforts; if the SLWRI is authorized, Reclamation would comply with applicable sections of the federal Clean Water Act.

DFW-265: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-266: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-267: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-268: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-269: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-270: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

DFW-271: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-272: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-273: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-274: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-275: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-276: The editorial recommendations submitted by the comment author have been incorporated into the Water Quality Technical Report.

DFW-277: The referenced Draft Geologic Technical Report was prepared jointly by two Professional Geologists, Mr. Jim Fitzgerald (North State Resources, Inc.) and Ms. Heather Shannon (MWH). Mr. Fitzgerald prepared information for the Shasta Lake and Vicinity portion of the Primary Study Area. Ms. Shannon prepared information for the Upper Sacramento River (Shasta Dam to Red Bluff) portion of the Primary Study Area and the Extended Study Area. This report has been revised by Professional Geologists, Dr. Thomas Koler and Mr. Duncan Drummond (North State Resources, Inc.).

DFW-278: Chapter 4, "Geology, Geomorphology, Minerals, and Soils," and The Geologic Technical Report has been updated to include current references and updated information.

DFW-279: The referenced Geologic Technical Report and the related discussion in Chapter 4, "Geology, Geomorphology, Minerals and Soils," have been revised and updated by a Professional Geologist licensed to practice in California and reviewed by a P.E. The EIS and supporting appendices have been corrected to concur with the commenter's statement regarding the Battle Creek Fault.

DFW-280: Reclamation has acknowledged and made the appropriate clarification.

DFW-281: The technical report does not include any discussion of impacts or mitigation; this is provided in the respective EIS chapters.

Chapter 4, "Geology, Geomorphology, Minerals, and Soils," addresses erosional processes and how they may be affected by SLWRI actions, including inundation and associated shoreline erosion.

DFW-282: Comment noted. Text was revised to more clearly state the definition of the Alquist-Priolo Earthquake Fault Zoning Act and identify those Earthquake Fault Zones within Shasta County outside of the Shasta Lake and Vicinity portion of the Primary Study Area.

DFW-283: Recommendations submitted by the comment author have been incorporated into Chapter 4, "Geology, Geomorphology, Minerals, and Soils," Section 4.1.2, "Geologic Hazards." These recommendations have also been incorporated into the Geologic Technical Appendix, Section 1.1.2, "Geologic Hazards."

DFW-284: Recommendations submitted by the comment author have been incorporated into Chapter 4, "Geology, Geomorphology, Minerals, and Soils," Section 4.1.2, "Geologic Hazards." These recommendations have also been incorporated into the Geologic Technical Appendix, Section 1.1.2, "Geologic Hazards."

DFW-285: The editorial recommendations submitted by the comment author have been incorporated into the technical report.

DFW-286: The editorial recommendations submitted by the comment author have been incorporated into the technical report.

DFW-287: The editorial recommendations submitted by the comment author have been incorporated into the technical report.

DFW-288: The editorial recommendations submitted by the comment author have been incorporated into the technical report.

DFW-289: The technical report does not include any discussion of impacts or mitigation; this is provided in the respective EIS chapters.

Chapter 4, "Geology, Geomorphology, Minerals, and Soils," addresses erosional processes and how they may be affected by SLWRI actions, including inundation and associated shoreline erosion.

DFW-290: Reclamation has gathered information and performed focus studies to document resource conditions and evaluate the potential impacts of the range of alternatives developed through the SLWRI feasibility study. The methods used to evaluate the impacts of the alternatives were based upon Reclamation's standard practices and input from agencies and subject matter experts.

DFW-291: The editorial recommendations submitted by the comment author have been incorporated into the Botanical Resources and Wetlands Technical Report.

DFW-292: The acreage of relocation areas was updated in the Botanical Resources and Wetlands Technical Report.

DFW-293: The Botanical Resources and Wetlands Technical Report includes a technical memo in the appendix that provides a detailed description of the study design. The botanical surveys were conducted in general accordance with the technical methods prescribed by Nelson (1994). *Nelson, J.R. 1994. Rare Plant Survey Guidelines. In M.W. Skinner and B.M. Pavlick (eds.), Inventory of Rare and Endangered Vascular Plants of California. California Native Plant Society. Sacramento, California. In the event the SLWRI is authorized, Reclamation understands that addition surveys and investigations may be required to support permit and consultation requirements.

DFW-294: Impact acreages were corrected and updated in the Botanical Resources and Wetlands Technical Report.

DFW-295: The technical report does not include any discussion of impacts or mitigation; this is provided in the respective EIS chapters.

The total acreage was added to Table 1-2 in the Botanical Resources and Wetlands Technical Report. . This affected environment and impact analysis e was updated in Chapter 12, "Botanical Resources and Wetlands," of the EIS.

DFW-296: The scientific names were referenced the first time they appear in the body of the text in both the Botanical Resources and Wetlands Technical Report and the EIS chapter.

DFW-297: The study area included all areas where potential direct, indirect, and cumulative impacts could occur. This area is different for each resource area and is not a fixed or defined size. The species with the widest breadth of evaluation were vernal pool-associated species; vernal pool grasslands that were within 250 feet of the bank edge were evaluated for potential indirect effects to the hydrology of these pools that could result from project implementation. The species with the smallest width of evaluation were bank swallows, which occur in localized areas within and immediately adjacent to the river channel in eroded banks.

DFW-298: As stated in the Botanical Resources and Wetlands Technical Report on page 1-30, lines 41-43 and page 1-31, lines 1-5, sensitive plant communities addressed in the document include locally or regionally declining communities that are tracked in the CNDDB. This includes the communities ranked S1-S3, as these are communities tracked in the CNDDB. Mapped locations of these natural communities are shown in Figures 1-2a through 1-2f for the Shasta Lake and Vicinity portion and in Figures 1-3a through 1-3j for the Upper Sacramento River (Shasta Dam to Red Bluff). Potential project impacts on these vegetation communities, as well as natural communities that are considered sensitive for other reasons (e.g., all riparian and wetland communities), were addressed in Chapter 12, "Botanical Resources and Wetlands," Section 12.3.4, "Direct and Indirect Impacts," under Impact Bot-5, Impact Bot-7, and Impact Bot-14.

See Chapter 12, "Botanical Resources and Wetlands," Section 12.3.5, "Mitigation Measures," for mitigation measures associated with impacts (Mitigation Measure Bot-4, Mitigation Measure Bot-5, Mitigation Measure Bot-7, and Mitigation Measure Bot-14.)

DFW-299: Sensitive plant communities located in the impoundment area are shown in Figures 1-2a through 1-2f in the Botanical Resources and Wetland Technical Report. A discussion of CDFW special-status natural communities was added to the Regulatory Setting section on page 12-86 of Chapter 12, "Botanical Resources." Figures 1-3a through 1-3j have been removed from the Botanical Resources and Wetlands Technical Report that accompanies the EIS.

DFW-300: Figures 1-3a through 1-3j have been removed from the Botanical Resources and Wetlands Technical Report.

DFW-301: Corrections were made to the Botanical Resources and Wetlands Technical Report.

DFW-302: For the Final EIS, the text shown on page 12-84 of the DEIS has been clarified as follows: "Occurrences of special-status natural communities are included in the CNDDB; however, no new occurrences have been added to the CNDDB since the mid-1990s when funding for natural communities tracking was cut." The document does not rely on CNDDB occurrences to identify jurisdictional wetlands and other waters of the United States, waters of the state, or riparian communities that may be subject to jurisdiction under Section 1602 of the Fish and Game Code. CNDDB terrestrial natural community occurrences are provided as supplemental information to the wetland delineation and vegetation mapping completed in support of the project.

DFW-303: Sensitive plant communities located in the impoundment area are shown in Figures 1-2a through 1-2f in the Botanical Resources and Wetland Technical Report. A discussion of CDFW special-status natural communities was added to the Regulatory Setting section on page 12-86 of Chapter 12, "Botanical Resources." Figures 1-3a through 1-3j have been removed from the Botanical Resources and Wetlands Technical Report.

DFW-304: The Botanical Resources and Wetlands Technical Report Attachment 6 (Botanical Survey Report 2002-2014) includes information on Shasta snow-wreath (*Neviusia cliftonii*) and Shasta huckleberry (*Vaccinium sp.*) surveys.

Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

DFW-305: The Botanical Resources and Wetlands Technical Report Attachment 6, "Botanical Survey Report 2002-2014," includes information on the botanical surveys including how many acres surveyed. Chapter 12, "Botany and Wetland Resources," provides a comprehensive discussion on impacts these resources.

DFW-306: The Botanical Resources and Wetlands Technical Report does not include an impact analysis. In Chapter 12, "Botanical Resources and Wetlands," of the EIS, Section 12.3.4, "Direct and Indirect Effects," Impact Bot-1: Loss of Federally or State Listed Plant Species and Impact Bot-3: Loss of USFS Sensitive, BLM Sensitive, or CRPR Species includes the analysis of impacts to special-status plant species. The Botanical Resources and Wetlands Technical Report Attachment 6, "Botanical Survey Report 2002-2014," includes information on the botanical surveys.

DFW-307: As described in the Botanical Resources and Wetlands Technical Report Attachment 6, "Botanical Survey Report 2002-2014," Reclamation conducted several focused botanical surveys addressing specific plant species that warranted additional work due to rarity and potential project impacts, specific habitat requirements that may have made previous botanical surveys insufficient, surveys for newly described species not included in previous survey efforts, or surveys for new, undescribed, species. These focused efforts included surveys for Shasta snow-wreath (*Neviusia cliftonii)* and Shasta huckleberry (*Vaccinium* sp. nov).

DFW-308: The Botanical Resources and Wetlands Technical Report Attachment 6, "Botanical Survey Report 2002-2014," includes information on the botanical surveys. Survey methods were described in the Botanical Survey Report.

DFW-309: A list of plant species observed was included in the Botanical Resources and Wetlands Technical Report Attachment 2, "List of Plant Species Observed in the Shasta Lake and Vicinity Portion of the Primary Study Area."

DFW-310: The Botanical Resources and Wetlands Technical Report was revised to enhance the discussion of Shasta snow wreath (*Neviusia cliftonii*). However, the Botanical Resources and Wetlands Technical Report does not include an analysis of impacts. In Chapter 12, "Botanical Resources and Wetlands," of the EIS, Section 12.3.4, "Direct and Indirect Effects," Impact Bot-1, "Loss of Federally or State Listed Plant Species," and Impact Bot-3, "Loss of USFS Sensitive, BLM Sensitive, or CRPR Species," includes the analysis of impacts to Shasta snow-wreath. The Botanical Resources and Wetlands Technical Report Attachment 6 (Botanical Survey Report 2002-2014) includes information on Shasta snow-wreath surveys and results.

DFW-311: The Botanical Resources and Wetlands Technical Report Attachment 6, "Botanical Survey Report 2002-2014," includes information on the number of Shasta snow-wreath locations.

DFW-312: The Botanical Resources and Wetlands Technical Report Attachment 6, "Botanical Survey Report 2002-2014," includes information on who conducted the Shasta snow-wreath surveys.

DFW-313: Acreage totals for the refined relocation areas are included in the EIS.

DFW-314: The Botanical Resources and Wetlands Technical Report was updated.

DFW-315: Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

DFW-316: The referenced text, "Project impacts on these species are not considered significant unless the species are known to have a high potential to occur within the area of disturbance associated with construction of the project" was written accurately and was not revised.

DFW-317: This paragraph was revised in the Botanical Resources and Wetlands Technical Report and the related chapter of the EIS.

DFW-318: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

33.8.7 Delta Stewardship Council

DSC1

DELTA STEWARDSHIP COUNCIL
A California State Agency

980 NINTH STREET, SUITE 1500
SACRAMENTO, CALIFORNIA 95814
WWW.DELTACOUNCIL.CA.GOV
(916) 445-5511

September 30, 2013

Katrina Chow, Project Manager
U.S. Bureau of Reclamation, Planning Division
2800 Cottage Way
Sacramento, CA 95825-1893

RE: Staff Comments on Draft Environmental Impact Statement For the Shasta Lake Water Resources Investigation

Dear Ms. Chow:

Thank you for giving the Delta Stewardship Council (DSC) the opportunity to review and provide comments on the draft Environmental Impact Statement (EIS) for the Shasta Lake Water Resources Investigation, which proposes to raise Shasta Dam and carry out habitat enhancements for anadromous fish species. DSC staff has reviewed the draft EIS and herein submits its comments.

DSC1-1 By way of background, the California Legislature created the DSC in 2009 to adopt and implement a legally enforceable plan (Delta Plan) to further the achievement of the State's coequal goals of providing a more reliable water supply for California and protecting, restoring and enhancing the Delta ecosystem in a way that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. As you know, federal now also incorporates the coequal goals (P.L. 112-074, Sec. 205). Although

DSC1-2 located upstream of the Delta, this project would impact California's coequal goals in several ways. Our comments below describe these impacts:

DSC1-3 Consistency with the coequal goals: The project objectives as stated in the EIS are consistent with the coequal goals. Evaluations by the Natural Resources Agency have reported that other actions under consideration to achieve the co-equal goals, such as the proposed Bay Delta Conservation Plan, will be more valuable if they are complemented by additional storage. We are, however, aware that the U.S. Fish and Wildlife Service[1] believes the EIS

DSC1-4 overstates the potential benefits of this project to anadromous fish, and that the Department of Fish and Wildlife has expressed concerns that the analysis is incomplete[2]. Both agencies

[1] U.S. Fish and Wildlife Service March; 7, 2013
[2] California Department of Fish and Wildlife; February 8, 2013

"Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place."
CA Water Code §85054

DSC1-4 CONTD have commented that dedicated cold water pool storage should be released to meet temperature requirements rather than for water supply purposes. We also are informed that DWR believes the alternatives identified the EIS may not comply with California Public

DSC1-5 Resource Code § 5093.542. We urge the Bureau to give due consideration to the comments provided by these agencies.

DSC1-6 Additional in-stream storage: The project would provide significant additional in-stream water storage upstream of the Delta. This could result in overall improvement in the reliability of water supplies diverted from the Delta, and could improve the average quality of the water in the Delta as well. The degree and extent to which these improvements occur would depend upon how the Central Valley and State Water Projects are operated, and would vary from year to year.

DSC1-7 Reduced flood damage along the Sacramento River: The USBR also plans to use the additional storage capacity to help reduce flood damage along the Sacramento River, which would help reduce peak flows and flooding potential in the Delta. Again, the actual effect would vary from year to year depending on rainfall patterns, other improvements to the Sacramento River Flood Control Project, and how the Central Valley and State Water Projects are operated. This enhanced flood management capacity will grow in value as California's climate changes.

DSC1-8 Meeting water quality goals for the ecosystem: Greater availability of water to meet ecosystem water quality goals in the Delta could have a beneficial effect on the Delta as well, depending on project operation. The project's increase in the cold water pool is intended to improve the survival of anadromous fish survival in the upper reaches of the Sacramento River. Additional water from the

DSC1-9 Shasta Reservoir could also be used for other environmental purposes in the Bay-Delta system (e.g. salinity control, especially during a Delta emergency).

DSC1-10 Finally, we note that one of the requirements of the NMFS Biological Opinion for salmon[3] is to explore "long-term passage prescriptions at Shasta Dam and re-introduction of winter-run into its native habitat in the McCloud and/or Upper Sacramento rivers." It appears that none of the alternatives address this issue. We recommend the final EIS specifically evaluate such alternatives. In addition, the final EIS should acknowledge that enlarging Shasta Reservoir would affect both the value of potential actions to improve fish passage at Shasta Dam and to re-introduce winter-run into the McCloud and/or Upper Sacramento rivers if the enlarged reservoir floods potential spawning and rearing areas upstream of the current reservoir.

[3] "Biological Opinion and Conference Opinion on the Long-term Operations of the Central Valley Project and State Water Project" page 275, bullet 1 (National Marine Fisheries Service, 2009).

Again, thank you for the opportunity to provide our comments on this EIS. Please contact Carl Lischeske at (916) 445-5891 if you need further information.

Sincerely,

Cindy Messer, Deputy Director

Responses to Comments from Delta Stewardship Council

DSC1-1: Comment noted.

DSC1-2: As subsequently stated by the commenter, SLWRI project objectives in the DEIS are consistent with California's coequal goals under the Delta Reform Act, and SLWRI action alternatives could provide benefits that would advance the coequal goals.

DSC1-3: Reclamation agrees that project objectives in the SLWRI EIS are generally consistent with the coequal goals of the 2009 Delta Reform Act of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem.

DSC1-4: CP4 and CP4A have a cold water pool allocation dedicated for fisheries benefits. This water is not dedicated for water supply purposes, but water supply benefits are incidental. As stated in Chapter 2, "Alternatives," "Of the increased reservoir storage space of CP4, about 378,000 acre-feet would be dedicated to increasing the supply of cold water for anadromous fish survival purposes. Of the increased storage space of CP4A, about 191,000 acre-feet would be dedicated to increasing the supply of cold water for anadromous fish survival purposes."

Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," Master Comment Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits," and Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability."

DSC1-5: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

DSC1-6: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

DSC1-7: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

DSC1-8: A response is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulation 40 CFR Part 1503.4). This comment will, however, be included as a part of the record and made available to decision makers before a final decision on the proposed project.

DSC1-9: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

DSC1-10: Please refer to Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," and Master Comment Response FISHPASS-1, "Fish Passage Above Shasta Dam."

33.8.8 Delta Stewardship Council

 DSC2

Fwd: Comment letter for USBR Shasta Lake project.

KATRINA CHOW <kchow@usbr.gov> Wed, Oct 23, 2013 at 1:07 PM
To: KATHLEEN DUNCAN <kduncan@usbr.gov>

Sent from my iPhone

Begin forwarded message:

From: "Ray, Dan@DeltaCouncil" <dan.ray@deltacouncil.ca.gov>
Date: September 30, 2013, 3:47:11 PM PDT
To: "Lischeske, Carl@Delta Council" <Carl.Lischeske@DeltaCouncil.ca.gov>, "'KChow@usbr.gov'" <KChow@usbr.gov>
Cc: "Messer, Cindy@DeltaCouncil" <cindy.messer@deltacouncil.ca.gov>, "Thomason, Christie@DeltaCouncil" <christie.thomason@deltacouncil.ca.gov>
Subject: RE: Comment letter for USBR Shasta Lake project.

DSC2-1 Good job. Thanks for sticking with this and getting it out.

From: Lischeske, Carl@Delta Council
Sent: Monday, September 30, 2013 3:28 PM
To: 'KChow@usbr.gov'
Cc: Messer, Cindy@DeltaCouncil; Thomason, Christie@DeltaCouncil; Ray, Dan@DeltaCouncil
Subject: FW: Comment letter for USBR Shasta Lake project.

Ms. Chow,

10/23/13 DEPARTMENT OF THE INTERIOR Mail - Fwd: Comment letter for USBR Shasta Lake project.

Attached are the Delta Stewardship Council staff comments on the subject project. Please call me if you have any questions.

Carl Lischeske

Lead Engineer

Delta Stewardship Council

(916) 445-5891

Responses to Comments from Delta Stewardship Council

DSC2-1: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

33.8.9 Department of Water Resources

DWR

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY

EDMUND G. BROWN JR., Governor

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

OFFICIAL FILE COPY
RECEIVED
SEP 27 2013

CODE	ACTION	SURNAME & DATE
700	V/R	Duncan
	30Sep13	
TO:	KChow	
FR:	Received	

SEP 26 2013

Ms. Katrina Chow
United States Department of Interior
Bureau of Reclamation, Mid Pacific Region
2800 Cottage Way, MP-700
Sacramento, California 95825

Dear Ms. Chow:

DWR-1 The Department of Water Resources (DWR) reviewed the Draft Environmental Impact Statement (DEIS) prepared for the Shasta Lake Water Resources Investigation by the Bureau of Reclamation (Reclamation) dated June 2013. The DEIS evaluates the potential effects associated with modifying Shasta Dam and enlarging Shasta Lake. DWR and Reclamation operate the State Water Project (SWP) and Central Valley Project (CVP), respectively, consistent with the terms and conditions of their water rights permits and all other regulatory requirements. The two agencies coordinate operations of the SWP and CVP to meet their joint regulatory obligations consistent with the terms of the "Agreement Between The United States of America And The State of California For Coordinated Operations Of The Central Valley Project And The State Water Project" (COA) dated November 24, 1986. Implementation of a project to modify Shasta Dam and Lake has the potential to impact the operations of the State Water Project (SWP) and joint operations under the COA.

Prior to implementing any project to enlarge Shasta Dam and Lake, Reclamation must work with DWR to evaluate any potential impacts to SWP operations and address any issues related to joint operations under the COA.

Sincerely,

Robert B Cooke

Robert Cooke, Chief
State Water Project Analysis Office

cc: (See attached list.)

cc: Mr. Ray Sahlberg
U.S. Department of Interior
Bureau of Reclamation
2800 Cottage Way
Sacramento, California 95825

Mr. Terry Erlewine, General Manager
State Water Contractors
1121 L Street, Suite 1050
Sacramento, California 95814-3944

Responses to Comments from Department of Water Resources

DWR-1: Reclamation will work with DWR on coordinating the long-term operation of any project authorized as part of the SLWRI program. It is not anticipated that there would be adverse impacts to the SWP. However, as the SWP and CVP are jointly operated, refinements to the Coordinated Operations Agreement (COA) or other operational effects will be addressed if a project is authorized.

33.8.10 Sacramento River Conservation Area Forum

SRCAF

From: **Dolan, Jane@DWR** <Jane.Dolan@water.ca.gov>
Date: Mon, Jul 29, 2013 at 2:01 PM
Subject: question re: Shasta Lake Feasibility Study EIS
To: "kchow@usbr.gov" <kchow@usbr.gov>

Hello Katrina Chow,

My staff and I have been reading the EIS of the Feasibility Study to ascertain an items of concern or interest to the Sacramento River Conservation Area Forum Board of Directors.

SRCAF-1

In several places within the EIS the Sacramento River Conservation Area Forum (Forum) is identified as "participating in the development of the Riverine Ecosystem Mitigation and Adaptive Management Plan." Further the 1989 Upper Sacramento River Fisheries and Habitat Management Plan is referenced many times. How is a 24+ year old plan considered in formulating the mitigation and conservation measures. And, what role is expected of the Forum in this outcome?

In my two plus years as Executive Director of the Forum, I have no knowledge of contact between the USBR and the Forum. Can you assist me in understanding the mitigation measures in the EIS that identify the Forum as a participant? Specifically the role that is expected? How was the Forum's interest, and our ability to have the resources to be able to participate determined?

Thank you,

Jane Dolan
Executive Director
Sacramento River Conservation Area Forum
2440 Main Street, Red Bluff, CA 96080
jane.dolan@water.ca.gov
telephone (530) 528-7411
cell phone (530) 518-1011

Responses to Comments from Sacramento River Conservation Area Forum

SRCAF-1: The mitigation measure Bot-7 in Chapter 12, "Botanical Resources and Wetlands," Section 12.3.5, "Mitigation Measures," specifically states that Mitigation and Adaptive Management Plan will be consistent with the Senate Bill 1086 program such that the years of effort and experience by the Sacramento River Conservation Area Forum would be incorporated to aid in successfully mitigating project impacts on riparian habitats in a coordinated manner that supports its efforts. It is the intent of Reclamation to include the Forum in correspondence regarding the Mitigation and Adaptive Management Plan, but no other official role has been designated for the Forum. Reclamation intends to include cooperating agencies and any other interested parties in the development of the Mitigation and Adaptive Management Plan.

33.8.11 Sacramento River Conservation Area Forum

SRCAF2

September 30, 2013

TO:
Ms. Katrina Chow
Project Manager
Bureau of Reclamation
Planning Division
2800 Cottage Way
Sacramento, CA 95825-1893
Kchow@usbr.gov

FROM:
Jane Dolan, Executive Director
Sacramento River Conservation Area Forum
(Forum)
2440 Main Street
Red Bluff, CA 96080
jdolan@water.ca.gov

RE:
Comments on Shasta Lake Water Resources Investigation Draft Environmental Impact Statement

Thank you for the opportunity to submit these comments on the Shasta Lake Water Resources Investigation Draft Environmental Impact Statement (DEIS).

SRCAF2-1 In regards to the Riverine Ecosystem Mitigation and Adaptive Management Plan that is proposed as a mitigation measure for multiple impacts, we agree that the impact of altered flow regimes to riparian and wetland communities should be mitigated. We also agree that the plan should be developed in coordination with the Sacramento River Conservation Area Forum (Forum) and state and federal resource agencies. We have been unable to get a response from Bureau staff to our inquiries to determine the level of participation envisioned for the Forum and the resources available to support that participation. We request a response to our inquiries to determine if the role envisioned for the Forum is appropriate for our organization.

SRCAF2-2 We are challenged to submit comments to the DEIS, as the nature and extent of mitigation envisioned for the project is ambiguous. The DEIS is vague on the extent of the actions that might occur under the Riverine Ecosystem Mitigation and Adaptive Management Plan, including

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Shasta Lake Investigation EIS
Forum Comment letter
9/30/13

SRCAF2-2 CONTD: the standard by which potential actions would be "feasible" under dam operating procedures. Therefore, it is unclear whether the implementation of such a plan would offset the impacts of the altered flow regimes on the river.

SRCAF2-3: It is also unclear how these actions might cause indirect impacts on agricultural economies and local communities on the river. The mitigation measure uses the three goals of the plan as performance standards. However, these standards are imprecise and do not convey the nature or extent of the actions proposed as mitigation. We believe that such a plan is more appropriately prepared as part of the DEIS and not prior to construction.

SRCAF2-4: The DEIS notes that details are not available about the opportunities for off-site mitigation and a comprehensive mitigation strategy is under development. It further states that future documents will include a discussion of mitigation for loss of habitat through preservation and enhancement. However, the document provides no indication of the type or magnitude of the habitat loss.

SRCAF2-5: If this strategy will include acquisition of privately owned lands along the Sacramento River, then the project may impact agricultural economies and county tax bases along the river.

SRCAF2-6: More detail and another opportunity to provide public input should be provided before the Bureau issues a final EIS.

SRCAF2-7: For example, is Mitigation Measure Geo-2 (restore degraded aquatic habitat in the vicinity of the impact) part of the comprehensive off-site strategy? As part of that strategy or not, the measure is unclear as to where the proposed compensatory mitigation would take place. If the restoration takes place on Sacramento River agricultural lands, then restoration could impact agricultural economies and the tax base of local communities and this impact should be included in the analysis.

SRCAF2-8: In regards to impacts to Bank Swallow, the DEIS concludes for all alternatives that the project will not impact the species. No analysis is provided to support the "no impact" conclusion, other than a statement that summertime stage will not increase more than two inches.

The DEIS does not consider potential sociological impact to communities in the areas where restoration and acquisition for mitigation is proposed and agricultural land taken out of production.

SRCAF2-9: The draft EIS lacks sufficient detail to know the extent of the restoration and thus the extent of impacts on local communities. Many different governmental programs have converted agricultural lands to habitat and privately owned lands to public lands. Additional efforts are proposed for the future by other agencies and the DEIS should provide objective measurements of the needed mitigation lands. It is unclear whether sufficient land exists to be restored and what the impacts of that restoration might be without an understanding of the magnitude of the restoration and acquisition.

In summary, the DEIS lacks sufficient detail on mitigation to understand whether it is sufficient to offset impacts and whether implementation of mitigation will have adverse impacts on agricultural economies and local communities.

SRCAF2-10 This lack of detail is particularly apparent in the proposed off-site mitigation strategy and the Riverine Ecosystem Mitigation and Adaptive Management Plan. The DEIS should be revised before issuing a final EIS to provide objective measures (e.g. X acres of riparian) of the mitigation that is needed and to identify locations where that mitigation is to take place. Local stakeholders such as the Forum could then more clearly understand the nature and magnitude of proposed restoration on the river and provide informed and appropriate input.

SRCAF2-11 We appreciate the opportunity to provide these comments. We look forward to contact from your agency in regards to our participation in developing a Riverine Ecosystem Mitigation and Adaptive Management Plan.

Respectfully submitted via email,

Jane Dolan
Executive Director
Sacramento River Conservation Area Forum
2440 Main Street
Red Bluff, CA 96080
Telephone (530) 528-7411
Email: jdolan@water.ca.gov

Responses to Comments from Sacramento River Conservation Area Forum

SRCAF2-1: The mitigation measure Bot-7 in Chapter 12, "Botanical Resources and Wetlands," Section 12.3.5, "Mitigation Measures," specifically states that Mitigation and Adaptive Management Plan will be consistent with the years of effort and experience by the Sacramento River Conservation Area Forum and would be incorporated to aid in

successfully mitigating project impacts on riparian habitats in a coordinated manner that supports its efforts. It is the intent of Reclamation to include the Forum in correspondence regarding the Mitigation and Adaptive Management Plan, but no other official role has been designated for the Forum. Reclamation intends to include cooperating agencies and any other interested parties in the development of the Mitigation and Adaptive Management Plan.

SRCAF2-2: Please refer to Master Comment Response CMS-1, “EIS Mitigation Plan.”

SRCAF2-3: NEPA requires full disclosure of the potential effects of Federal actions and accompanying alternatives and possible mitigation. The mitigation measure Bot-7 in Chapter 12, "Botanical Resources and Wetlands," Section 12.3.5, "Mitigation Measures," describes a range of performance measures to mitigate identified impacts on riparian and wetland communities.

Mitigation Measure Bot-7 identifies specific actions (modification of dam operations and funding restoration actions) that will be included in the final plan to avoid and compensate for impacts on riparian and wetland communities such that a no-net-loss performance standard is met. Mitigation Measure Bot-7 also identifies the minimum measures that will be implemented to avoid, minimize, and compensate for impacts. Details about off-site mitigation opportunities in the primary study area are not yet available. Potential mitigation lands containing comparable wetland and special-status species habitat comparable to those that would be affected by the action alternatives have been identified and specific details about how these lands may be used for mitigation will be discussed in detail in future documents and be subject to review by regulatory agencies and the public. The DEIS follows standard NEPA procedures in disclosing impacts on biological resources and providing mitigation measures that Reclamation will be required to implement following future Congressional authorization of an action alternative. The intent of this document is to identify measures that are flexible and adaptable so they can be implemented effectively by Reclamation to respond to direct and indirect impacts on riparian and wetland habitats resulting from the project. The mitigation measure clearly states that a mitigation and adaptive management plan will be implemented and will include implementation funding mechanisms and criteria. On pages ES-32 and ES-33, the DEIS identifies implementation of a comprehensive revegetation plan and a comprehensive mitigation strategy to minimize potential effects on biological resources as environmental commitments. Therefore, the document properly identifies the probability of implementation of mitigation as required under NEPA and commits Reclamation to implementing this mitigation.

As stated under Mitigation Measure Bot-7, page 12-165, lines 13-15, feasible measures in this context are those that are not in conflict with applicable laws, agreements, and regulations, or with the purpose of the project. As stated on page 12-165, lines 24-34, appropriate restoration actions are those that do any of the following: 1) enhance connectivity of river side channels (e.g., by modifying the elevation of secondary channels, remnant oxbows, or meander scars); 2) expand the river meander zone at selected locations (e.g., by assisting in funding projects that meet this objective); 3) increase floodplain connectivity (e.g., by assisting in funding projects that meet this objective); 4) control and remove nonnative, invasive plant species from riparian areas to shift dominance to native species; 5) create riparian and wetland communities (e.g., through plantings); and 6) increase shaded riverine aquatic habitat (e.g., through plantings). Because the plan would be developed in coordination with USFWS, NMFS, CDFW, and the Sacramento River Conservation Area Forum, each of these entities would have the opportunity to provide input on the appropriateness and feasibility of restoration actions.

SRCAF2-4: Please refer to Master Comment Response CMS-1, “EIS Mitigation Plan.”

SRCAF2-5: As discussed in the Real Estate Appendix to the DEIS, specific mitigation lands will be identified during final design and permitting following Congressional Authorization.

SRCAF2-6: Please refer to Master Comment Response NEPA-1, “Sufficiency of the EIS.”

SRCAF2-7: Mitigation Measure GEO-2 in EIS Chapter 4, "Geology, Geomorphology, Minerals, and Soils," Section 4.3.5, "Mitigation Measures," refers to mitigation to take place only in the Lake Shasta and Vicinity portion of the primary study area (as described in Chapter 1, "Introduction," Section 1.3, "Setting and Location") and not downstream from the dam on the Sacramento River.

SRCAF2-8: Please refer to Master Comment Response EI-2, “Potential Impacts to Bank Swallow and Bank Swallow Habitat.”

SRCAF2-9: As stated in Chapter 2, “Alternatives,” Reclamation will implement commitments to avoid, reduce, mitigate, and/or compensate for adverse socioeconomic and related environmental impacts to the extent practicable, including –but not limited to– compliance with the policies and provisions set forth in the Uniform Relocation Assistance and Real Property Acquisition Policies Act for all relocations. Please see response to SRCAF2-1, SRCAF2-3, and SRCAF2-5.

SRCAF2-10: Please see the response to SRCAF2-3.

SCRAF2-11: Comment noted.

33.8.12 Shasta Regional Transportation Agency

SRTA

From: **Ellen Talbo** <etalbo@srta.ca.gov>
Date: Fri, Aug 9, 2013 at 5:15 PM
Subject: Shasta Investigation Request for Information
To: "wmoore@usbr.gov" <wmoore@usbr.gov>

SRTA-1

Name=Ellen Talbo
e-mail=srta@srta.ca.gov
title=Associate Transportation Planner
Organization=Shasta Regional Transportation Agency
address=1255 East Street, Ste. 202
city=Redding
state=CA
zip=96001
comments=
=Send

Responses to Comments from Shasta Regional Transportation Agency

SRTA-1: Please refer to Master Comment Response MAILINGLIST-1, "Addition or Change to the Mailing List."

33.8.13 State Water Resources Control Board

SWRCB

CALIFORNIA Water Boards

EDMUND G. BROWN JR. GOVERNOR

MATTHEW RODRIQUEZ SECRETARY FOR ENVIRONMENTAL PROTECTION

State Water Resources Control Board

SEP 17 2013

In Reply Refer to:
KDM: A005625

Ms. Katrina Chow
U.S. Bureau of Reclamation
2800 Cottage Way, MP-700
Sacramento, CA 95825-1893

Dear Ms. Chow:

COMMENTS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) FOR SHASTA LAKE WATER RESOURCES INVESTIGATION

SWRCB-1 The State Water Resources Control Board (State Water Board), Division of Water Rights (Division) has reviewed the DEIS for the Shasta Lake water resources investigation. The DEIS evaluates six alternatives for raising the existing Shasta Dam and Shasta Reservoir. Shasta Reservoir has a current capacity of 4,550,000 acre-feet (af). The maximum enlargement under consideration is 634,000 af. Thus, the maximum enlarged capacity would be 5,184,000 af.

Division staff evaluated U.S. Bureau of Reclamation's water rights for Lake Shasta to determine whether the project would require an additional appropriative water right. The Lake Shasta water rights for consumptive use purposes (irrigation, domestic, municipal, etc.) are under permits issued on Application 5626, 9363 and 9364. Power generation is covered by the permits issued on Applications 5625 and 9365.

SWRCB-2 The table below lists the Lake Shasta water rights (storage element only). The water rights for Lake Shasta are subject not only to individual water right limits, but also to combined right limits. The table below also lists the water rights (storage element only) that are part of the combined right limitation terms:

Water Right	Uses	Storage Quantity In af per annum (afa)	Project
5625	Power	3,190,000	Shasta
9365	Power	1,303,000	Shasta
	Total Power	*4,493,000*	

FELICIA MARCUS, CHAIR | THOMAS HOWARD, EXECUTIVE DIRECTOR

1001 I Street, Sacramento, CA 95814 | Mailing Address: P.O. Box 100, Sacramento, Ca 95812-0100 | www.waterboards.ca.gov

RECYCLED PAPER

5626	Municipal, etc.	3,190,000	Shasta
9363	Municipal, etc.	310,000	Shasta
9364	Municipal, etc.	1,303,000	Shasta
	Total Municipal, etc.	*4,803,000*	
9366	Municipal, etc.	0	Contra Costa Canal
9367	Municipal, etc.	0	Contra Costa Canal
9368	Municipal, etc.	0	Tracy Pumping Plant

SWRCB-2 CONTD.

The combined right limits are as follows:

- The total amount of water to be appropriated by direct diversion and by storage under permits issued pursuant to Applications 5626, 9363, 9364, 9366, 9367 and 9368 shall not exceed 6,500,000 af per annum of which not in excess of 3,450,000 afa shall be by direct diversion. The maximum combined rates of direct diversion and rediversion of stored water shall not exceed 22,200 cubic feet per second.

- Applications 5625, 5626 and 9363: The total amount of water to be appropriated by storage under permits issued pursuant to Applications 5625, 5626, 9363, 9364 and 9365 shall not exceed 4,493,000 afa.

- Applications 9364 and 9365: The total amount of water to be appropriated under permits issued pursuant to Applications 5625, 5626, 9363, 9364 and 9365 shall not exceed 4,493,000 afa.

SWRCB-3

The water rights authorize specific quantities for collection to storage annually. The rights do not state the size of the facility that the water will be stored in. Consequently, provided that Reclamation does not exceed its diversion limits, additional water rights are not needed based solely on enlargement of the reservoir size. Should Reclamation determine that it will annually collect more than a combined total of 4,493,000 af to storage in the enlarged reservoir, or exceed the other annual combined right limits listed above, an additional appropriative right is required.

SWRCB-4

Table 6-5 provides simulated average end-of-month Shasta Reservoir Storage under existing condition (2005) and future condition (2030). This data indicates that the reservoir retains more water in storage under all alternatives considered in the DEIS than under the no action alternative. Inasmuch as carryover storage remains in the reservoir, new collection of a like amount would not occur. Nonetheless, Division staff requests that Reclamation provide documentation that the project can be operated under existing rights. To document this, Division staff requests that Reclamation provide a monthly diversions table covering the modeling period of the DEIS showing that the reservoir enlargement project can be operated within the annual combined right limits listed above. Thank you in advance for the information.

If you require further assistance, please contact Katherine Mrowka at (916) 341-5363 or by email at kathy.mrowka@waterboards.ca.gov. Written correspondence or inquiries should be addressed as follows: State Water Resources Control Board, Division of Water Rights, Attn: Katherine Mrowka, P.O. Box 2000, Sacramento, CA, 95812-2000.

Sincerely,

ORIGINAL SIGNED BY:

Katherine Mrowka, Senior
Permitting and Licensing Section
Division of Water Rights

cc: Valentina Cabrera-Stagno
Environmental Protection Agency
Cabrera-Stagno.Valentina@epa.gov

Stephanie Skophammer
Environmental Protection Agency
SKOPHAMMER.STEPHANIE@EPA.GOV

Lisa Holm
U.S. Bureau of Reclamation
Lisa M Holm (lholm@usbr.gov)

Ray Sahlberg
U.S. Bureau of Reclamation
rsahlberg@usbr.gov

Responses to Comments from State Water Resources Control Board

SWRCB-1: Comment noted.

SWRCB-2: Comment noted.

SWRCB-3: Thank you for your comment related to potential future water rights appropriations or changes in existing water rights that may be required if the SLWRI is implemented.

Please refer to Master Comment Response WR-1, "Water Rights."

SWRCB-4: Reclamation will provide the information requested by the State Board at the appropriate stage in project planning.

Please refer to Master Comment Response WR-1, "Water Rights."

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33.10 Comments from Special Interest Groups and Responses

This section contains copies of comment letters (and any attachments) from the special interest groups listed in Table 33.10-1. As noted previously, each comment in the comment letters was assigned a number, in sequential order (note that some letters may have more than one comment). The numbers were then combined with an abbreviation for the organization (example: AQUA-1).

Responses to the comments follow the comment letters, and are also numbered, corresponding to the numbers assigned in the letters. The letters and associated responses are sorted alphabetically by abbreviation and appear in the chapter in that order.

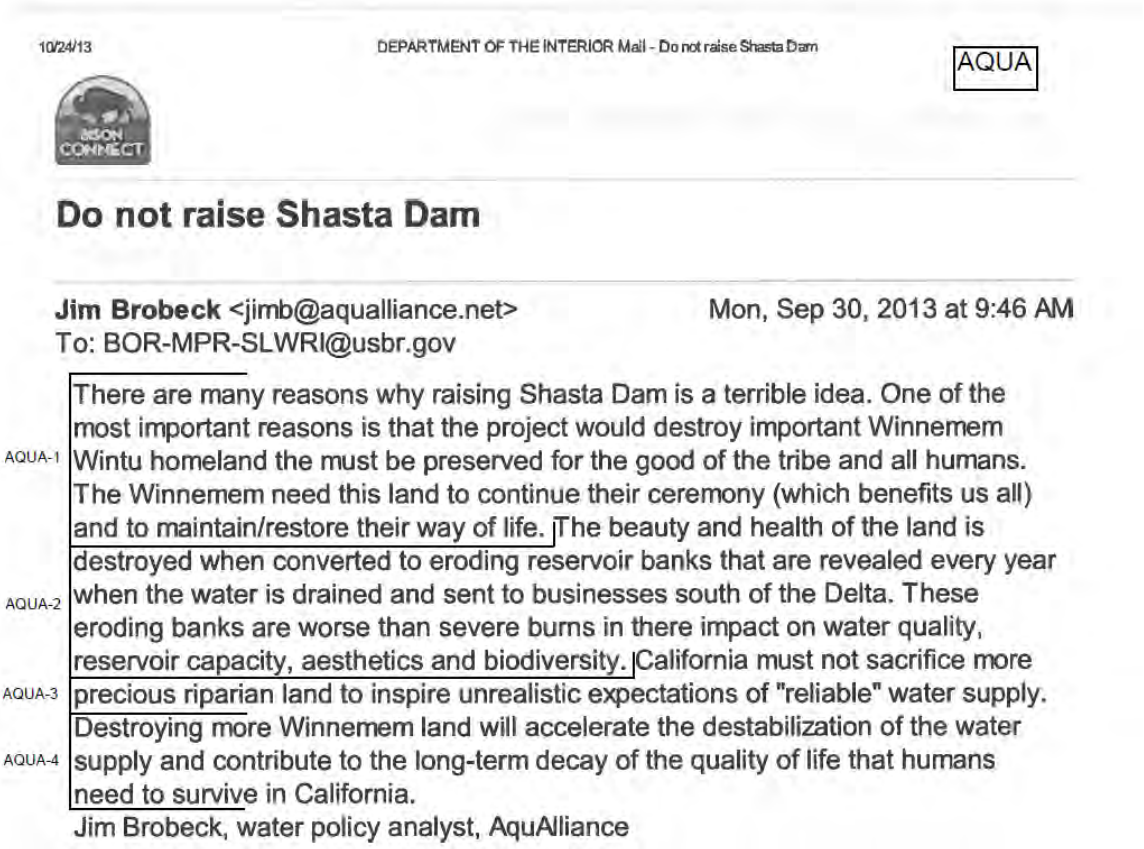
Table 33.10-1. Special Interest Groups Providing Comments on Draft Environmental Impact Statement

Abbreviation	Special Interest Group
AQUA	AquAlliance
BEC	Butte Environmental Council
CALT	CalTrout
CCHOA	Campbell Creek Homeowners Association
CFBF	California Farm Bureau Federation
CFCA1	Citizens for Clean Air
CFCA2	Citizens for Clean Air
CFCA3	Citizens for Clean Air
CWC	California Wilderness Coalition and Friends of the River
EMAI	EMA, Inc.
EPIC	Environmental Protection Information Center
EWC	Environmental Water Caucus
FOTDW1	Friends of the Delta Watershed
FOTDW2	Friends of the Delta Watershed
FOTDW3	Friends of the Delta Watershed
FOTDW4	Friends of the Delta Watershed
FOTR1	Friends of the River
FOTR2	Friends of the River
IOSDE	International Organization for Self-Determination and Equality
LAFO	Dale La Forest & Associates
LCDA	Lakehead Community Development Association

Table 33.10-1. Special Interest Groups Providing Comments on Draft Environmental Impact Statement (contd.)

Abbreviation	Special Interest Group
LHMWC1	Lakeshore Heights Municipal Water Company
LHMWC2	Lakeshore Heights Municipal Water Company
NCPA	Northern California Power Agency
NRDC1	Natural Resources Defense Council
NRDC4	Natural Resources Defense Council
NWHN1	Northstate Women's Health Network
NWHN2	Northstate Women's Health Network
PFT1	Pacific Forest Trust
PFT2	Pacific Forest Trust
PGE1	Pacific Gas & Electric Company
PGE2	Pacific Gas & Electric Company
PGE3	Pacific Gas & Electric Company
PGE4	Pacific Gas & Electric Company
PGE5	Pacific Gas & Electric Company
PGE6	Pacific Gas & Electric Company
PORG	Porgans & Associates
PPLU	Plumbers and Pipefitters Local Union #228
RCOR	Rotary Club of Redding
RFC	Rivers for Change
SCCC	Shasta County Coordination Committee
SCSHA	Salt Creek Summer Homesites Association
SLBOA	Shasta Lake Business Owners Association
SLFP	Sacred Land Film Project
SRPT	Sacramento River Preservation Trust
STCDA	Save The California Delta Alliance
TCPC	The California Parks Company
TNC	The Nature Conservancy
TRE	The River Exchange

33.10.1 AquAlliance



10/24/13 DEPARTMENT OF THE INTERIOR Mail - Do not raise Shasta Dam

AQUA

Do not raise Shasta Dam

Jim Brobeck <jimb@aqualliance.net> Mon, Sep 30, 2013 at 9:46 AM
To: BOR-MPR-SLWRI@usbr.gov

AQUA-1 There are many reasons why raising Shasta Dam is a terrible idea. One of the most important reasons is that the project would destroy important Winnemem Wintu homeland the must be preserved for the good of the tribe and all humans. The Winnemem need this land to continue their ceremony (which benefits us all) and to maintain/restore their way of life. The beauty and health of the land is destroyed when converted to eroding reservoir banks that are revealed every year

AQUA-2 when the water is drained and sent to businesses south of the Delta. These eroding banks are worse than severe burns in there impact on water quality, reservoir capacity, aesthetics and biodiversity. California must not sacrifice more

AQUA-3 precious riparian land to inspire unrealistic expectations of "reliable" water supply. Destroying more Winnemem land will accelerate the destabilization of the water

AQUA-4 supply and contribute to the long-term decay of the quality of life that humans need to survive in California.

Jim Brobeck, water policy analyst, AquAlliance

Responses to Comments from AquAlliance

AQUA-1: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources."

AQUA-2: The EIS acknowledges that the banks of the reservoir (Shasta Lake) have been subjected to erosional processes resulting in the appearance of what Chapter 19, "Aesthetics and Visual Resources," describes as the "bathtub ring" effect. This effect is common to reservoirs used for water storage, hydropower purposes and flood control benefits. The vegetation clearing plan outlined in Chapter 2, "Alternatives," was developed to reduce the potential impacts of this process on newly exposed areas in the short-term. A number of the EIS chapters describe the current condition and potential environmental effects of expanding this effect; specifically Chapter 4, "Geology, Geomorphology, Minerals, and Soils," Chapter 7, "Water Quality," Chapter 13, "Wildlife Resources," Chapter 12, "Botanical Resources

and Wetlands," Chapter 14 "Cultural Resources," and Chapter 18, "Recreation and Public Access."

AQUA-3: Please refer to Master Comment Response ALTR-1, "Range of Alternatives – General," Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts."

AQUA-4: A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR 1503.4). Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

33.10.2 Butte Environmental Council

BEC

Comments on Draft Environmental Impact Statement

Carol Perkins <cuestageo@live.com> Mon, Sep 30, 2013 at 9:42 PM
To: "BOR-MPR-SLWRI@usbr.gov" <bor-mpr-slwri@usbr.gov>
Cc: Robyn DiFalco <robynd@becprotects.org>

Comments are embedded as well as attached.

Sincerely,
Carol Perkins
Water Policy Advocate
Butte Environmental Council

September 30, 2013

Katrina Chow, Project Manager

Shasta Lake Water Resources Investigation

United States Department of the Interior

Bureau of Reclamation, Mid-Pacific Region

2800 Cottage Way, MP-700

Sacramento, CA 95825

By email to: BOR-MPR-SLWRI@usbr.gov

Subject: Comments on Draft Environmental Impact Statement dated June 2013

Butte Environmental Council (BEC) submits the following response letter to the U.S. Bureau of Reclamation (USBR) regarding the Shasta Lake Water Resources Investigation Draft Environmental Impact Statement (DEIS). Concerned citizens of the northern Sacramento Valley recognize that the federal government's proposal to raise Shasta Dam, funded by U.S. taxpayers, is part and parcel to a water grab that will socialize the costs of water and its delivery for the 'profitable' benefit of a few. The proposal is flawed, environmentally destructive, and will fail to meet intended objectives. California (and the USBR) must recognize the natural limits of the state's water supply and learn to live within these boundaries. There exists no 'new water' nor will the process of pouring more concrete guarantee the delivery of more water.

BEC's policy statement regarding water identifies our concerns for Northern Sacramento Valley water resources. Specifically, we believe that citizens should have control over local resources; that Northern California's watersheds must be protected for future generations; and that its ground and surface water must not be exported out of the area to address misuse, waste, and over-allocation elsewhere in the state. These comments focus on the flaws, environmental impacts, and objective failures documented throughout the DEIS surrounding the proposed action of raising Shasta Dam.

According to the Bureau, the objectives of the dam raise echo the co-equal goals of the BDCP to an extent. These goals fall into two operational categories: (1) export operations – or, "increase water supply and water supply reliability," and (2) conservation operations – or more specifically, "increase survival of anadromous fish populations in the upper Sacramento River " and "maintain or improve water quality conditions in the Sacramento River downstream from Shasta Dam and in the Sacramento-San Joaquin Delta."

Local control over local resources

This project is costly and may provide, theoretically, an insignificantly small amount of water. [1] Recent stakeholder meetings in the area have provided evidence that it is a universally unpopular project, which places financial backing on U.S. taxpayers that are and will remain unaware of both their obligation and the regional impacts to the environment and interests of local

residents. The U.S. Fish and Wildlife Service states this proposal will have "negligible benefits" for threatened and endangered salmon and steelhead in the Sacramento River. And it could drown the remaining homeland of the Winnemen Wintu Tribe, including traditional cultural sites on the McCloud River still in use today. The interests and benefits of residents north of the Delta must not be suppressed by the greedy demands of south of Delta entities.

Protection for future generations

An 18.5-foot raise of Shasta Dam could, theoretically and periodically, flood nearly 1.5 miles of the McCloud and upper Sacramento Rivers. Both streams were identified by the Forest Service as potential National Wild & Scenic Rivers and the McCloud is protected under state law from dams and reservoirs. At stake are the rivers' nationally significant wild trout fisheries, as well as outstandingly remarkable scenic, geological, and Native American cultural values (particularly for the McCloud). In addition, enlarging the reservoir could further effect downstream flows in the Sacramento River to the detriment of the river's riparian and aquatic habitats and the many threatened and endangered fish and wildlife species that depend on these habitats. These flow modifications will adversely affect a segment of the Sacramento River upstream of Red Bluff identified by the BLM as eligible for Wild & Scenic protection and that has been proposed for National Recreation Area designation. [2]

Eliminate operational conundrums that result in

more water exported out of the hydrologic region

The Sacramento River hydrologic region is the headwaters of the state providing on average 74% of the flow into the Delta. Building a higher dam will not guarantee more water. Getting more water through the Delta is constrained: DWR and independent experts have recognized and documented this fact. [3] **Regulatory, operational and infrastructure constraints** limit the ability to adaptively manage operations to support co-equal objectives regardless of construction changes in and surrounding the Delta. 2013 was not a critical dry year and Shasta releases for flood control did not occur early in the year. However, there was concern in June that enough cold-water storage remained in Shasta for fall- and winter-run Chinook. [4] In addition, significant water transfers to SOD interests occurred, while NOD water users were left with unmet needs.

BEC requests that the federal government abandon this ill-conceived project now and into perpetuity. The right decision to eliminate this project will save dollars for real projects with real benefits for all citizens and the environment; will lessen the environmental damage already wreaked by California's poorly designed water projects; and will uphold Native American interests and the rights of the environment.

If you have questions please contact me or Carol Perkins, Water Policy Advocate, Butte Environmental Council.

Sincerely,

Robyn DiFalco, Executive Director

robynd@becnet.org

cc:

Dianne Feinstein, U.S. Senator for California

Barbara Boxer, U.S. Senator for California

[1] Biological opinions (BiOps) for salmon and smelt have reduced average carryover in Shasta by 80TAF, which is incidentally nearly the maximum firm water supply (88TAF) that the raise would generate for South Of Delta

(SOD) interests. The firm water supply would only be achievable without dedicated storage for carryover or cold pool supplies.

Operational Effects of the Biological Opinions Using Planning Models . September 7, 2001. Walter Bourez. MBK Engineers; and, *SLWRI DEIS.* July 2013. USBR.

[2] The U.S. Bureau of Reclamation (Reclamation) and the National Marine Fisheries Service (NMFS) conducted a Landowner and Stakeholder Workshop on August 27, 2013 concerning a pilot 'reintroduction' project for Chinook salmon and steelhead to tributaries above Shasta Lake. Alice Berg (NMFS) described that approximately 80 to 90 percent of the historic spring-run Chinook salmon habitat and nearly 100 percent of the historic winter-run Chinook salmon habitat has been lost. Raising the dam could, theoretically, exacerbate these conditions by further inundating upstream habitat and increasing the extent of warm water.

[3] "The project Plan documents make it clear that operations of the CVP and SWP reservoirs are governed by BiOps or FERC licenses, and not BDCP. In addition, they note limited flexibility in reservoir operation due to cold water pool management, particularly on Shasta and Folsom Reservoirs. In this way, the reservoirs are in effect another constraint on BDCP (Chapter 3), rather than an asset for management.

Yet operations of these reservoirs greatly impact winter- and spring-run Chinook habitat downstream. As Shown above, these operations contribute to the significant impairment of flows of the Sacramento River and its major tributaries and are a challenge when trying to meet the biological objectives of BDCP. Additionally, these dams block access to holding, spawning and rearing habitat that has far-reaching effects on winter- and spring-run Chinook salmon populations (Williams, 2006, 2009). These Dams also support mitigation hatcheries whose operations may be contributing to harm of native salmon (Moyle et al., 2011)."

"… all three reservoirs are at or near dead pool for the last two years of the drought cycle. Had water-year 1989 been closer in runoff to the other drought years, dead pool conditions would have occurred for the last three years of the six-year drought. Although a statement of the obvious, dead pool limits flexibility in managing water supply and ecosystem needs, both immediately downstream and in the Delta. This is likely to be of greatest concern for managing flow and temperature needs of winter- and spring-run Chinook salmon, particularly under

warming climate conditions. Changes in flow releases to meet the needs of listed salmon are highly likely to impact export operations during dry periods."

Panel Review of the Draft Bay Delta Conservation Plan: Prepared for the Nature Conservancy and American Rivers. September 2013. Mount, Jeffrey; Fleenor, W.; Gray, B.; Herbold, B.; Kimmerer, W. Saracino & Mount, LLC.

[4] It's a balance of two issues, Mr. Wilson explained: "The amount of flow required to be released from Shasta Reservoir to meet salinity standards versus this need to retain a sufficient cold water pool at Shasta for protection of salmon, meeting water quality standards, and also having carryover storage for next year."

Delta Watermaster Craig Wilson, June 27, 2013 meeting of the Delta Stewardship Council.

SLWRI_DEIS_BEC comment ltr.pdf
709K

Butte Environmental Council

1 W Second Street, Suite 3
Chico, CA 95928
(530) 891-6426
(530) 891-6426 FAX
www.becnet.org

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Endangered Species Faire
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John Scott

Staff
Robyn Di
Executive Di
Maggi Barry
Office Coordinator
Julia Murphy
Communications/Project Assistant
Carol Perkins
Advocacy Consultant
Nami Ta
Advocacy Co
Tanya Parish
BMP Coor

BEC-1
BEC-2
BEC-3
BEC-4
BEC-5
BEC-6
BEC-7
BEC-8

September 30, 2013

Katrina Chow, Project Manager
Shasta Lake Water Resources Investigation
United States Department of the Interior
Bureau of Reclamation, Mid-Pacific Region
2800 Cottage Way, MP-700
Sacramento, CA 95825

By email to: BOR-MPR-SLWRI@usbr.gov

Subject: Comments on Draft Environmental Impact Statement dated June 2013

Butte Environmental Council (BEC) submits the following response letter to the U.S. Bureau of Reclamation (USBR) regarding the Shasta Lake Water Resources Investigation Draft Environmental Impact Statement (DEIS).

Concerned citizens of the northern Sacramento Valley recognize that the federal government's proposal to raise Shasta Dam, funded by U.S. taxpayers, is part and parcel to a water grab that will socialize the costs of water and its delivery for the 'profitable' benefit of a few. The proposal is flawed, environmentally destructive, and will fail to meet intended objectives. California (and the USBR) must recognize the natural limits of the state's water supply and learn to live within these boundaries. There exists no 'new water' nor will the process of pouring more concrete guarantee the delivery of more water.

BEC's policy statement regarding water identifies our concerns for Northern Sacramento Valley water resources. Specifically, we believe that citizens should have control over local resources; that Northern California's watersheds must be protected for future generations; and that its ground and surface water must not be exported out of the area to address misuse, waste, and over-allocation elsewhere in the state. These comments focus on the flaws, environmental impacts, and objective failures documented throughout the DEIS surrounding the proposed action of raising Shasta Dam.

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Local control over local resources

This project is costly and may provide, theoretically, an insignificantly small amount of water. Recent stakeholder meetings in the area have provided evidence that it is a universally unpopular project, which places financial backing on U.S. taxpayers that are and will remain unaware of both their obligation and the regional impacts to the environment and interests of local

BEC-8 CONTD

residents. The U.S. Fish and Wildlife Service states this proposal will have "negligible benefits" for threatened and endangered salmon and steelhead in the Sacramento River. And it could drown the remaining homeland of the Winnemen Wintu Tribe, including traditional cultural sites on the McCloud River still in use today. The interests and benefits of residents north of the Delta must not be suppressed by the greedy demands of south of Delta entities.

BEC-9

BEC-10

BEC-11

Protection for future generations

BEC-12

An 18.5-foot raise of Shasta Dam could, theoretically and periodically, flood nearly 1.5 miles of the McCloud and upper Sacramento Rivers. Both streams were identified by the Forest Service as potential National Wild & Scenic Rivers and the McCloud is protected under state law from dams and reservoirs. At stake are the rivers' nationally significant wild trout fisheries, as well as outstandingly remarkable scenic, geological, and Native American cultural values (particularly for the McCloud). In addition, enlarging the reservoir could further effect downstream flows in the Sacramento River to the detriment of the river's riparian and aquatic habitats and the many threatened and endangered fish and wildlife species that depend on these habitats. These flow modifications will adversely affect a segment of the Sacramento River upstream of Red Bluff identified by the BLM as eligible for Wild & Scenic protection and that has been proposed for National Recreation Area designation. [3]

BEC-13

BEC-14

Eliminate operational conundrums that result in more water exported out of the hydrologic region

BEC-15

The Sacramento River hydrologic region is the headwaters of the state providing on average 74% of the flow into the Delta. Building a higher dam will not guarantee more water. Getting more water through the Delta is constrained: DWR and independent experts have recognized and documented this fact. [3] **Regulatory, operational and infrastructure constraints** limit the ability to adaptively manage operations to support co-equal objectives regardless of construction changes in and surrounding the Delta. 2013 was not a critical dry year and Shasta releases for flood control did not occur early in the year. However, there was concern in June that enough cold-water storage remained in Shasta for fall- and winter-run Chinook. [4]

BEC-16

BEC-17

In addition, significant water transfers to SOD interests occurred, while NOD water users were left with unmet needs.

BEC-18

BEC requests that the federal government abandon this ill-conceived project now and into perpetuity. The right decision to eliminate this project will save dollars for real projects with real benefits for all citizens and the environment; will lessen the environmental damage already wreaked by California's poorly designed water projects; and will uphold Native American interests and the rights of the environment.

If you have questions please contact me or Carol Perkins, Water Policy Advocate, Butte Environmental Council.

Sincerely,

Robyn DiFalco, Executive Director
robynd@becnet.org

cc:

Dianne Feinstein, U.S. Senator for California
Barbara Boxer, U.S. Senator for California

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[1] Biological opinions (BiOps) for salmon and smelt have reduced average carryover in Shasta by 80TAF, which *Operational Effects of the Biological Opinions Using Planning Models* . September 7, 2001. Walter Bourez. MBK Engineers; and, *SLWRI DEIS.* July 2013. USBR.

[2] The U.S. Bureau of Reclamation (Reclamation) and the National Marine Fisheries Service (NMFS) conducted a Landowner and Stakeholder Workshop on August 27, 2013 concerning a pilot 'reintroduction' project for Chinook salmon and steelhead to tributaries above Shasta Lake. Alice Berg (NMFS) described that approximately 80 to 90 percent of the historic spring-run Chinook salmon habitat and nearly 100 percent of the historic winter-run Chinook salmon habitat has been lost. Raising the dam could, theoretically, exacerbate these conditions by further inundating upstream habitat and increasing the extent of warm water.

[3] "The project Plan documents make it clear that operations of the CVP and SWP reservoirs are governed by BiOps or FERC licenses, and not BDCP. In addition, they note limited flexibility in reservoir operation due to cold water pool management, particularly on Shasta and Folsom Reservoirs. In this way, the reservoirs are in effect another constraint on BDCP (Chapter 3), rather than an asset for management.

Yet operations of these reservoirs greatly impact winter- and spring-run Chinook habitat downstream. As Shown above, these operations contribute to the significant impairment of flows of the Sacramento River and its major tributaries and are a challenge when trying to meet the biological objectives of BDCP. Additionally, these dams block access to holding, spawning and rearing habitat that has far-reaching effects on winter- and spring-run Chinook salmon populations (Williams, 2006, 2009). These Dams also support mitigation hatcheries whose operations may be contributing to harm of native salmon (Moyle et al., 2011)."

"… all three reservoirs are at or near dead pool for the last two years of the drought cycle. Had water-year 1989 been closer in runoff to the other drought years, dead pool conditions would have occurred for the last three years of the six-year drought. Although a statement of the obvious, dead pool limits flexibility in managing water supply and ecosystem needs, both immediately downstream and in the Delta. This is likely to be of greatest concern for managing flow and temperature needs of winter- and spring-run Chinook salmon, particularly under warming climate conditions. Changes in flow releases to meet the needs of listed salmon are highly likely to impact export operations during dry periods."

Panel Review of the Draft Bay Delta Conservation Plan: Prepared for the Nature Conservancy and American Rivers. September 2013. Mount, Jeffrey; Fleenor, W.; Gray, B.; Herbold, B.; Kimmerer, W. Saracino & Mount, LLC.

[4] It's a balance of two issues, Mr. Wilson explained: "The amount of flow required to be released from Shasta Reservoir to meet salinity standards versus this need to retain a sufficient cold water pool at Shasta for protection of salmon, meeting water quality standards, and also having carryover storage for next year."

Delta Watermaster Craig Wilson, June 27, 2013 meeting of the Delta Stewardship Council.

Responses to Comments from Butte Environmental Council

BEC-1: Please refer to Master Comment Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits."

BEC-2: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record," and Master Comment Response ALTR-1, "Range of Alternatives – General."

BEC-3: Please refer to Master Comment Response GEN-4, "Best Available Information," and Master Comment Response GEN-1, "Comment Included as Part of the Record."

BEC-4: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

BEC-5: Please refer to Master Comment Response NEPA-1, "Sufficiency of the EIS," and Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts."

BEC-6: The comment appears to reference the coequal goals of the 2009 Delta Reform Act, which are referenced in BDCP documentation. SLWRI project objectives, which are described in EIS Chapter 2, "Alternatives," Section 2.1.2, "Project Objectives," are generally consistent with coequal goals of the 2009 Delta Reform Act of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem.

BEC-7: Please refer to Master Comment Response Gen-1 "Comment Included as Part of the Record."

BEC-8: Please refer to Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts," Master Comment Response P&N-1, "Purpose and Need and Objectives," Master Comment Response ALTS-1, "Alternative Selection," and Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

BEC-9: Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

BEC-10: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources."

BEC-11: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

BEC-12: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," and Master Comment Response WASR-8, "Effects

to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

BEC-13: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River."

BEC-14: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

BEC-15: Please refer to Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir," and Master Comment Response RAH-3, "Dry Year Effects to Reservoir Storage,"

BEC-16: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

BEC-17: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

BEC-18: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

33.10.3 CalTout

10/18/13 DEPARTMENT OF THE INTERIOR Mail - CalTrout comments on Shasta Dam Raise DEIS CALT

CalTrout comments on Shasta Dam Raise DEIS

Curtis Knight <cknight@caltrout.org> Mon, Sep 30, 2013 at 2:12 PM
To: "BOR-MPR-SLWRI@usbr.gov" <BOR-MPR-SLWRI@usbr.gov>

Dear Ms. Chow,

Thanks for the opportunity to comment.

Curtis

CALIFORNIA TROUT
Curtis Knight
Conservation Director
(530)868-1872
www.caltrout.org

2 attachments

CALIFORNIA TROUT

image001.png
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10/18/13 DEPARTMENT OF THE INTERIOR Mail - CalTrout comments on Shasta Dam Raise DEIS

DEIS Shasta Dam CalTrout_Sept_2013.pdf
401K

CALIFORNIA TROUT
KEEPER OF THE STREAMS

September 30, 2013

Ms. Katrina Chow
United States Department of the Interior Bureau of Reclamation
Mid-Pacific Region 2800 Cottage Way, MP-700
Sacramento, CA 95825

Sent via email to: BOR-MPR-SLWRI@usbr.gov
RE: Comments on **Draft Environmental Impact Statement Shasta Lake Water Resources Investigation**

Ms. Chow,

CalTrout appreciates the opportunity to comment on the Bureau of Reclamation's Draft Environmental Impact Statement (DEIS) Shasta Lake Water Resources Investigation and the potential raising of Shasta Dam.

CalTrout is primarily concerned about:

CALT-1

- The raising of Shasta Dam would further inundate up to three miles of blue ribbon wild trout fisheries on the Upper Sacramento and McCloud Rivers. The McCloud River has given enough. Two dams on the river block access for anadromous fish, divert over 80% of its flow and flood miles of habitat.

CALT-2

- The McCloud River is protected under the state Wild and Scenic Rivers Act. The CA Legislature has found and declared that the McCloud River 'possesses extraordinary resources in that it supports one of the finest wild trout fisheries in the state'. The free flowing waters of the McCloud are legally protected--rolling back these protections sets a dangerous legal precedent.

CALT-3

- Central Valley salmon recovery requires a comprehensive approach. The Draft Feasibility Report focuses on a single species (winter-run Chinook salmon) and one of many stressors to this species (water temperature below Shasta Dam). It's telling that NMFS Draft Recovery Plan does not identify Shasta Dam raise as a preferred action to improve Central Valley salmon and steelhead.

Further Inundation of Blue Ribbon Waters

A Shasta Dam Raise would inundate miles of wild trout habitat in two of the states most popular and pristine trout fishing destinations---the Upper Sacramento and McCloud Rivers.

The McCloud River ranks as one of the most famous and revered trout streams in the world and is one of the few remaining great wild trout rivers in California. The McCloud is a designated Wild Trout Stream by the California Department of Fish and Game and is home to the renowned rainbow trout that was stocked around the world and continues to be notable for its beauty. Anglers come from around the world to fish in the pristine waters and remote, rugged canyon of the McCloud and its world famous fishery is of great economic benefit to the local economy. Surveys estimate that between 7,000-14,000 visitors come to the lower McCloud River, primarily to fish and camp.

CALT-4

In the late 1800's, fisheries experts and anglers from around the world looked to the McCloud River as the quintessential trout, steelhead and salmon river. Almost 200 miles from the ocean, this 77 mile long river had the biggest, toughest most hard fighting steelhead and resident rainbow trout. It contained a unique species of trout - the redband trout, the only California occurrence of the aggressive bull trout, a spring-run, fall-run Chinook salmon and a salmon with a life history developed nowhere else in the world – the winter –run Chinook salmon. The fish from the McCloud are the seed stock for trout and salmon around the world.

A Shasta Dam raise would inundate approximately another 3,550 of the McCloud River—or about 3% of the remaining free flowing river between McCloud Dam and Shasta Reservoir. During high pool miles of habitat would be flooded, sediment deposition would destroy spawning habitat and slack water habitat would favor non-native fish predators from Shasta Lake at the expense of native trout. During low pool an ugly bath tub ring would replace what is now healthy riparian habitat and scenic river canyon.

The BOR acknowledges the McCloud's special status in their "Major Topics of Interest" section, but offers almost no mention of the loss of up to two miles of the Upper Sacramento River, and dances around discussions of the effects flooding would have on the McCloud River:

CALT-5

> Specific information is lacking concerning the river reach that could periodically be inundated if Shasta Dam and Shasta Lake were enlarged because the lands along this part of the river are privately owned and access for biological and other surveys has been limited; therefore, general information concerning the lower McCloud River as a whole is provided for some resource areas. This section also includes a brief description of the current transition reach (see Figure 25-1) because the reach of the river that would be newly inundated would likely take on the characteristics of the existing transition reach.

Given the owners of that "private stretch" of the McCloud River are none other than Westlands Irrigation District -- who bought the property specifically to eliminate one barrier to dam raising -- it's hard to imagine what the barriers to discovery are.

A Protected River

CALT-6

The free-flowing sections of the McCloud River are protected under state law. The proposed raising of Shasta Dam is in clear violation of the California Wild and Scenic Rivers Act for the McCloud River (Wild and Scenic Rivers Chapter, CA Public Resources Code §5093.542[1]). Under the act the state legislature makes the finding that "maintaining the McCloud River in its free-flowing conditions to protect its fishery is the highest and most beneficial use of the water" under the state constitution. The act prohibits the construction of additional dams, reservoirs, diversions and other water impoundment facilities on the McCloud River.

In the late 1980s, the CA Resources Agency assessed the suitability of the McCloud River inclusion for State Wild and Scenic River designation and protection. The McCloud was found eligible, but the California legislature declined to add the river to the California wild and scenic river system. The legislature instead passed an amendment to the California Wild and Scenic Rivers Act to protect the river's free-flowing condition and the river's fishery from McCloud Dam to Shasta Reservoir resulting in the existing protection under CA Public Resources Code §5093.542.

CALT-7

The McCloud River has also been found to be eligible federal Wild and Scenic status under the Wild and Scenic Rivers Act. However, the river was not formally designated due to an alternative protection strategy proposed by landowners and agencies. In 1991, the McCloud River Coordinated Resource Management and Planning (CRMP) group was formed and a protection plan was adopted in 1994. The CRMP requires its signatories to protect the values that make it eligible for Federal designation as wild and scenic and contains a provision stating that the USFS reserves the right to pursue designation if the CRMP is terminated or fails to protect these values.

CALT-8

The raising of Shasta Dam would violate both the Public Resources Code and McCloud River CRMP Plan protections. Attempts to rescind these laws set a dangerous precedent of scaling back protection when it is inconvenient. Moreover, the PRC Code and CRMP plan protection underscore the desires of the state legislature, the public and the local landowners that the McCloud remain in its. The PRC code states 'the continued management of river resources in their existing natural condition represents the best way to protect the unique fishery of the McCloud River.' Continued management does not include flooding more of the river by raising Shasta Dam.

Salmon Recovery

CALT-9

With a majority of cost of the dam raise being attributed to the need to improve Central Valley steelhead and salmon, the rationale for spending over half-billion dollars on salmon recovery needs to be reviewed in a comprehensive way, not a single species and single dam approach.

For example, there are multiple stressors to Central Valley salmon and steelhead. According NMFS' Draft Recovery Plan these stressors include:

CALT-6 CONTD

[1] See Attachment 1

CALT-9 CONTD

- The barriers of Keswick and Shasta dams, which block access to historic staging and spawning habitat
- Flow fluctuations, water pollution, water temperature impacts in the upper Sacramento River during embryo incubation
- Loss of juvenile rearing habitat in the form of lost natural river morphology and function, and lost riparian habitat and instream cover
- Predation during juvenile rearing and outmigration
- Ocean harvest
- Entrainment of juveniles at the C.W. Jones and Harvey O. Banks pumping plants

CALT-10

A more comprehensive approach is needed to coordinate actions to ensure the long-term sustainability of Central Valley salmon and steelhead. Dam reoperation, improvements to tributaries, increased access to floodplain habitats and many other strategies are being implemented now to improve all runs Central Valley steelhead and salmon. NMFS Draft Recovery Plan highlights many of these efforts. The Draft Feasibility Report falls does not recognize these efforts and instead focuses on winter-run Chinook and how a Shasta Dam raise would affect this single species.

CALT-11

The most obvious impact to the winter-run Chinook salmon was the construction of Shasta dam blocking access to historic spawning grounds. NMFS Draft Recovery Plan identifies at least four independent winter-run Chinook salmon populations with a stronghold in the McCloud and other populations in Fall River, Hat Creek and Upper Sacramento River. The construction of Shasta Dam mixed these runs into a single population below Shasta Dam resulting in a population bottleneck.

CALT-12

The Draft Feasibility Report mischaracterizes the NMFS Draft Recovery Plan identified stressors to winter-run Chinook and solutions to address them. NMFS is clear that a key strategy for securing the long-term viability of winter-run Chinook salmon is establishing 'at least on other viable independent population' in the Battle Creek and/or tributaries above Shasta Reservoir. There is no mention of a Shasta Dam raise. These is clear focused priority by NMFS that the best way to ensure the long term survival of winter-run Chinook is to establish a population above Shasta Dam. But they do not mention the need to raise Shasta Dam.

Best Allocation of Resources?

CALT-13

As the scientists at the UC Davis Center for Watershed Sciences California Water Blog noted, if we're asking taxpayers to cough up $655 million to benefit fish, then it's fair to ask if fish wouldn't better benefit from spending that $655 million some other way:

> New major water projects are increasingly justified based on recovering fish and environmental benefits lost through construction of previous projects. Yet we are not seriously studying what would be the best investment portfolio for fish and the environment. We are still trying to justify individual projects rather than trying to find the best portfolio of activities to accomplish objectives, particularly environmental objectives. This approach is backwards, and ineffective.

CALT-13 CONTD

Independent single-facility studies of improvements to a complex system are expensive and time-consuming, and distract us from addressing greater system-wide problems. If we continue to study this complex system incrementally, money and time will be spent without substantial improvements or strategic direction.[2]

CALT-14

As further noted in the California Water blog, the increased water capacity in the lake will result in very expensive water, while added water deliveries aren't significant on a state-wide scale:

1. The study found that the most economical expansion was about 14% (634,000 acre-ft), costing $1.1 billion dollars, roughly $1,700 per acre-ft of storage capacity. This would expand statewide surface storage capacity by 1.5%, although water storage capacity is not equal to water deliveries.
2. This expansion produces an additional 76,000 acre-ft of firm yield (dry year deliveries). This is less than 0.2% of agricultural and urban water use in California. (Modern water engineers will wonder why the antiquated firm yield is still the main water supply indicator.) Average annual deliveries increase by only 63,000 acre-ft. Other traditional benefits (hydropower, recreation, flood reduction) were small.

CALT-15

We remain unconvinced of any increased recreational opportunity accruing to the project should more flat water be created; blue ribbon trout streams are far more rare than stillwater recreational opportunities.

CALT-16

On the issue of climate change and the need to expand reservoirs in California the scientists at UC Davis warn that expanding reservoirs in not necessarily useful for climate change.

> Climate warming will reduce seasonal snowpack, but with some changes in reservoir management, existing large reservoirs on most of California's rivers can largely accommodate seasonal shifts in runoff (Connell-Buck et al. 2011). Climate warming will be somewhat costly, but not catastrophic for most conventional water storage operations (Willis et al. 2010; Madani and Lund 2010). Change in total precipitation is more important than warming alone. The physical, economic and ecological instability of the Sacramento-San Joaquin Delta probably poses more risk to California's water supply than climate warming (Lund et al. 2010).[3]

Cultural Impacts

CALT-17

And while our objections focus on resources, there is a large cultural cost to dam raising; raising Shasta Dam would submerge 43 of the remaining Winnemem Wintu's sacred sites under the lake's waters. This follows the inundation of most of the tribal lands that were lost when the lake was originally flooded.

CALT-13 CONTD

[2] See http://californiawaterblog.com/2012/02/22/expanding-water-storage-capacity-in-california/

CALT-16 CONTD

[3] See California Water Blog at http://californiawaterblog.com/

Recommendations

CALT-18

- Mitigation: We are concerned about the description of possible mitigation for *Impacts WASR 1-4* for the McCloud River. WASR-1 addresses the eligibility of the McCloud River for federal Wild and Scenic River status and that 'no feasible mitigation measures available to reduce impact'. We believe consideration of funding to the McCloud River Coordinated Resource and Management Planning (CRMP) group be considered mitigation as this group is tasked with maintaining the attributes that make the McCloud River eligible for federal Wild and Scenic status.

CALT-19

WASR-3 addresses impacts to fisheries from further inundating the McCloud River. We would like to highlight the impact Shasta Dam had on the extirpation of bull trout in the McCloud River and that fishery mitigation measures should require feasibility studies on the reintroduction of bull trout.

CALT-20

We are also concerned about WASR-4 regarding the statement that there is 'no feasible mitigation measures available to reduce the impact' of further inundation of state protected free flowing condition of the McCloud River. We believe the mitigation measures for the inundation of free flow waters should be identified. One possible way to mitigate the impact of inundating free flowing waters would be to identify where in the McCloud watershed inundated waters could be returned to free flowing water. Lakin Dam on the upper McCloud River and McCloud Reservoir offer two opportunities. In the case of McCloud Reservoir consideration could be given to modifying the McCloud intake to divert water to the Pit River. Moving the diversion structure upstream may allow for a lower or reduced dam height and could possibly allow for fish passage.

CALT-21

There is also no mention of mitigation for further inundation of the lower portion of the Upper Sacramento River.

CALT-22

- Comprehensive Salmon Recovery: The rationale to raise Shasta Dam to benefit a single run of Central Valley salmon is flawed and counter to the way fish scientists have been thinking about salmon recovery in California. Assessing reservoir reoperation, expanding floodplains, addressing Delta issues, removing dams on Battle Creek are all positive steps. Hatchery reform is important too. These fish management, habitat restoration and water management activities must be assessed and implemented in a coordinated way to address salmon and steelhead recovery needs. The Draft Feasibility Study falls short of this by focusing on a single run of salmon and on the effects of only one action.

CALT-23

- Redesign the Spillway Capacity: Shasta Reservoir is presently drawn way down by November each year to provide enough room for storage of a series of potential storm events as flood protection. A reasonable alternative could be to redesign the spillway for increased carrying capacity in the event of that type of flood event. The protection against an uncontrolled release over the dam would be achieved by a greater capacity for controlled releases through a larger capacity spillway, rather than by building the dam higher to contain that type of a storm event. This could be an effective, cost efficient and environmentally superior solution.

CALT-24

- Downstream Floodplain Expansion: Most of the attempts to bolster wild salmon and steelhead populations have focused on improving riverine spawning and rearing habitat and increasing flow releases from dams to manage temperature and move juveniles to the sea. However, research has shown that floodplains may be an important missing ingredient in the efforts to restore these fishes. Salmon have evolved to take advantage of the historically abundant floodplains in California. During outmigration, juvenile salmonids follow increased flows from an annual spring snowmelt from the channel out onto the floodplain. The abundant food resources, relatively low velocities and warmer temperatures on the floodplain make for ideal rearing conditions, producing growth rates that are up to three times those of juveniles that remain in the channels. Reconnecting floodplains to the Sacramento River through levees setbacks and improved water management is an important factor in addressing Central Valley salmon and steelhead recovery needs.

CALT-25

- Improve Hydrologic Models for Shasta Reservoir Tributaries: Currently hydrologic models, used to predict the amount of winter and spring inflow to Shasta Reservoir from major tributaries (Upper Sacramento, McCloud and Pit Rivers), are outdated and unsophisticated. By updating the models to more accurately predict runoff, Shasta Reservoir could be better managed to ensure full capacity at the beginning of each dry season. Currently, the reservoir rarely fills partly because of over draw down in the fall months in anticipation of heavy winter inflows. More accurate models predicting the timing and amount of inflow would allow a less conservative approach to managing Shasta Reservoir water levels and would result in increased water yield in most years.

Conclusion

CALT-26

Raising Shasta Dam will come at the expense of a river the California Legislature acknowledges as one of the most beautiful and valuable in the state. While CalTrout remains committed to protecting and restoring Central Valley anadromous fisheries, the benefits of raising Shasta Dam to Central Valley steelhead and salmon need to be done in a more coordinated and comprehensive way. We remain unwilling to sacrifice irreplaceable river habitat for benefits that are uncertain and costly.

Sincerely,

Curtis Knight
Conservation Director

Attachment 1

CA Public Resources Code §5093.542

The Legislature finds and declares that the McCloud River possesses extraordinary resources in that it supports one of the finest wild trout fisheries in the state. Portions of the river have been appropriately designated by the Fish and Game Commission, pursuant to Chapter 7.2 (commencing with Section 1725) of Division 2 of the Fish and Game Code, as wild trout waters, with restrictions on the taking, or method of taking, of fish. The Legislature has determined, based upon a review of comprehensive technical data evaluating resources and potential beneficial uses, that potential beneficial uses must be balanced, in order to achieve protection of the unique fishery resources of the McCloud River, as follows:

(a)The continued management of river resources in their existing natural condition represents the best way to protect the unique fishery of the McCloud River. The Legislature further finds and declares that maintaining the McCloud River in its free-flowing condition to protect its fishery is the highest and most beneficial use of the waters of the McCloud River within the segments designated in subdivision (b), and is a reasonable use of water within the meaning of Section 2 of Article X of the California Constitution.

CALT-6 CONTD

(b)No dam, reservoir, diversion, or other water impoundment facility shall be constructed on the McCloud River from Algoma to the confluence with Huckleberry Creek, and 0.25 mile downstream from the McCloud Dam to the McCloud River Bridge; nor shall any such facility be constructed on Squaw Valley Creek from the confluence with Cabin Creek to the confluence with the McCloud River.

(c)Except for participation by the Department of Water Resources in studies involving the technical and economic feasibility of enlargement of Shasta Dam, no department or agency of the state shall assist or cooperate with, whether by loan, grant, license, or otherwise, any agency of the federal, state, or local government in the planning or construction of any dam, reservoir, diversion, or other water impoundment facility that could have an adverse effect on the free-flowing condition of the McCloud River, or on its wild trout fishery.

(d)All state agencies exercising powers under any other provision of law with respect to the protection and restoration of fishery resources shall continue to exercise those powers in a manner to protect and enhance the fishery of those segments designated in subdivision (b). In carrying out this subdivision, any exercise of powers shall be consistent with Section 5093.58.

(e)Nothing in this section shall prejudice, alter, affect in any way, or interfere with the construction, maintenance, repair, or operation by the Pacific Gas and Electric Company of the existing McCloud-Pit development (FERC 2106) under its license, or prevent Pacific Gas and Electric from constructing a hydroelectric generating facility by retrofitting the existing McCloud Dam if the operation of the facility does not alter the existing flow regime below the dam.

CalTrout Comments on Shasta Dam Raise DEIS 8

Responses to Comments from CalTrout

CALT-1: Chapter 11, "Fisheries and Aquatic Ecosystems," of the EIS has been revised to include additional information on impacts to tributaries to Shasta Lake, including the Sacramento River and McCloud River upstream from Shasta Lake. Under CP3, about 2,189 feet of the Upper Sacramento River would be subject to inundation. Under CP3, about 3,550 feet of the McCloud River would be subject to inundation.

While the commenter is correct in the statement regarding anadromous fish that is part of the existing condition and not an impact of any alternatives evaluated in the EIS.

Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CALT-2: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

CALT-3: Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

CALT-4: Chapter 11, "Fisheries and Aquatic Ecosystems," of the EIS has been revised to include additional information on impacts to tributaries to Shasta Lake, including the Sacramento River and McCloud River upstream from Shasta Lake. Under CP3, about 2,189 feet of the Upper Sacramento River would be subject to inundation. Under CP3, about 3,550 feet of the McCloud River would be subject to inundation.

While the commenter provides interesting commentary on the socio-economic and ecologic historical conditions associated with the McCloud River, it does not provide information relevant to the analysis provided in this EIS.

Chapter 25, "Wild and Scenic River Considerations for McCloud River," of the EIS discloses the impacts to the McCloud River and the relevant outstandingly remarkable values (e.g., wild trout fishery). The commenter is incorrect in stating "during high pool miles of habitat would be flooded."

Please refer to Master Comment Response NEPA-1 "Sufficiency of EIS," and Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River."

CALT-5: Based on comments on the DEIS, the EIS has been revised to include a discussion of the Sacramento River in the context of the Wild and Scenic Rivers Act. Specifically, Chapter 17, "Land Use," has been revised to include this topic.

Reclamation has worked closely with private landowners throughout the planning process to collect information and use the best available science to support the NEPA process. Information included in both Chapter 11, "Fisheries and Aquatic Ecosystem," Chapter 12, "Botanical Resources and Wetlands," Chapter 13, "Wildlife Resources," and

Chapter 25, "Wild and Scenic River Considerations for McCloud River," is based on surveys and investigations performed on private lands, including property currently owned by Westlands Water District.

Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CALT-6: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

CALT-7: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response WASR-4, "CRMP's Responsibilities to Maintain the Outstandingly Remarkable Values of the McCloud River."

CALT-8: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response WASR-4, "CRMP's Responsibilities to Maintain the Outstandingly Remarkable Values of the McCloud River."

CALT-9: Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

CALT-10: This comment is based on the Draft Feasibility Report. However, the DEIS evaluated the effects of the SLWRI on all four runs of Chinook salmon, as well as steelhead, green sturgeon and other species found in the Sacramento River and Delta.

Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

CALT-11: Please refer to Master Comment Response DSFISH-6, "Historic Dam Effects on Fisheries."

CALT-12: Please refer to Master Comment Response FISHPASS-1, "Fish Passage Above Shasta Dam," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

CALT-13: Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," Master Comment Response DSFISH-3, "Fish Habitat Restoration," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

CALT-14: The SLWRI DEIS does not include evaluations related to economic feasibility because it is not required under NEPA. Accordingly, the DEIS does not identify a "most economical" alternative. As described in Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," updated evaluations related to economic feasibility was included in the SLWRI Final Feasibility Report.

Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," Master Comment Response COST/BEN-3, "Estimated Increased Water Supply Reliability under Action Alternatives," and Master Comment Response COST/BEN-4, "Non-monetary Benefits of Action Alternatives."

CALT-15: As stated in the DEIS Chapter 18, "Recreation and Public Access," Section 18.1.1, "Recreation," the different types of recreation activities are discussed for the Shasta Lake area. Reclamation did not designate a relative value for any one type of recreation over another for the impact analysis. As discussed in the DEIS Modeling Appendix, Chapter 10, "Recreational Visitation," an increase in number of visitor days is expected to increase for each of the action alternatives.

Please refer to Master Comment Response REC-1, "Effects to Recreation at Shasta Lake."

CALT-16: The primary goals of enlarging Shasta reservoir are to improve water supply reliability and to enhance anadromous fish survival conditions in the Sacramento River.

Please refer to Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir," providing an explanation on how an enlarged reservoir would allow more storage of water by reducing flood releases. Chapters 6, "Hydrology, Hydraulics, and Water Management," and Chapter 11, "Fisheries and Aquatic Ecosystems," contain results showing the beneficial impacts of reservoir enlargement on water supply reliability and anadromous fish survival conditions in the Sacramento River. A detailed sensitivity analysis was conducted to assess the potential impacts of project alternatives under various future climate change scenarios and the results are summarized in the Climate Change Modeling Appendix. Model results show that the proposed enlarged

Shasta operation would result in both increased May and September reservoir storage in both drier and wetter climates than during the historical baseline period. Please refer to Figures 3-120 through 3-122 in the Climate Change Modeling Appendix for more information on changes in reservoir storages under climate change scenarios. Please refer to Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations," and Master Comment Response ALTR-1, "Range of Alternatives – General."

CALT-17: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-3, "Current Effects to Cultural Resources."

CALT-18: Mitigation Measure WASR-3, "Develop and Implement a Comprehensive Multi-scale Wild Trout Fishery Protection, Restoration and Improvement Program Within the Lower McCloud River Watershed," in Chapter 25, Wild and Scenic River Considerations for McCloud River was revised for the Final EIS. WASR-3 requires Reclamation to work with the watershed stakeholders (e.g., CRMP members) to include funding for the development a basin plan that identifies deficient areas where riparian and watershed improvements can be made and work with landowners to improve those areas.

CALT-19: WASR-3 requires Reclamation to protect, restore, and improve aquatic habitat in the lower McCloud River watershed.

CALT-20: Comments received on the DEIS related to Impact WASR-4 resulted in developing a mitigation measure intended to evaluate opportunities available to Reclamation that could potentially mitigate, to some degree this impact if the SLWRI is authorized.

Currently, there is no authority available to Reclamation to consider the types of mitigation proposed by the commenter.

CALT-21: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System," and Master Comment Response WASR-3 "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River ."

CALT-22: This comment is based on a flawed assumption that the DEIS focuses on a single run of Chinook salmon. All runs of Chinook salmon are evaluated in the DEIS, as well as all other species within the Sacramento River and Delta (See Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects"). Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," Master Comment Response ALTR-1,

"Range of Alternatives – General," Master Comment Response DSFISH-3 "Fish Habitat Restoration," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

CALT-23: Reducing flood damage along the Sacramento River is a secondary objective of the project. Reclamation did not formulate alternatives to address secondary objectives, but secondary objectives were considered to the extent possible through pursuit of the primary project objectives.

As described in Chapter 2, "Alternatives," Section 2.3.1, "Management Measures Common to All Action Alternatives," of the DEIS, eight of the management measures retained during the alternatives development process are included, to some degree, in all of the action alternatives. One of those is:

Modify Flood Operations – Potential modification of flood operations would be considered for all action alternatives. Enlargement of Shasta Reservoir would require alterations to existing flood operation guidelines or rule curves, to reflect physical modifications, such as an increase in dam/spillway elevation. The rule curves would be revised with the goal of reducing flood damage and enhancing other objectives to the extent possible.

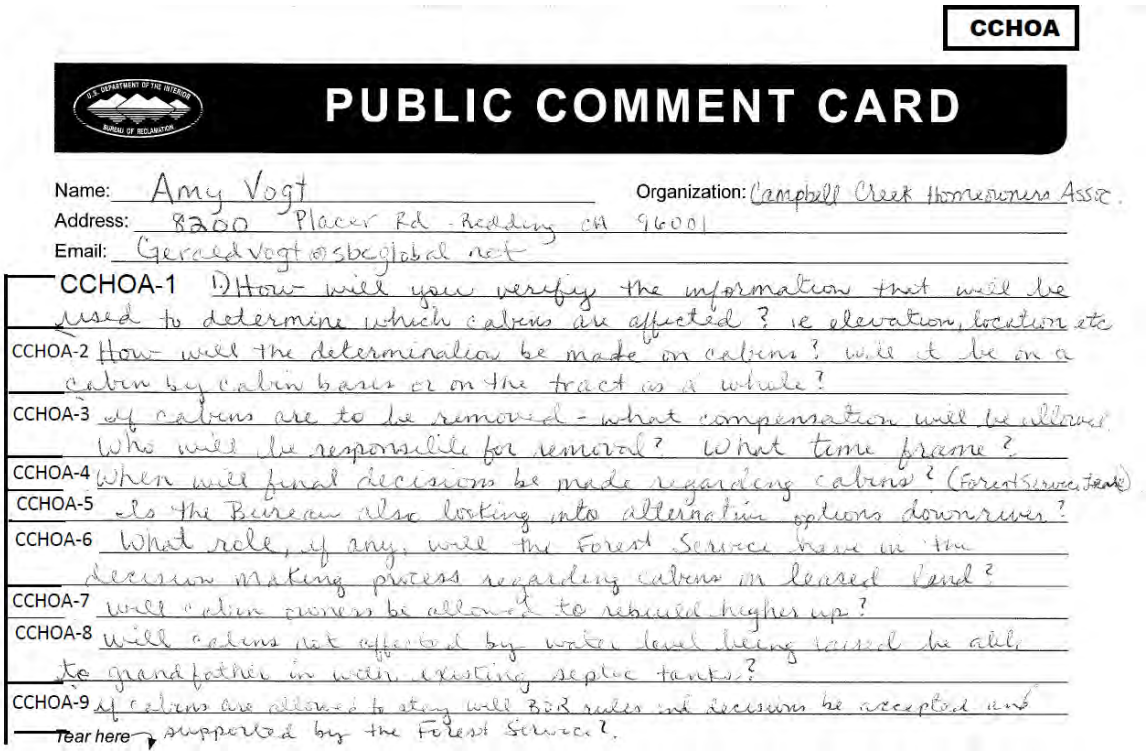
The ability to pass the probable maximum flood (PMF) was a consideration in the design of the SLWRI dam raise alternatives. As summarized in Chapter 2 "Alternatives," Section 2.3, "Action Alternatives," of the DEIS and described in detail in Chapter 2, "Dam and Reservoir Raise Options," of the Draft Engineering Summary Appendix to the DEIS, the total discharge capacity of the existing spillway is 186,000 cubic feet per second (cfs) at reservoir water surface (RWS) elevation 1,065 (NGVD29). All action alternatives include an additional 2-foot increase in the height of the full pool above the dam raise height resulting from spillway modifications, including replacing the three drum gates with six sloping, fixed-wheel gates. The total discharge capacity of the raised spillway included in the action alternatives is estimated to be 266,300 cfs.

CALT-24: Please refer to Master Comment Response DSFISH-9, "Flow-Related Effects on Fish Species of Concern."

CALT-25: Please refer to Master Comment Response GEN-4, "Best Available Information," and Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir."

CALT-26: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

33.10.4 Campbell Creek Homeowners Association



CCHOA

PUBLIC COMMENT CARD

Name: Amy Vogt Organization: Campbell Creek Homeowners Assoc.
Address: 8200 Placer Rd - Redding CA 96001
Email: Gerceedvogt@sbcglobal.net

CCHOA-1 1) How will you verify the information that will be used to determine which cabins are affected? ie elevation, location etc
CCHOA-2 How will the determination be made on cabins? will it be on a cabin by cabin basis or on the tract as a whole?
CCHOA-3 If cabins are to be removed - what compensation will be allowed? Who will be responsible for removal? What time frame?
CCHOA-4 When will final decisions be made regarding cabins? (Forest Service funds)
CCHOA-5 Is the Bureau also looking into alternative options downriver?
CCHOA-6 What role, if any, will the Forest Service have in the decision making process regarding cabins on leased land?
CCHOA-7 Will cabin owners be allowed to rebuild higher up?
CCHOA-8 Will cabins not affected by water level being raised be able to grandfather in with existing septic tanks?
CCHOA-9 If cabins are allowed to stay will BOR rules and decisions be accepted and supported by the Forest Service?

Tear here

Responses to Comments from Campbell Creek Homeowners Association

CCHOA-1: If the project is authorized by Congress, formal verification of site-specific impacts to structures affected by enlargement of the reservoir would occur. In addition to guidance provided by Congress, structures subject to Reclamation action will be verified consistent with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and its associated amendments. Information collected through this process for Recreational Residence Tracts cabins will be provided to the USFS for its use in applying special use permit terms to cabins under its jurisdiction. These terms are described in the Real Estate Appendix of the DEIS and are as follows: "If during the term of this permit the authorized officer determines that specific and compelling reasons in the public interest require revocation of this permit, this permit shall be revoked after 180 days written notice to the holder, provided that the authorized officer may prescribe a shorter notice period if justified by the public interest. The USFS shall then have the right to relocate the holder's improvements to another lot, to remove them, or to require the holder to relocate or remove them, and the USFS shall be obligated to pay an equitable amount for the

improvements or for their relocation and damages resulting from their relocation that are caused by the USFS."

CCHOA-2: Please refer to Master Comment Response FSCABINS-2, "USFS's Authority over Privately Owned Cabins on USFS Lands."

CCHOA-3: Please refer to Master Comment Response FSCABINS-2, "USFS's Authority over Privately Owned Cabins on USFS Lands."

CCHOA-4: Please refer to Master Comment Response FSCABINS-2, "USFS's Authority over Privately Owned Cabins on USFS Lands."

CCHOA-5: Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability."

CCHOA-6: Please refer to Master Comment Response FSCABINS-2, "USFS's Authority over Privately Owned Cabins on USFS Lands."

CCHOA-7: Please refer to Master Comment Response FSCABINS-3, "Relocation of Privately Owned Cabins on USFS Lands."

CCHOA-8: As stated in Chapter 21, "Utilities Service," Section 21.3.4, "Direct and Indirect Effects," of the DEIS, septic systems within the project area are governed by Shasta County Development Standards. Consistent with these standards, all septic system within 200 feet of the new full pool waterline or 100 feet downslope of the new full pool waterline would be demolished. Wastewater pipes, septic tanks, vaults/pits, and leach fields would be abandoned in place. Relocation of septic systems on private property would be done in one of two ways: (1) construct new septic systems on the property of the affected home or facility, where feasible; or (2) define a possible localized WWTP alternative for homes that do not meet Shasta County requirements for septic system separation from the lake. The general WWTP would include a pressurized sewer collection system to transport wastewater flows to several centralized package WWTPs. The EIS identifies the likely construction of localized WWTPs for the areas of Salt Creek, Sugarloaf/Tsasdi Resort, Lakeshore (possibly several plants), Antlers Campground, Campbell Creek Cove, Bridge Bay Marina, Silverthorn Resort, and Jones Valley. Additional localized WWTPs for cabins on land held in USFS Special Use Permit will be evaluated following any Congressional authorization of an action alternative and subject to USFS permit terms and conditions.

CCHOA-9: Please refer to Master Comment Response FSCABINS-2, "USFS's Authority over Privately Owned Cabins on USFS Lands."

33.10.5 California Farm Bureau Federation

CFBF

CALIFORNIA FARM BUREAU FEDERATION

OFFICE OF THE GENERAL COUNSEL
2300 RIVER PLAZA DRIVE SACRAMENTO CA 95833-3293 · PHONE (916) 561-5665 · FAX (916) 561-5691

September 27, 2013

Via U.S. Mail and Electronic Mail
(BOR-MPR-SLWRI@usbr.gov)

OCT 2 2 2013

710 KDuncan
22Oct13
to: KChow

Ms. Katrina Chow
Project Manager
Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Re: Comments on Draft EIS for the Shasta Lake Water Resources Investigation

Dear Ms. Chow:

The California Farm Bureau Federation ("Farm Bureau") appreciates the opportunity to review and comment upon the Draft Environmental Impact Statement ("DEIS") for the Shasta Lake Water Resources Investigation ("SLWRI").

CFBF-1 The California Farm Bureau Federation ("Farm Bureau") is a non-governmental, non-profit, voluntary membership California corporation whose purpose is to protect and promote agricultural interests throughout the state of California and to find solutions to the problems of the farm, the farm home and the rural community. Farm Bureau is California's largest farm organization, comprised of 53 county Farm Bureaus currently representing more than 74,000 agricultural, associate and collegiate members in 56 counties. Farm Bureau strives to protect and improve the ability of farmers and ranchers engaged in production agriculture to provide a reliable supply of food and fiber through responsible stewardship of California's resources. A key component of Farm Bureau's advocacy is the protection of affordable and reliable water supplies for California's farmers and ranchers.

CFBF-2 Farm Bureau strongly supports all cost-efficient means of increasing California's water supply, including the construction of additional storage facilities. As California's population surpasses 38 million people, demand-side pressures on established agricultural water supplies continue to grow. Compounding these pressures is the overlay of environmental requirements for water, much of which has been implemented on the back of a water supply system that was not originally designed for the same. It seems to us that the only sensible solution set for addressing the growing supply/demand imbalance for water in California simply must include additional storage options for surface water supplies.

SCANNED

Location	ENV-6.00
Project	214
Control No.	13044120
Folder I.D.	1230427
Date Input & Initials	10-22-13 KM

NANCY N. MCDONOUGH, GENERAL COUNSEL
ASSOCIATE COUNSEL
CARL G. BORDEN · KAREN NORENE MILLS · CHRISTIAN C. SCHEURING · KARI E. FISHER · JACK L. RICE

CFBF-3

Farm Bureau believes that the expansion of Shasta Dam and Reservoir is an intelligent option for such additional storage. We understand that the DEIS is the ultimate product of the 2000 CALFED Bay-Delta Programmatic Record of Decision, and that primary planning objectives include the improvement of anadromous fish survival in the upper Sacramento River, as well as increasing water supplies and water supply reliability for the Central Valley Project and related water users. Secondary planning objectives include, among others, increased flood protection downstream on the Sacramento River, additional hydropower generation capabilities, and the maintenance or improvement of water quality conditions downstream through the Delta.

CFBF-4

Several of the alternative comprehensive plans considered in the DEIS – in particular, those based upon an 18.5-foot dam raise – appear to provide substantial and potentially cost-effective benefits in improved management of cold-water resources for the protection of fish, as well as a restored reliability for CVP and other water supplies to agriculture. We appreciated the DEIS's careful examination of the project purpose and need, the project alternatives, and the no-action alternative. The DEIS also presented a thorough examination of project-related environmental impacts and feasible mitigation measures. We especially appreciated the recognition of the indirect adverse impacts of the no-action alternative on agricultural lands and production. Farm Bureau also noted the incorporation of analysis based upon projected climate change, which we believe is a clarion call for additional surface storage in California.

CFBF-5

Farm Bureau urges the Bureau of Reclamation to move forward with additional steps in this process, including circulation of a Final EIS and issuance of a record of decision. In addition, as the preferred alternative is identified for the Shasta Dam and Reservoir enlargement, Farm Bureau looks forward to a detailed cost-accounting for the public benefits of the enlargement, including those accruing to lost reliability of CVP water supplies that has resulted from the application of species-related public laws in the Bay-Delta watershed and their consequences for the movement of water supplies.

Thank you for the opportunity to provide our views and comments on the DEIS. If you have any questions in relation to this letter, please do not hesitate to contact me directly.

Very truly yours,

Christian C. Scheuring
Managing Counsel

CCS/dke

Responses to Comments from California Farm Bureau Federation

CFBF-1: Comment noted.

CFBF-2: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

CFBF-3: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CFBF-4: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CFBF-5: Thank you for your comment. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

33.10.6 Citizens for Clean Air

September 22nd, 2013 Page 1

CFCA1

Katrina Chow, Project Manager
Bureau of Reclamation, Planning Division
2800 Cottage Way
Sacramento, CA 95825-1893
email: kchow@usbr.gov

Citizens For Clean Air's Public Comments: Shasta Lake Water Resource Investigation, Draft EIS (Shasta Dam Raising Project)

Our community is overwhelmingly opposed to this project.

Citizens For Clean Air formally requests that the public comment period be extended until January 15, 2014.

CFCA1-1 Shasta County, a federally recognized Environmental Justice (EJ) community is being asked to review an approximately 6000 page document. It is unreasonable to expect average citizens, to meaningful participate as stakeholders in the review process under the Bureau's current time line.

CFCA1-2 The available evidence demonstrates this project is an attempted water grab by the Westlands and Metropolitan Water Districts. These two water districts are rich and powerful south state water companies, posing as public agencies.

CFCA1-3 The raising of Shasta Dam is being advocated as a benefit for North State farmers and endangered fish species. Yet nowhere in the massive 6000 page Draft EIS has the Bureau demonstrated any valid scientific evidence to prove such claims.

CFCA1-4 The raising of Shasta Dam will flood sacred native sites, destroy existing resorts and marinas, dislocate the town of Lakehead and impact our local economy in a negative manner.

CFCA1-5 If the Westlands and Metropolitan Water Districts want to raise the dam for their personal profits, they (and not the public) should pay for it. By allowing the use of eminent domain for private gain, the Bureau of Reclamation is complicit in activities that are legally indefensible.

CFCA1-6 Many Winnemem Wintu were left homeless when the government forcibly removed them from their ancestral lands, flooding their villages and sacred sites.

All these years later, the Winnemem Wintu have yet to receive the "like lands" that were promised in the 1941 Indian Lands Acquisition Act, which authorized the stealing and subsequent destruction of their homeland.

"Like lands" for a tribe who lived along the McCloud River for over six thousand years, would be along the McCloud River. This land along the McCloud would still be considered their ancestral land.

The 3,000 acre Bollibokka Fishing Club on the McCloud River was sold to Westlands Water District for nearly $35 million. Why does the nation's largest water district, located in Southern California (Fresno) want this land?

"We did not want to see the use of this land to be changed to impede the potential of raising the dam." Tom Birmingham, general manager, Westlands. ~Record Searchlight 2/19/2007

CFCA1-7

It is the very property that would protect the Winnemem Wintu's remaining sacred sites. This is the land that Westlands has recently purchased in their efforts to "de-list" the McCloud River and thereby remove a major impediment to the Shasta Dam raising project.

The Bureau of Reclamation knew the Winnemem were entitled to "like land" for their land the federal government removed them from in the late 1930's. Why didn't the Bureau stop the sale of the Bollibokka fishing club to Westlands?

Your agency's duty to honor your legal commitment to the Winnemem is much older and more important than appeasing special interests in Southern California.

In 1851, the Winnemem (represented by the signature of Numterareman), along with other Wintu bands signed the [congressional] Treaty at Cottonwood Creek which ceded to the United States a vast territory.

In 1914, the U.S. government took steps to purchase land from the Winnemem Wintu.

CFCA1-8

Congress recognized the Winnemem Wintu in the 1941 Indian Lands Acquisition Act.

For decades the Winnemem received scholarships, health care and permits to gather eagle feathers from the federal government. They had federal tribal recognition.

In the 1980's, the Bureau of Indian Affairs reorganized their Agency and established a Federal Recognition List. The Winnemem Wintu were wrongfully (and secretly) left off of that list. The Bureau of Indian Affairs has not corrected it's own error to this day. The tribe's medical care, scholarships and permits were canceled without notification.

However, the most grievous harm by the Bureau of Indian Affairs is the tribe's loss of sovereign status. Without the Winnemem's rightful status, their fight to save ancestral and sacred sites from permanent destruction is severely compromised.

Until the Winnemem receive 'like lands' for the land Congress acknowledges they took and Congress declared they would compensate the Winnemem for, this project is without moral or legal grounds to proceed. The original deal has never been completed.

CFCA1-9

Is this the reason for the Bureau of Reclamation's formal "no response" to the theft of the Winnemem Wintu's lands?

CFCA1-10

The Westlands Water District and the Metropolitan Water District are behind legislation to de-list the McCloud River from current protection under the California Wild & Scenic Rivers Act.

It is the policy of the State of California that certain rivers which possess extraordinary scenic, recreational, fishery, or wildlife values shall be preserved in their free-flowing state, together with their immediate environments, for the benefit and enjoyment of the people of this state. The Legislature declares that such use of these rivers is the highest and most beneficial use and is a reasonable and beneficial use of water within the meaning of Section 2 of Article X of the California Constitution. - The California Wild & Scenic Rivers Act (Public Resources Code Sec. 5093.50 et seq.)

The upper McCloud River offers spectacular waterfalls, great fishing, and shady camping and picnicking spots under towering pine trees. With easy access from Highway 89, the upper McCloud offers a wide variety of outdoor recreation opportunities. The Forest Service acquired 13 miles of this river in 1989 through a land exchange with the Champion timber company. The 2,600 acre river corridor had long been a Forest Service priority for acquisition because of its exceptional recreational and scenic qualities. This segment of the river is considered eligible by the Forest Service for National Wild & Scenic River status due to its free flowing character and outstanding scenic, geological, and fishery values.

CFCA1-10 CONTD.

According to Friends of the River, the upper McCloud is perhaps best known for its three spectacular waterfalls. They provide an exhilarating sight for hikers and anglers. A short trail extends upstream and downstream from Fowler Campground and provides easy access to the waterfalls. This segment of the river is also popular with anglers, although upstream of the falls, the river provides habitat for the rare McCloud redband trout in two small tributaries closed to fishing.

Included is the following excerpt from a February 2, 2013 Record Searchlight article:

"McCloud River takes central role in the dam-raising proposal" ~By Damon Arthur Saturday,

The Westlands Water District and Metropolitan Water District, two rich and powerful south state water agencies interested in raising the height of Shasta Dam have the McCloud River in its sights.

The law governing the river' s status forbids any state agency from planning for or building anything that would affect the river. The law also specifically says the state can' t spend money on proposals to raise Shasta Dam.

A U.S. Bureau of Reclamation draft report released last year said it would be economically feasible to raise the dam, but two issues were unresolved: the McCloud' s wild and scenic status and the numerous Winnemem Wintu sacred sites along the river."

CFCA1-11

The land acquired by Westlands would be sold to the federal government and inundated if officials and lawmakers decided to raise the dam. Will Westlands set the price the federal government, i.e. the people pay for this land?

CFCA1-12

Where are the Environmental Assessments for flooding 3,000 acres of pristine land?

CFCA1-12 CONTD.

We urge you to visit this amazing wilderness yourself and after it wins your heart, apply for National Wild and Scenic Status protection.

CFCA1-13

Shasta County was recognized by the federal Environmental Appeals Board, *In Re Knauf Fiber Glass,* as an Environmental Justice community, requiring EJ guidelines to be addressed.

CFCA1-14

We want to point out that in a Bureau of Reclamation press release dated December 7th, 2012, the Bureau claimed "Reclamation initially released the Draft Feasibility Report in February 2012..." Yet, the first time the Winnemem and Citizens for Clean Air realized the report had been 'released for public comment' was when citizens happened upon your press release on December 9th.

This does not qualify as "Early and sustained involvement with the effected community"

After public outcry, the comment period was extended until January 28. We were never notified of this time extension. Citizens discovered the extension while scrolling through press releases on the Bureau's website.

CFCA1-15

We attended the September 10, 2013 Bureau meeting held in Redding, CA regarding the SLWRI project. Several times the Bureau's staff mentioned (with humorous groans) that the new Environmental Impact Report was over 1,000 pages. Some people have estimates it to be around 6,000 pages. It is not conveniently numbered. On-line, it is divided into many sections which makes it very time consuming and confusing.

In legal circles, if you want to overwhelm and bog down your opponents, you "blizzard" them with thousands of pages of mostly unnecessary information they have to pick through to find what they need.

"However, for perspective, it relies on the reader being familiar with the massive, 10 year-old EISs for the implementation of the Central Valley Project Improvement Act and the CalFed program. Both documents were about two feet thick; organized for those looking for specific subjects, not overall perspective; and probably hard to find by now. It would be most useful for the revised DEIS, to include an account of the major water problems facing California, each of which is potentially budget-busting in a slow economy. Otherwise EISs for enormous, but still small, billion-dollar parts of the overall picture come across as examples of piece mealing..."

~Sept. 13,2013 Letter to the Editor, Buford Holt, U.S. Bureau of Rec. (retired.)

1,000's of pages of documents (in an unfriendly format) is a highly unreasonable burden to place on an Environmental Justice community. This is a low income community, with lower than average education rates.

Are citizens supposed to read thousands of pages, analyze the information and compose a comprehensive response in three months? In their spare time?!

Citizens For Clean Air has had volunteers skim through the plethora of sections. We did not find answers regarding the direct and cumulative impacts to this community. These impacts are not being seriously considered.

CFCA1-16

For example, the Bureau did not appear to think it was appropriate to include new inundation levels for the proposed raising of Shasta Dam. If the dam breaks, I guess we are just out of luck?

The Bureau still claims they do not need to consider the 3M quarry's impact as part of the dam raising project. Isn't a potential "take" site identified in the preliminary EIS the proposed 3M Quarry?

Wouldn't the quarrying of Turtle Bay be considered a related impact on the environment if an EIS was done on the original Shasta Dam project?

Eric Cassano finally received the map he has been requesting for our group, Citizens For Clean Air, on September 15, 2013.

This newly released map is critical for our community's public comments.

Our greatest concern, besides the Winnemem's sacred sites, is the devastation that will come to the residents of Shasta Lake and Shasta County from the proposed 3M Moody Flats Quarry.

CFCA1-17

The importance of the "Shasta Dam Enlargement Sand and Aggregate Sources" report can not be underestimated. It is only weeks before all public comments are due.

In response to repeated Freedom of Information Act (FOIA) requests, the Bureau claims they have had no communication with the proposed 3M Quarry.

However, it is our understanding that in February of 2012, during a conference call, including Katrina Chow, and community activist Eric Cassano, Ms. Chow informed Mr. Cassano that the Bureau had a geologist who was the contact liaison for the proposed 3M quarry.

At the Bureau's previous July SLWRI workshop in Redding, Bureau representatives told Eric Cassano that the Bureau plans to acquire all the aggregate for the project on site. If that is accurate, then the specific site needs to be identified and the impacts considered in the Draft EIS.

If the Bureau intends to purchase the aggregate from the 3M Quarry, then the Bureau needs to state that now to produce a legally defensible document.

If the 3M Quarry is going to supply aggregate for the project, the City of Shasta Lake is the rightful lead agency. All the impacts of the 3M Quarry must be considered in the Bureau's Draft EIS.

If the Bureau is planning to build a Construction Depot within the City of Shasta Lake borders, then the City of Shasta Lake is the correct lead agency, not Shasta County.

Also, the full impact of the Construction Depot must be included in this Draft EIS.

CFCA1-17 CONTD.

"Pacific Constructors, the main company building Shasta Dam, set up its own camp near the base of the Shasta Dam site, called "Contractor's Camp" or "Shasta Dam Village". The company built an enormous 2,000-man mess hall, hospital, recreational center and other venues at the dam site. Three other makeshift camps nearby, called "Central Valley", "Project City", and "Summit City", soon filled with men from all over the state hoping to get jobs at the Shasta Dam as drillers, crane operators, mechanics, truck drivers, carpenters, welders, among others." ~ wikipedia.org/wiki/Shasta Dam

The 3M Quarry project includes several acres inside the limits of the City of Shasta Lake.

A road within city limits was identified by the facilitator of the 3M Scoping Meeting as being used by the proposed 3M project to bring in fuel and explosives as part of their planned operation. This is not addressed in the Bureau's Draft EIS.

If the Bureau intends to ever use aggregate or cement from the 3M Quarry, they must include the quarry and all it's impacts as part of the Bureau's Draft EIS. The Bureau must also go through the Draft EIS certification process with the correct local lead agency - the City of Shasta Lake.

CFCA1-18

In the Bureau's latest Draft EIS, the document skims over compensation for the residents/ businesses if their property is flooded. Bureau representatives left critical questions unanswered. How much would these residents be given for their properties? Which homes

CFCA1-19

will be flooded? Which business will be flooded? How much will they be paid for their

CFCA1-21

businesses? How are the business owners and employees being compensated for years of

CFCA1-22

lost income?

CFCA-20

CFCA1-23

The Westlands Water District, already the largest agricultural user of Northern California water, has purchased 3,000 acres along the McCloud River to "make it easier to one day raise Shasta Dam."

Westlands is also aggressively pushing legislation to remove the existing state law that protects the McCloud River from development or flooding. WWD is privately owned by 'farmers' that don't grow anything. They buy the water at a cheap 'agricultural' rate and resell the water further south at a profit.

CFCA1-24

Records obtained under the Public Records Act, revealed a "Secret Society" organized in 2009 to influence water rates (and other decisions) at California's largest public water district - The Metropolitan Water District. MWD has an annual budget of $1.8 billion and serves a six-county region with an annual economy valued at greater than $1 trillion.

CFCA1-25

The Delta Watershed acts as a natural limit to how much water can be diverted south. Each year, California pumps about 4.9 million acre feet of freshwater out of the Delta. The proposed Peripheral Tunnels, two giant water tunnels, would have the capacity to carry up to 11 million acre-feet annually. The proponents of the project say they would "never use the tunnels at full capacity."

Why then build them so large? Why not build *one* tunnel?

Page 7

CFCA1-25 CONTD.

It is indisputable that the additional 6 million acre-feet of water yearly would come from the Sacramento River and other North State Rivers. Therefore, the full impact of the Peripheral Tunnels must be part of a valid and legally defensible EIS.

According to the Sacramento Bee, Sacramento Mayor Kevin Johnson and City Manager John Shirey have expressed opposition to Governor Jerry Brown's proposal to build these giant tunnels. Johnson expressed concerns over the impact to the region's water supply and habitat. "For us, we want to be good stewards," the mayor said. "I'm going to speak out any chance I get." Shirey said the plan is moving "without any collaboration with the city of Sacramento."

This master plan to ship the North State's water south hinges on the Peripheral Tunnels. If the tunnels are not built, not enough water can get through to make the project viable.

No tunnels means no raising of Shasta Dam. The remaining Winnemem Wintu's sacred sites would not be flooded, businesses and homes in Lakehead would not be destroyed. The resorts on the Lake would not be ruined. The beautiful McCloud River would still be enjoyed by everyone. The City of Shasta Lake would not be devastated by an enormous quarry.

The full impacts of constructing the water tunnels under the Delta as a direct impact of the Shasta Dam raising project must be included.

Sincerely,

Celeste Draisner
Heidi Strand
Citizens for Clean Air
P.O. Box 1544,
Shasta lake City, Ca 96019
(530) 223-0197

Responses to Comments from Citizens for Clean Air

CFCA1-1: Please refer to Master Comment Response COMMENTPERIOD-1, "Comment Period."

CFCA1-2: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CFCA1-3: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CFCA1-4: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," Master Comment Response REC-1 "Effects to Recreation at Shasta Lake," and Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity."

CFCA1-5: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

CFCA1-6: Please refer to Master Comment Response CR-2, "Federal Recognition," and Master Comment Response CR-3 "Current Effects to Cultural Resources."

CFCA1-7: Reclamation does not control the activities of individual CVP Contractors. Reclamation did not participate in the purchase of the club on the McCloud River.

CFCA1-8: Please refer to Master Comment Response CR-2, "Federal Recognition."

CFCA1-9: A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR 1503.4). Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

CFCA1-10: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

CFCA1-11: Please refer to Master Comment Response PLAR-11, "Inundation Zone/Reservoir Buffer."

CFCA1-12: Please refer to Master Comment Response GEN-1 "Comment Included as Part of the Record."

CFCA1-13: We have reviewed the federal Environmental Appeals Board rulings in the Knauf air quality rulings and have not found a definite response related to whether Shasta County has been recognized as an environmental justice community.

Please refer to Master Comment Response EJ-1, "Potential Effects to Disadvantaged Communities."

CFCA1-14: This comment appears to be related to the Draft Feasibility Report and not the DEIS, which is the subject of these responses. No further response is required related to this NEPA document.

CFCA1-15: The Executive Summary for the DEIS summarizes the pertinent information from the document in one location to make the key findings more accessible to readers. The DEIS is also written in plain language and uses appropriate graphics so that decision makers and the public can readily understand them consistent with NEPA Regulations 40 CFR 1502.8. The purpose and need for the project is discussed in Chapter 1, "Introduction," which is two pages long. This section provides a discussion of the water resources problems that the proposed action addresses. The environmental justice chapter of the DEIS is 31 pages long and addresses the environmental justice community and issues. Information on other related major water resources projects in California is included in Section 3.2.9, "Cumulative Effects," and is 34 pages long. While an effort was made to present information clearly and concisely throughout the DEIS, NEPA and other regulatory requirements dictate that a major project such as proposed in the DEIS is thoroughly evaluated.

CFCA1-16: Potential impacts related to hydrology and flooding are discussed in the EIS Chapter 6, "Hydrology, Hydraulics, and Water Management."

Please refer to Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity," and Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir."

CFCA1-17: As displayed in the Engineering Summary Appendix Plate 25, "Potential Borrow Sites," currently operational commercial borrow sources are listed as well as potential borrow sites around the reservoir that are on federal land. The figure has been updated in the Final EIS to include the names of the commercial borrow sites.

The proposed Moody Flats Quarry is not on Federal lands and is still in the preliminary phases of environmental documentation (EIR is under development), and accordingly, it was not identified as a borrow source for the project. However, in response to public comment and information recently made available by the quarry project proponents, the Moody Flats Quarry is included in the cumulative effects analysis and is described in Final EIS Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences, Section 3.2.9, "Cumulative Effects." Further, Moody Flats Quarry is included in the cumulative effects analysis within related resources chapters of the Final EIS (Chapters 4 through 25), as appropriate.

There are currently no plans for the creation of a "construction depot" or temporary construction housing within the City of Shasta Lake. As stated in the EIS Chapter 16, "Socioeconomics, Population, and Housing," a total labor force of 300 to 360 construction workers would be needed depending on the chosen action alternative. It is also expected that the labor force can come from within the primary study area.

CFCA1-18: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

CFCA1-19: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

CFCA1-20: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

CFCA1-21: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

CFCA1-22: Please refer to Master Comment Response PLAR-1 "Effects to Private Residences and Businesses."

CFCA1-23: Reclamation does not control the activities of individual CVP Contractors. Reclamation did not participate in the purchase of the club on the McCloud River**.** Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

CFCA1-24: Please refer to Master Comment Response GEN-2, "Unsubstantiated Information."

CFCA1-25: Water released from Shasta Reservoir does flow into the Sacramento River where it is delivered to CVP contractors in the Sacramento Valley and also pumped from the South Delta for CVP contractors south of the Delta. It is reasonable to assume that if the BDCP were to be implemented, some water released from Shasta Dam would be conveyed through the Delta conveyance facilities to contractors south of the Delta. As described in Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," the BDCP is considered for the purposes of evaluating potential cumulative impacts of the SLWRI. Further speculation on implementation of the BDCP or similar programs is not required by NEPA.

Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," Master Comment Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits," Master Comment Response EI-1, "Intent of NEPA Process to

Provide Fair and Full Discussion of Significant Environmental Impacts," Master Comment Response CR-1, "Potential Effects to Cultural Resources," Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity," Master Comment Response REC-1, "Effects to Recreation at Shasta Lake," Master Comment Response REC-3, "Effects to Tourism at Shasta Lake," Master Comment Response ENG-2, "Borrow Materials," and Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River."

33.10.7 Citizens for Clean Air

CFCA2

official comment, shasta dam raising EIS

hswriter@frontiernet.net <hswriter@frontiernet.net> Sat, Sep 28, 2013 at 9:02 PM
Reply-To: "hswriter@frontiernet.net" <hswriter@frontiernet.net>
To: "kchow@usbr.gov" <kchow@usbr.gov>

Sept 28th, 2013

Dear Bureau of Reclamation Project Manager Katrina Chow,

CFCA2-1 Please add this comment to the official record of the current preliminary Environmental Impact Statement being reviewed for the raising of Shasta Dam.

CFCA2-2 The current EIS being circulated is incomplete. The Coleman Fish hatchery was built as mitigation to protect the salmon when Shasta Dam was built. The Battle Creek Watershed is critical to the salmon's survival. This watershed has been
CFCA2-3 and continues to be devastated by Sierra Pacific's clear-cutting.

CFCA2-4 The Federal Fish and Wildlife Agency must take a lead role in this EIS process. The endangered salmon and their critical habitat in the Battle Creek watershed must be
CFCA2-5 adequately considered and protected for this EIS to be sufficient.

CFCA2-6 The following is a letter to John Laird, Secretary of California Natural Resources regarding the Battle Creek watershed. Please include this as part of my comments.

Sincerely,
Heidi Strand, Co-chair
Citizens for Clean Air

August 20th, 2013

John Laird, Secretary

California Natural Resources Agency

1416 Ninth Street, Suite 1311

Sacramento, CA 95814

(916) 653-5656

RE: Immediate halt of *pre-fire approved* Sierra Pacific Industries (SPI) logging in the Battle Creek Watershed

Dear Mr. Laird;

I am requesting your immediate response because of potential irreparable harm to watersheds of the U.S. and recognized endangered species.

In our previous letter to you, we noted how Sierra Pacific's *own experts* expressed concern for the Battle Creek Watershed.

"The soil is now exposed to much more damage from the rain because the forest canopy is not there to shelter it." ~ Dr. Cajun James, Sierra Pacific scientist

Recently, a memo from William E. Snyder, Deputy Director, Resource Management, Department of Forestry and Fire Protection, dated March 11, 2013 has come to our attention:

> "At a February 7, 2013 hearing, the Court [San Francisco Superior court] clarified that the Pacific Fisher should be given candidacy status...Code s/s 2080 will apply to [the] fisher as a candidate species...CAL FIRE must ensure that adequate measures to avoid take of Pacific fisher are included in each plan it approves....so long as the Pacific fisher remains a candidate species...RPF's will be expected to adequately scope and consider the possibility of take, significant adverse impacts, and cumulative impacts in their Plan lies within the current range of species. "

The California Natural Resources Agency and Cal Fire have the authority to re-evaluate this protected species habitat in order to *prevent irreparable harm*.

Sierra Pacific is logging in the Battle Creek Watershed, using non-sustainable practices.

Last year in Shasta County, the Battle Creek Watershed was devastated by the Ponderosa Fire. The Ponderosa Fire occurred *after* Sierra Pacific's Timber Harvest Plan (THP) was approved.

Does your agency intend to comply with the endangered species act and protect animals?

The Pacific Fishers' current habitat must be evaluated before clear-cutting is allowed to continue.

Page 1
The Battle Creek Alliance hired renowned Hydrologist Tom Myers, PhD to evaluate THP 2-12-026 in the Battle Creek watershed. With a Ph.D and M.S. In hydrology/hydrogeology (and more than 28 years experience as a consultant, government planner, academic researcher, etc.), Mr. Myers expertise in this situation should have been considered.

It is our understanding that this esteemed Hydrologists detailed analysis was largely ignored. In fact, it was left out of your agency's "Rapid Assessment of Sediment from Clearcut Timber Harvest Activities in the Battle Creek Watershed, Shasta and Tehama County, California" study.

Was this done at Sierra Pacific's request? Please forgive us if our sources have misinformed us.

However, if this information is accurate and Sierra Pacific can change the accuracy of your studies *behind closed doors*, then this grievous error must be corrected by your agency in the new assessment. Here are some of the important issues Hydrologist Tom Myers raised, before the impacts of last year's devastating Ponderosa Fire in Shasta County occurred:

"The THP [timber harvest plan] provides insufficient information to assure that the Water Drafting Plan has been designed to minimize damage to watershed and stream...This is the driest period of the year throughout the watershed...SPI does not provide flow measurements or estimate flow for this period at any of the proposed drafting sites so that the impacts to the stream could be determined; it is unknown from the data in this THP whether 200 gpm will remove a small fraction of the flow or all of it. The following recommendations should be implemented to improve the protection of the Battle Creek and Bailey Creek watershed.

. There should be specific passby flow requirement established, designed to minimize the loss of habitat,even if temporary.

. Drafting from the stream should not cause the flow to drop below the specified passby flow requirement. . The THP should include an estimate of average and 2-and 10-year, 7-day low flows at each of the [8] sites for comparison with the drafting rate.

. There should be a specific time interval required between subsequent water drafts or a total number of drafts allowed per day. Requirements that simultaneous drafting not occur are insufficient because drafts that are closely spaced in time can drain the stream for a long period.
. The THP should not allow any substantial channel damming to create a head for pumping. If the stream level is to low to get the pump into, it is too low for a diversion.

[SPI states] the "majority of the precipitation...will occur in the form of snow." the THP provides no data or references to support this assertion.

Page 2

. The ITF report should be relied on only sparingly until the work can be repeated during a wetter period so that sediment movement and erosion processes can actually be observed.

. SPI should complete watershed modeling that would consider the complete realm of flow and sediment delivery changes in the watershed.

The cumulative analysis of sediment is...with a primary reliance on studies of other watersheds...without a map [of] the new clearcuts with the old, there is no way to assess even qualitatively the potential for sediment movement among cuts. A similar review applies to the discussion provided regarding peak flows.

. The cumulative impacts analysis should be redone with a complete flow and sediment model created for the watershed. It could be used to assess the changes caused by past and potentially to be caused by future cuts. It will help to assess whether the watershed is approaching a threshold where rapid changes could begin to occur (Myers 2012)."

Why was this information ignored? Could you, Mr. Laird, and your agency have at least considered some of the questions brought up in the above expert's detailed report?

are calling for an immediate halt to Sierra Pacific's unsustainable logging practices in the Battle Creek Watershed, until the impacts of the Ponderosa Fire can be evaluated.

Every day we do not hear from you and your agency, we feel disenfranchised from the decision-making process.

Irreparable harm may occur if action is not taken.

Who will the pubic hold accountable if the Pacific Fisher disappears forever? What will you tell your grandchildren?

Sincerely,

Marily Woodhouse, www.thebattlecreekalliance.org **(530) 474-5803**

Celeste Draisner, Secretary, Protectors of Anderson Health

Sharon Young, President, Protectors of North State Wetlands

Arnold Erickson, Co-chair, Citizens for Clean Air

CC: Kamala Harris, California Attorney General CC: Mr. Jared Blumenfeld, Region 9 Administrator CC: Matt Weiser, the Sacramento Bee CC: Gina McCarthy, EPA Administrator CC: Forests forever CC: Earthjustice CC: Bruce Ross, Record Searchlight CC: Townsend Raimundo Besler & Usher CC: John Mancasola, McConnell Foundation CC: Centerville Water District CC: Pedro Lucero, David Murillo, Bureau of Reclamation CC: Earth Island Institute CC: Kevin Bundy, Center for Biological Diversity CC: Ebbetts Pass Forest Watch CC: Epic CC: Joseph Snook, US ~ Observer CC: Dr. Kathryn Sullivan, National Oceanic and Atmospheric Admin. CC: Chief Counsel, Liane Randolph,California Resource Agency CC: Bill Jennings, executive director California Sportfishing Protection Alliance CC: Brenda Haynes, Anderson-Cottonwood Irrigation District

Page 3

Responses to Comments from Citizens for Clean Air

CFCA2-1: Comment noted.

CFCA2-2: Please refer to Master Comment Response NEPA-1, "Sufficiency of the EIS."

CFCA2-3: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CFCA2-4: Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

CFCA2-5: The SLWRI does not alter critical habitat in the Battle Creek watershed, and therefore does not include an assessment of the salmon or habitat in Battle Creek.

CFCA2-6: Comment noted.

33.10.8 Citizens for Clean Air

CFCA3

A friendly feline reminder that Public Comments are due on the raising of Shasta Dam Sep 30, 2013

Rose Flame <mysecretfires@gmail.com> Mon, Sep 23, 2013 at 1:18 PM
To: info@packersbay.com, admin@silverthornresort.com, info@philsprop.com, Donna Smith <managersaltcreekresort@gmail.com>, antlersrvpark@campingshastalake.com, info@bassholebarandgrill.com, Lesa@lakeshasta.com, office@fawndaleoaks.com, info@shastatackle.com, joyce@shastarv.com, houseboats dotcom <admin@houseboats.com>, info@shastacamping.com, info@mt-gatervpark.com, tsasdi2@snowcrest.net, robert@shastalakehb.com, "hswriter@frontiernet.net" <hswriter@frontiernet.net>, "fantompenguin@fantompenguin.com" <FantomPenguin@fantompenguin.com>, "Frank J. Strazzarino, Jr." <info@reddingchamber.com>, news@khsltv.com, news <news@krcrtv.com>, S Young <mahalo3366@yahoo.com>, Charles Alexander <sushibar007@hotmail.com>, Seabrook Leaf <seabrook@frogwood.org>, John Laird <secretary@resources.ca.gov>, Damon Arthur <darthur@redding.com>, organizations@moveon.org, "gomauro ." <mauro@signaloflove.org>, Marily Woodhouse <trees@thebattlecreekalliance.org>, Tom Stokely <tstokely@att.net>, Mark Lathrop <MLathrop@spi-ind.com>, Gracious A Palmer <graciouspalmer2009@yahoo.com>, Peter Griggs <pgriggs@shastacollege.edu>, Gypsy Perry <gypsyperry03@gmail.com>, Carla Thompson <cthompson@cityofshastalake.org>, Carole Ferguson <cferguson@redding.com>, Jeff <jkiser@ci.anderson.ca.us>, Gary Cadd <white.bear@sbcglobal.net>
Cc: BOR-MPR-SLWRI@usbr.gov, Katrina Chow <kchow@usbr.gov>, "Wsloan@mofo.com" <wsloan@mofo.com>, Pete Lucero <plucero@usbr.gov>

Hello Everyone,

CFCA3-1

Citizens For Clean Air has formally submitted public comments on the proposal to raising Shasta Dam. As you may have guessed, we came out on the side of our friends and neighbors. Thanks to everyone who made the July 16,th and September 10th Bureau of Reclamation meetings a success.

What an an amazing turnout!

We are asking for even more help from our community. Especially ... we need experts to ask detailed environmental questions on the cumulative impacts of the project.

Written comments on the Draft EIS may be provided before midnight Monday, September 30, and should be mailed to Katrina Chow, Project Manager, Reclamation, Planning Division, 2800 Cottage Way, Sacramento, CA 95825-1893, 916-978-506 or email BOR-MPR-SLWRI@usbr.gov

Personally... I recommend email. It leaves a permanent record, Go ask Enron.

Best Regards,
Celeste Draisner
Citizens For Clean Air
530-223-0197
P.O. Box 1544
Shasta Lake, CA 96019

9/30/13 DEPARTMENT OF THE INTERIOR Mail - A friendly feline reminder that Public Comments are due on the raising of Shasta Dam Sep 30, 2013

P.S.

Here is a link showing why emails are really the way to go:
http://yosemite.epa.gov/oa/eab_web_docket.nsf/Filings%20By%20Appeal%20Number/2303451E3FD9594B85257B5500684B63/$File/EAB%20Celeste%20Omer%20email...30.pdf

Bureau of Rec. Sept. 2013 comments .odt
30K

https://mail.google.com/mail/u/0/?ui=2&ik=9dde2c7cc7&view=pt&cat=Draft EIS Public Comments&search=cat&th=1414c7af3676fe0d 2/2

Responses to Comments from Citizens for Clean Air

CFCA3-1: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

33.10.9 California Wilderness Coalition and Friends of the River

CWC

CALIFORNIA WILDERNESS COALITION

Comments of
Friends of the River
California Wilderness Coalition
Shasta Lake Water Resources
Investigation Draft Environmental Impact
Statement

FRIENDS OF THE RIVER

September 30, 2013

Ms. Katrina Chow
SLWRI Project Manager
Bureau of Reclamation Planning Division
2800 Cottage Way
Sacramento, CA 95825-1893
Fax: (916) 978-5094
Email: BOR-MPR-SLWRI@usbr.gov

Dear Ms. Chow:

Thank you for soliciting public comments in response to the Shasta Lake Water Resources Investigation (SLWRI) Draft Environmental Impact Report (DEIS). Below are the joint comments of Friends of the River and the California Wilderness Coalition. Friends of the River's Executive Director, Bob Center, will be submitting separate comments before the deadline. In addition, Friends of the River contributed to and hereby incorporate by reference the joint comments to be submitted by the California Environmental Water Caucus. We also hereby incorporate by reference the joint comments of Friends of the River and the California Wilderness Coalition to the SLWRI Draft Feasibility Study and Preliminary DEIS, dated January 28, 2013. We also hereby incorporate by reference verbal comments made for Friends of the River by Steven Evans at the public hearings held in Redding and Sacramento on September 10 and 11, 2013.

CWC-1

1. Unavailability Of Hard Copies Of The DEIS Made Public Review Of This Massive And Complicated Document Difficult.

Friends of the River must protest the failure of the Bureau of Reclamation to provide hard copies of the SLWRI DEIS to the interested public. It is almost impossible to thoroughly review such a massive document online or via disc. Failing to provide printed copies of this document to those interested in conducting a thorough public review is a "penny wise, but pound foolish" approach to NEPA. We believe that a revised DEIS will be necessary and hereby request a hard copy of any future SLWRI documents.

CWC-2
CWC-3
CWC-4

1

2. The DEIS Fails To Admit The Connection Between The SLWRI And The Bay Delta Conservation Plan.

CWC-5 The SLWRI draft Feasibility Report clearly documents that every additional drop of water stored by a raised dam and expanded reservoir will be sold to federal water contractors. This not only refutes the Bureau's claim that the primary benefit of the dam raise is improved fisheries, it also underscores a direction connection to the SLWRI with the Bay-Delta Conservation Plan (BDCP). The current version of the BDCP proposes construction of two giant tunnels beneath the Delta to facilitate export of Sacramento River water south. The DEIS's and Feasibility Study's summary of benefits from the dam raise clearly show that 77% of the water stored behind a raised Shasta Dam will be sold to water contractors south of the Delta (the remainder will be sold to north of Delta contractors).

CWC-6 The DEIS fails to document this important connection and is violation of the public disclosure mandate of the National Environmental Policy Act.

CWC-7 A revised DEIS must clearly document the connection between the SLWRI and BDCP and fully disclose the role this connection plays in the cost-benefits of the SLWRI.

3. Raising Shasta Dam Will Not Significantly Increase Anadromous Fish Survival As Claimed In The DEIS.

CWC-8 The DEIS predicts that the dam raise alternatives will increase juvenile anadromous fish survival by 61,000 to 813,000 fish annually. (DEIS Table S-2, pg. ES-26) This is a misleading way to present the alleged benefits of the proposed dam raise. Although increasing juvenile salmon survival by up to 813,000 fish sounds significant, the less than 1% return rate of juveniles as adults three years later means that this billion dollar or more project may produce fewer than 813 additional adult salmon in any one year, and in most years, considerably less than that number.

CWC-9 It is questionable as to whether the Bureau will operate the raised dam and expanded reservoir in a way that guarantees that the cold water pool will be available during the dry and critically dry years when water temperatures are a major factor in juvenile salmon survival. Sadly, there are no hard or firm standards that the Bureau is apparently required to follow. When the Bureau finds it inconvenient to meet temperature standards for juvenile salmon survival, it simply "coordinates" (a polite way of saying it pressures) state and federal regulatory agencies to agree to move the temperature control point on the Sacramento River to a spot more convenient for the Bureau's dam and reservoir operations. The Sacramento Basin Water Quality Control Plan unequivocally sets the salmon temperature control point at Red Bluff. Over the years, the Bureau has found it convenient to move this control point further upstream to Bend, Balls Ferry, and in 2013, even further upstream to a point near Anderson.

CWC-10 In its draft Fish and Wildlife Coordination Report (June 2013), the U.S. Fish and Wildlife Service (USFWS) found the dam raise/expanded reservoir benefits of the

CWC-10 CONTD

dam raise to be "negligible". According to the USFWS, in 90% of the years, the dam raise/expanded reservoir will provide no benefits for juvenile salmon. In addition,

CWC-11

the USFWS found that most of the fish benefits identified in the SLWRI are from spawning gravel augmentation and side channel rearing habitat restoration – mitigation measures that are not dependent on the dam raise/reservoir expansion and that can be implemented regardless whether the dam is raised.

CWC-12

It is important to recognize that the existing dam and reservoir can be operated to maintain an abundant population of endangered winter-run Chinook salmon. The completion of Shasta Dam in 1945 should have doomed this fish to quick extinction since access to its primary spawning grounds on the McCloud and upper Sacramento Rivers were permanently blocked by the dam. But once the reservoir was filled, operations of the dam in its first two decades "provided in-river conditions that sustained the winter-run Chinook population. Abundance estimates for winter-run Chinook in the 1960s ranged form a high of 125,000 in 1962 to a low of 49,000 in 1965." (National Marine Fisheries Service 1997 Proposed Winter-Run Recovery Plan, pg. II-12) Essentially, the winter-run became dependent on cold water releases from Shasta Dam for its survival. But since 1970 to the present, dam operations have consistently failed to provide cold water to the river in order to meet federal water contract commitments in the Sacramento-San Joaquin Delta.

CWC-13

The question is: If the existing dam and reservoir can be operated in a manner that can provide the needed cold water for improved juvenile salmon survival, why is this not an alternative under serious consideration in the SLWRI? The answer is found on DEIS page 2-49, where the Bureau states:

CWC-14

> The adaptive management plan (for the proposed cold water pool created by the raised dam/enlarged reservoir) *may* include operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, *as long as there are no conflicts with operational guidelines or adverse impacts on water supply reliability.* (*Emphasis* ours)

This simple statement clearly demonstrates the Bureau's lack of commitment to operate Shasta Dam and Reservoir to benefit endangered salmon regardless of whether the SLWRI is implemented or not. It reveals that the true purpose of the SLWRI is to increase the water supply for water contractors.

4. Key Recovery Actions In The 2009 Central Valley Salmon and Steelhead Recovery Plan Are Not Considered In the SLWRI DEIS.

CWC-15

The National Marine Fisheries Service's (NMFS) 2009 Central Valley Salmon and Steelhead Recovery Plan proposed a number of actions to protect and restore all runs of salmon and steelhead in the Sacramento River and its tributaries. Just a few of these actions include regulating pollution discharges from agricultural and urban sources, setting back and maintaining riparian vegetation on flood control levees,

CWC-15 CONTD

restoring 185 miles of continuous riparian habitat between Red Bluff and Sacramento, screening water diversions that have substantial fishery impacts, curtailing development in flood plains, negotiating additional instream flows or purchasing water rights, remediating acid mine pollution, and restoring the former footprint of Lake Red Bluff to riparian habitat.

CWC-16

The DEIS ignores most of these actions and only obliquely refers to others. For example, it is unclear that adaptive management flows mentioned in the DEIS are the same thing as this specific recovery action proposed by the NMFS:

> Implement a river flow management plan that balances carryover storage needs with instream flow needs for winter-run Chinook salmon based on runoff and storage conditions, including flow fluctuation and ramping criteria (USFWS 2001).

CWC-17

A revised SLWRI DEIS should include sufficient detail and information to make it clear whether adaptive management flows proposed in the DEIS meet the intent of the recovery action proposed in the Recovery Plan.

CWC-18

The Recovery Plan also calls for the restoration of 185 miles of continuous riparian habitat along the Sacramento River between Red Bluff and Sacramento. It is important to note that the USFWS clearly believes that "the reduction in winter flows with the raising of Shasta Dam would result in adverse effects to riparian habitat along the Sacramento River..." (USFWS Coordination Report pg. 176) The SLWRI proposes as a specific restoration measure to restore riparian habitat in the upper and lower Sacramento Rivers (upstream and downstream of Red Bluff respectively) the development and implementation of a Riverine Ecosystem Mitigation and Adaptive Management Plan (REMAMP). The plan will supposedly avoid and compensate for the impact of altered flow regimes on the river's riparian and wetland communities. But little information is provided in regard to the

CWC-19

REMAMP, which apparently does not exist even in draft or outline form, nor does it seem to apply to the Delta (as recommended in the Recovery Plan). There is no assurance that the REMAMP will actually meet the riparian habitat restoration objective found in the Recovery Plan.

CWC-20

In addition, some impacts identified in the DEIS imply that conditions for fish populations targeted for recovery may worsen. For example, remediation efforts at Iron Mountain Mine now controls 95% of the mine pollution that formerly flowed into the river. But the USFWS in its coordination report notes that the SLWRI reservoir expansion may exacerbate acid mine pollution by inundating additional abandoned mines and mine tailings that could leach additional metals into the river.

CWC-21

The DEIS notes that "In addition to runoff from the historic workings (i.e., adits and portals), a number of large mine tailing deposits are currently leaching various metals into tributaries of Shasta Lake." (DEIS pg. 7-15) The Bureau apparently eliminated reducing acid mine and metal pollution as a recovery objective from the SLWRI "due to numerous implementation issues." It proposes to prepare and implement a site-specific Remediation Plan for historic mine features subject to

4

CWC-21 CONTD: inundation but its not clear if this will be completed in time to allow for the completion of the dam raise and filling of the enlarged reservoir, nor is it clear whether this mitigation meets the intent of the Recovery Plan.

CWC-22: The Recovery Plan recommends minimum instream flows and ramping rates to benefit salmon. The DEIS notes that the 1993 NMFS Biological Opinion (BO) set minimum flows in the river, but it is unclear whether these are the same minimum flows recommended in the Recovery Plan, nor does the BO address ramping rates.

CWC-23: Interestingly, the primary fish recovery goal of SLWRI alternative CP4 is to provide a more "fish-friendly" environment with "reservoir storage dedicated to fish, *to either improve flows or water temperatures*." (DEIS pg. 11-54, *emphasis* ours) This is hardly the firm recovery objective outlined in the Recovery Plan. Apparently, the Bureau believes it can either improve flows or temperatures but not both. The primary constraint is the reservation of much of the existing storage, as well as the additional water provided by the raise, to meet water contract commitments.

CWC-24: Another recovery action virtually ignored in the DEIS is the reduction of agricultural and urban pollution into the Sacramento River and Delta. Although there are a number of mitigation measures in the DEIS to reduce pollution from construction and other upland activities into Shasta Reservoir, there is little assessment of the need to reduce agricultural, municipal, and industrial pollution into the Sacramento River downstream of the Dam, in order to reduce adverse impacts on salmon.

CWC-25: For example, one of the specific recovery actions outlined by NMFS in its original 1997 winter run recovery plan is to control contaminant input from the Colusa Basin Drain, which visibly degrades the water quality of the Sacramento River. The Drain is the largest source of agricultural pollution to the river and is a major source of pesticides, turbidity, sediments, nutrients, dissolved solids, trace metals, and warm water into the river. Exposure of juvenile salmon to this kind of pollution is suspected to be detrimental.

CWC-26: And yet, there is no effort in the SLWRI to consider pollution remediation in the river downstream of Shasta Dam as yet another action that could be taken to improve juvenile salmon survival.

CWC-27: In addition, the Recovery Plan proposes to restore key populations to former habitat that has become inaccessible due to dams, including Shasta Dam. The DEIS pays short shrift to this proposal, which is particularly inexcusable given the alleged focus of the SLWRI.

CWC-28: If the Bureau is truly serious about improving salmon survival, a revised SLWRI should incorporate more of the Recovery Actions outlined in the NMFS Recovery Plan.

CWC-29: In addition, the SLWRI should seriously consider an alternative that re-operates the existing dam/reservoir in order to fully meet downstream temperature needs and flow requirements (for salmon as well as riparian habitat).

CWC-30: A revised DEIS must connect the key objectives and recovery actions in the 2009 Recovery Plan to the mitigation measures proposed in the SLWRI DEIS.

CWC-31: Further, the revised DEIS should evaluate and determine the feasibility and role of the Bureau in

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CWC-31 CONTD

implementing all recovery actions, particularly in restoring populations upstream of Shasta Dam.

CWC-32

A revised SLWRI should include an alternative that focuses on the salmon improvement measures recommended in the USFWS Coordination Report, including restoration of spawning and rearing habitat, improving fish passage, increasing minimum flows, and screening water diversions. (USFWS Coordination Report pg. v), as well as other specific management measures initially considered in the SLWRI but removed from further analysis (as outlined in the USFWS Report pg. vi).

5. The Project's Impacts On Sensitive, Threatened, And Endangered Species Are Underestimated In The DEIS.

CWC-33

The DEIS admits that there will be significant and unavoidable impacts on a number of sensitive, threatened, and endangered wildlife species and their habitat, including the Shasta salamander, foothill yellow-legged frog, tailed frog, northwestern pond turtle, bald eagle, northern spotted owl, purple martin, willow flycatcher, Vaux's swift, yellow warbler, yellow-breasted chat, long-eared owl, northern goshawk, Cooper's hawk, great blue heron, osprey, red-tailed hawk, red-shouldered hawk, American robin, Anna's hummingbird, Pacific fisher, American marten, ringtails, eight special status bat species, and four special status mollusks.

The DEIS also admits to significant and unavoidable permanent loss of general wildlife habitat and critical deer winter and fawning range. According to the DEIS, impacts associated with the take and loss of the endangered California red-tailed frog are still to be determined. And also according to the DEIS, impacts on riparian associated special status wildlife species may be potentially significant but are supposedly reduced to less than significant by the development and implementation of the previously mentioned but amorphous Riverine Ecosystem Mitigation and Adaptive Management Plan.

CWC-34

Despite the fact these significant and unavoidable impacts on these many sensitive and special status wildlife species are documented in the DEIS, the document fails to adequately reveal the serious nature of these impacts, particularly on the seven rare but not federally listed species endemic (found nowhere else) to the Shasta Reservoir vicinity, including the Shasta salamander, two rare plant species, and three rare snails (mollusks).

CWC-35

Some species are particularly susceptible to inundation by the expanded reservoir. For example, tree snags in the Pit River Arm of Shasta Reservoir appear to support a stable population of 18 breeding pairs of purple martin, a migratory bird that is generally uncommon in California and is considered by the California Department of Fish and Wildlife to be a species of special concern. The Pacific Coast population of purple martin has substantially declined in the last 50 years. Raising Shasta Dam will completely submerge the martin's existing nesting habitat and it would take decades for new nesting snags to become available to replace the lost habitat.

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CWC-36 A revised DEIS should better document significant and unavoidable impacts on endemic and other special status species and more fully consider alternatives that reduce the impacts to insignificant levels.

6. The DEIS Underestimates Impacts Of Modified Flows From A Raised Shasta Dam On The Sacramento River And The Proposed Mitigation Measure Is Too Vague And Incomplete.

CWC-37 The DEIS claims that potentially significant impacts on riparian associated aquatic and terrestrial special status wildlife due to modifications of the existing flow regime caused by the dam raise will be reduced to less than significant levels by the development and implementation of a Riverine Ecosystem Mitigation and Adaptive Management Plan (REMAMP).

CWC-38 The DEIS also recognizes that the impacts of flow modification on riparian habitat and ecosystem processes is inconsistent with local and regional plans and goals promoting riparian habitat on the Sacramento River. The DEIS notes that these are potentially significant impacts reduced to less than significant levels by the proposed REMAMP.

CWC-39 The USFWS unequivocally states that reduced winter flows caused by the raising of Shasta Dam will result in adverse effects to riparian habitat along the Sacramento River. So these are real issues but unfortunately, the proposed mitigation (the REMAMP) does not yet exist, so there is no way for the public to understand just how the proposed mitigation will truly reduce these impacts to insignificance.

CWC-40 Flow modification impacts to the Sacramento River's riparian and aquatic ecosystems, and the many sensitive, threatened, and endangered fish and wildlife species that depend on these dynamic ecosystems, are generally given short shrift throughout the DEIS. These impacts were well documented in Sacramento River Ecological Flows Study Final Report (CALFED Ecosystem Restoration Program, March 2008). Just a few of the more pertinent facts from this report include:

CWC-41
- Dam-related alterations of river flow regimes have been identified as one of the three leading causes of declines in imperiled aquatic ecosystems.

CWC-42
- Available data support the hypothesis that the reduced frequency and duration of floodplain inundation in the post-dam era may have contributed to the decline of the winter-run Chinook population.

CWC-43
- The Shasta Dam raise will reduce the "stream power" of the Sac by 16% and reduce the amount of floodplain area reworked by high flows by 8%. Diversions from the river to fill the proposed Sites Offstream Storage Reservoir (another CALFED water storage project under study) will further reduce the river's stream power by up to 15%.

CWC-44
- Fremont cottonwood initiation success, Chinook and steelhead rearing WUA

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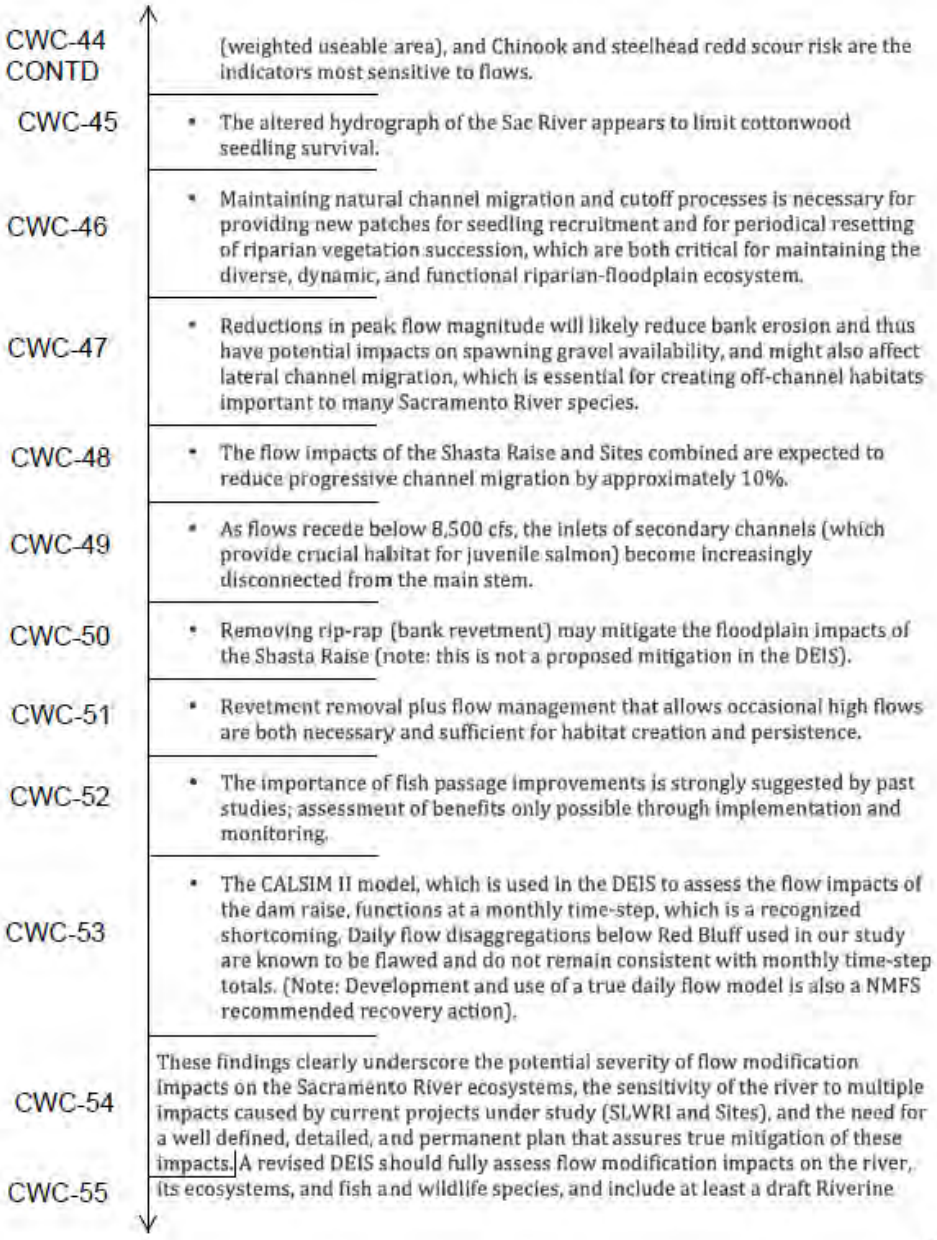

CWC-44 CONTD

(weighted useable area), and Chinook and steelhead redd scour risk are the indicators most sensitive to flows.

CWC-45

- The altered hydrograph of the Sac River appears to limit cottonwood seedling survival.

CWC-46

- Maintaining natural channel migration and cutoff processes is necessary for providing new patches for seedling recruitment and for periodical resetting of riparian vegetation succession, which are both critical for maintaining the diverse, dynamic, and functional riparian-floodplain ecosystem.

CWC-47

- Reductions in peak flow magnitude will likely reduce bank erosion and thus have potential impacts on spawning gravel availability, and might also affect lateral channel migration, which is essential for creating off-channel habitats important to many Sacramento River species.

CWC-48

- The flow impacts of the Shasta Raise and Sites combined are expected to reduce progressive channel migration by approximately 10%.

CWC-49

- As flows recede below 8,500 cfs, the inlets of secondary channels (which provide crucial habitat for juvenile salmon) become increasingly disconnected from the main stem.

CWC-50

- Removing rip-rap (bank revetment) may mitigate the floodplain impacts of the Shasta Raise (note: this is not a proposed mitigation in the DEIS).

CWC-51

- Revetment removal plus flow management that allows occasional high flows are both necessary and sufficient for habitat creation and persistence.

CWC-52

- The importance of fish passage improvements is strongly suggested by past studies; assessment of benefits only possible through implementation and monitoring.

CWC-53

- The CALSIM II model, which is used in the DEIS to assess the flow impacts of the dam raise, functions at a monthly time-step, which is a recognized shortcoming. Daily flow disaggregations below Red Bluff used in our study are known to be flawed and do not remain consistent with monthly time-step totals. (Note: Development and use of a true daily flow model is also a NMFS recommended recovery action).

CWC-54

These findings clearly underscore the potential severity of flow modification impacts on the Sacramento River ecosystems, the sensitivity of the river to multiple impacts caused by current projects under study (SLWRI and Sites), and the need for a well defined, detailed, and permanent plan that assures true mitigation of these impacts.

CWC-55

A revised DEIS should fully assess flow modification impacts on the river, its ecosystems, and fish and wildlife species, and include at least a draft Riverine

8

CWC-55 CONTD

Ecosystem Mitigation and Adaptive Management Plan for review and comment by the public. In addition, this plan should fulfill the role of the Sacramento River and Delta Riparian Habitat Restoration and Management Plan outlined in the NMFS

CWC-56

Recovery Plan and noted as a needed mitigation measure in the USFWS Coordination Report. The Adaptive Management Plan should also fully comply with

CWC-57

all local and regional plans to protect and restore riparian habitat along the river.

CWC-58

It is even more important that this Adaptive Management Plan be completed and available for public review in the revised DEIS because it will determine the future health of riparian and aquatic ecosystems on more than 31,000 acres of federal, state, and other public lands that support some of the most important riparian and aquatic habitat on the Sacramento River (including the BLM's Sacramento River Bend Outstanding Natural Area, the USFWS' Sacramento River National Wildlife Refuge, State Wildlife Areas managed by the California Department of Fish and Game, four State Parks and Recreation Areas, and several local parks and recreation areas).

CWC-59

It is unclear whether the adaptive management plan intended to benefit salmon is the same adaptive management plan intended to benefit the downstream riparian and aquatic ecosystems. The term "adaptive management plan" seems to be interchangeable throughout the DEIS. If they are the same plan, then we assume that

CWC-60

the Bureau's qualification about the timing and magnitude of releases from Shasta Dam to benefit downstream ecosystems will be applied – "*as long as there are no conflicts with operational guidelines or adverse impacts on water supply reliability.*" (DEIS pg. 2-49) If this is the case, it is clear that this proposed Adaptive Management Plan will not reduce the flow modification impacts on riparian and aquatic ecosystems to less than significant levels simply because water contracts will always trump well meaning but relatively toothless mitigation measures.

7. Impacts Of Reservoir Enlargement On Potential Wild & Scenic Rivers

CWC-61

Enlarging Shasta Reservoir by raising the dam from 6.5 to 18.5 feet will flood public lands managed by the Forest Service encompassing segments of the upper Sacramento, McCloud, and Pit Rivers, Salt Creek, and several small tributary streams. This flooding, however minor it may seem to the Bureau, triggers several requirements and mandates in the National Wild & Scenic Rivers Act. Although the DEIS attempts to address Wild & Scenic River issues in Chapter 25, it fails to recognize the actual requirements of the Act and the true implications of the reservoir enlargement in regard to previous Forest Service studies and commitments made in the 1994 Shasta-Trinity National Forests Plan. Nor does the DEIS adequately address the impacts of reservoir enlargement and the legal implications of violating the California Public Resources Code.

8. The National Wild & Scenic Rivers Act requires consideration by all federal agencies of federal Wild & Scenic River protection for the McCloud, upper

9

Sacramento, and Pit Rivers, and other reservoir tributaries as an alternative to the federal proposal to raise the dam and expand the reservoir.

CWC-62

Section 5(d)(1) of the National Wild & Scenic Rivers Act states:

> In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic, and recreational river areas, and all river basin and project plan reports submitted to the Congress shall consider and discuss any such potentials. The Secretary of the Interior and the Secretary of Agriculture shall make specific studies and investigations to determine which additional wild, scenic, and recreational river areas within the United States shall be evaluated in planning reports by all Federal agencies as potential alternative uses of the water and related land resources involved.

This section of federal law clearly requires the Bureau of Reclamation to go beyond the simple reporting of past state and federal considerations of Wild & Scenic protection for the river segments affected by the SLWRI. It specifically requires consideration of Wild & Scenic protection in the context of and as an alternative to the proposed dam raise and reservoir enlargement, not only for the McCloud, but also for the upper Sacramento and Pit Rivers, and all other streams on public lands tributary to Shasta Reservoir. No such comprehensive assessment of Wild & Scenic Rivers is provided in the DEIS.

CWC-63

The Bureau should work with the Forest Service to include in a revised DEIS a comprehensive assessment specifically addressing the impacts of the dam raise and reservoir enlargement on the free flowing character and outstanding values of all rivers and streams tributary to the reservoir and include a range of alternatives that proposes Wild & Scenic protection with and without various reservoir enlargement alternatives.

CWC-64

For example, the Forest Service in the 1994 Shasta-Trinity National Forests Draft Plan found the upper Sacramento River from Box Canyon Dam to the Whiskeytown-Shasta-Trinity National Recreation Area to be eligible for federal protection, but the agency did not recommend it because of land ownership patterns along the river. But the river was also not actively threatened by reservoir expansion at that time. The Wild & Scenic Rivers Act requires the Forest Service and the Bureau to revisit potential Wild & Scenic protection of the upper Sacramento River in the context of the project outlined in the revised DEIS, as well as for other rivers and streams that may be affected by reservoir expansion.

CWC-65

The Bureau of Reclamation has previously recognized the clear mandate of the National Wild & Scenic Rivers Act to consider and evaluate potential Wild & Scenic Rivers as potential alternative uses to water and related land resources in the planning for water development. As part of its planning and study of the Auburn

CWC-65 CONTD

Dam project on the North and Middle Forks of the American River, the Bureau convened a multi-agency interdisciplinary team that determined segments of the river that would be flooded by the dam proposal to be eligible for Wild & Scenic protection in 1993 (letter dated March 17, 1993 from Susan E. Hoffman, Division of Planning and Technical Services Chief, U.S. Bureau of Reclamation Mid-Pacific Region). The study to determine if the eligible segments were suitable for designation was scheduled for Phase II and III of the American River Water Resources Investigation. This part of the study was never completed because soon after the eligibility finding, Congress rejected authorization of the Auburn Dam project.

9. The National Wild & Scenic Rivers Act requires consideration of federal Wild & Scenic River protection for the segments of the lower Sacramento River with significant federal lands downstream of Shasta Dam as an alternative to the federal proposal to raise the dam and expand the reservoir.

CWC-66

The lower Sacramento River between Anderson and Colusa has several segments with substantial federal public lands managed by the Bureau of Land Management (BLM) and the U.S. Fish and Wildlife service (USFWS). In its draft Fish and Wildlife Coordination Report, the USFWS stated "Riparian and floodplain habitat along the Sacramento River and in the Yolo and Sutter Bypasses would be adversely affected by further changes in the timing, duration, and frequency of flood flows due to an enlarged Shasta Dam." (USFWS Draft Coordination Report, pg. viii, June 2013) Even the SLWRI DEIS admits that flow modification from the dam raise may have potentially significant impacts on the river's riparian and aquatic ecosystems and fish and wildlife. These agency findings clearly trigger the section 5(d)(1) requirement that the federal segments of the lower river be studied and considered for potential federal protection as an alternative to the proposed water resources project.

CWC-67

The BLM manages nearly 18,000 acres of federal public lands as the Sacramento River Bend Outstanding Natural Area (SRBONA), which encompasses a 25-mile stretch of the Sacramento River between Balls Ferry and Red Bluff. The BLM found the federal portions of this segment to be eligible for National Wild & Scenic River protection in recognition of its free flowing character and outstandingly remarkable scenic quality, recreation opportunities, cultural/historic values, anadromous and resident trout fisheries, and vegetation. The outstandingly remarkable vegetation value was specifically defined as the river's Great Valley oak riparian forests. (BLM Redding Resource Management Plan and ROD, and BLM Redding RMP FEIS, June 1993 and July 1992 respectively)

CWC-68

In addition to the Wild & Scenic finding, BLM management direction designated the river as an Outstanding Natural Area and requires protection and enhancement of the river's riparian vegetation, wetlands, and anadromous fisheries. BLM management direction for the SRBONA also included the long-term survival of special status species, maintenance and improvement (if feasible) of scenic quality,

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conserving archeological resources, and providing for semi-primitive recreation opportunities. In addition, general policy and program direction in the BLM Manual and the Redding RMP require the BLM to protect the free flowing character and specific outstandingly remarkable values of all eligible rivers.

CWC-68 CONTD

Determining the suitability of the eligible Sacramento River segment was deferred by BLM due to budgetary and personnel constraints (BLM Redding RMP pg. 28, June 1993) The BLM Manual specifically states in regard to water resources projects that may affect eligible or suitable Wild & Scenic Rivers:

> The BLM should, within its authority, consider protecting the river values that make the river eligible or suitable through the land use plan and activity-level NEPA analysis. If a river is listed in the Nationwide Rivers Inventory, the Federal agency involved with the proposed action must consult with the land-management agency in an attempt to avoid or mitigate adverse effects. (BLM Manual 6400-WILD AND SCENIC RIVERS—POLICY AND PROGRAM DIRECTION FOR THE IDENTIFICATION, EVALUATION, PLANNING, AND MANAGEMENT, Sec. 3.8(D), pg. 3-14 7/13/2012)

CWC-69

The SLWRI DEIS mentions BLM management responsibility for public lands along the Sacramento River in several sections. It also mentions the BLM's Wild & Scenic eligibility finding for the Sacramento River between Balls Ferry and Iron Canyon and notes that BLM management direction requires its public lands along the river to be "managed to protect the outstandingly remarkable values and free-flowing character..." However, the documentation of BLM's responsibilities ends there in the SLWRI. There is no connection made between the Sec. 5(d)(1) mandate to consider potential Wild & Scenic protection of the river as an alternative to the SLWRI nor is there any substantive discussion about how the dam raise could modify flows and adversely affect the river's outstandingly remarkable anadromous fisheries and riparian forests, which make the river eligible for Wild & Scenic protection.

CWC-70

The SLWRI DEIS fails to connect the Bureau's proposed alternatives with the BLM's mandate to protect the river's eligible segment. The SLWRI is also inconsistent with the BLM's current management direction for this part of the Sacramento River.

CWC-71

As part of a revised DEIS, the Bureau must consult with the BLM and pursuant to Sec. 5(d)(1) of the Act the BLM must initiate a Wild & Scenic River suitability study for the segment of the Sacramento River identified as eligible by the BLM as an alternative to the SLWRI.

10. The DEIS fails to recognize that Sec. 5(d)(1) of the National Wild & Scenic Rivers Act also applies to federal public lands that comprise the Sacramento River National Wildlife Refuge.

CWC-72 The USFWS manages more than 10,300 acres of federal public lands along the Sacramento River between Red Bluff and Colusa as the Sacramento River National Wildlife Refuge. These lands were acquired by the USFWS and incorporated in the Refuge in order to protect and restore riparian and aquatic habitats and the many sensitive, threatened and endangered species that depend on these habitats. As far as we know, none of the Refuge lands along the river have been studied for their Wild & Scenic eligibility or suitability per sec. 5(D)(1) of the Act. Nor does the DEIS make any mention of potential Wild & Scenic eligibility and suitability of these segments.

CWC-73 A revised DEIS, the Bureau must consult with the USFWS and pursuant to Sec. 5(d)(1) of the Act, the USFWS must initiate a Wild & Scenic River suitability study for the Refuge segments of the Sacramento River as an alternative to the SLWRI.

11. The DEIS admits that all alternatives to raise the Shasta Dam and expand its reservoir will adversely affect the McCloud River's eligibility as a National Wild & Scenic River and will specifically harm the river's free flowing character, water quality, and outstandingly remarkable values.

CWC-74 In Chapter 25, the DEIS documents that raising Shasta Day by 6.5-18.5 feet will flood from 1,470 feet to 3,550 feet of the segment of the McCloud River eligible for National Wild & Scenic River protection. The DEIS also admits that this flooding will adversely affect the McCloud's free flowing character, water quality, and outstandingly remarkable Native American cultural, wild trout fishery, and scenic values.

CWC-75 Conservationists believe that even more of the eligible segment of the McCloud River will be harmed by the dam raise alternatives because the Bureau incorrectly identifies elevation 1,070 feet as the terminus of the McCloud segment identified by the Forest Service. In fact, the terminus of the eligible McCloud segment is simply defined by the Forest Service as "Shasta Lake". (LRMP FEIS, Appendix pgs. E-4, E-13) The Forest Service's map depicting the eligible segment of the McCloud shows that eligible segment ends at the McCloud River Bridge (FEIS Appendix E pg. 3-36). There is no mention of elevation 1,070 as the terminus of the eligible segment and there is no reference in the LRMP to the McCloud's so called "transition reach". Hence, the impact of the dam raise and reservoir expansion is greater than what is documented in the DEIS.

12. Flooding the McCloud River violates the 1995 Shasta-Trinity National Forests Land and Resource Management Plan and Record of Decision in regard to protecting the McCloud River's eligibility as a potential National Wild & Scenic River.

CWC-76 The Forest Service recommended Wild & Scenic River protection for the McCloud River in its 1990 draft of the Shasta-Trinity National Forests Land and Resource Management Plan (LRMP). In response to concerns expressed by river-side

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landowners, the Forest Service chose to pursue protection of the McCloud River's free flowing character and outstandingly remarkable values through a Coordinated Resource Management Plan (CRMP) developed by the Forest Service and other federal and state agencies and the riverside landowners. This decision is reflected in the 1995 final Shasta-Trinity National Forests LRMP and Record of Decision (ROD), which state:

> A Coordinated Resource Management Plan (CRMP) has been adopted for long term management of the Lower and Upper McCloud River and Squaw Valley Creek. This agreement is between private land owners, the Forest Service, Pacific Gas & Electric, Nature Conservancy, CalTrout, and the DFG. This plan will effectively maintain the outstandingly remarkable values of this potential wild and scenic river. If for any reason the terms of the CRMP are not followed and the wild and scenic river eligibility is threatened, the Forest Service will recommend these segments for Federal Wild and Scenic designation. (1995 Final LRMP, page 3-23)
>
> If, after a period of good faith effort at implementation, the CRMP fails to protect the values which render the river suitable for designation then the Forest Service will consider recommendation to the national Wild and Scenic River System. (1995 ROD page 17)

CWC-76 CONTD

The DEIS admits that raising the dam will periodically flood 1,470 feet of the eligible segment of the McCloud River, which would make the flooded segment ineligible for federal Wild & Scenic protection. (DEIS pg. 25-26) Conservation groups believe that more of the eligible river would be flooded (see discussion below about the actual terminus of the eligible McCloud). Regardless, it is clear that the Bureau's proposal to raise Shasta Dam and expand its reservoir directly violates the intent and constitutes failure of the CRMP, and it also violates the protective management proposed in the LRMP. Therefore, the Forest Service is bound by its own ROD to consider and recommend federal protection for the river. This requirement is not reflected in the DEIS and it should be included in the revised DEIS.

CWC-77

CWC-78

The Bureau is misleading the public when it claims that raising the dam and expanding the reservoir will not conflict with the Shasta-Trinity National Forests LRMP because the portion of the McCloud that would be flooded is private land and not National Forest land. The Forest Service has the authority to study and recommend the river within its reservation boundary, as it did so in the 1990 draft LRMP. It has the authority to determine that reservoir expansion and flooding of the eligible segment of the McCloud reflect a de-facto failure of the CRMP and therefore triggers Forest Service reconsideration of its Wild & Scenic River recommendation for the McCloud. This important protection is a fundamental component of the LRMP, which means that the Bureau's proposal violates the LRMP.

CWC-79

14

13. All dam raise/reservoir enlargement alternatives violate the California Public Resources Code 5093.542 prohibiting the construction of a reservoir that would harm the McCloud's free flowing condition and extraordinary wild trout fishery upstream of the McCloud River Bridge.

CWC-80

In 1989, the California Legislature passed and the Governor signed legislation declaring that the McCloud River possesses extraordinary resources, including one the of the finest wild trout fisheries in the state, and that continued management of river resources in their existing natural condition represents the best way to protect the unique fishery of the McCloud, and that maintaining the McCloud in its free-flowing condition to protect its fishery is the highest and most beneficial use of the waters of the river.

The legislation specifically prohibited any dam, reservoir, diversion, or other water impoundment on the McCloud River upstream of the McCloud River Bridge. It also prohibited any state agency cooperation, participation, or support for any dam, reservoir, diversion, or other water impoundment facility that could have an adverse effect on the free flowing condition of the McCloud River or on its wild trout fishery. These prohibitions and conditions are now memorialized in the California Public Resources Code (PRC) 5093.542.

CWC-81

The DEIS admits that all dam raise alternatives will have a significant unmitigated impact on the McCloud's free flowing condition and will have a potentially significant impact on the river's wild trout fishery (DEIS pg. 25-40). The DEIS suggests that the wild trout fishery impacts could be mitigated to less than significant levels but these mitigations have yet to be identified. Regardless, all the dam alternatives in the DEIS clearly violate state law. To ensure compliance with PRC 5093.542, the California Legislature and the Governor passed and signed statewide water bond legislation prohibiting use of the bond funds to raise Shasta Dam.

CWC-82

Clearly, the SLWRI's proposal to raise Shasta Dam and expand its reservoir violates state law. So why is the Bureau continuing to study this illegal project?

CWC-83

Does the Bureau intend to cite federal preemption over state law in regard to this matter? If so, the DEIS should admit this.

14. The DEIS fails to mention that the Sacramento River between Anderson and Colusa is in the Nationwide Rivers Inventory and is protected by Presidential Directive.

CWC-84

A segment of the Sacramento River from the I-5 bridge crossing in Anderson to Arnold Bend upstream of Colusa was included in the National Park Service's 1982 Nationwide Rivers Inventory (NRI). The NRI was created by a directive from President Carter. The directive requires each federal agency, as part of its normal planning and environmental review process, to take care to avoid or mitigate adverse effects on rivers identified in the NRI. Further, all agencies are required to

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CWC-84 CONTD

consult with the National Park Service prior to taking actions which could effectively foreclose wild, scenic or recreational stats for rivers on the inventory.

CWC-85

The NRI describes this segment of the Sacramento River as a swift moving river isolated from surrounding civilization by a narrow band of dense riparian vegetation that meanders over a wide area with numerous islands and oxbow lakes. It also notes that the river flows through scenic Iron Canyon with a stretch of rapids, supports important anadromous fish populations and the state's most important salmon spawning grounds, includes outstanding riparian habitat for the yellow-billed cuckoo and giant garder snake, provides excellent rafting and boating opportunities, receives intense recreational use with fishing as the most popular activity, and is an important popular recreation resource for nearby urban areas.

CWC-86

There is no mention in the SLWRI of the NRI segment of the Sacramento River, the mandate to avoid or mitigate adverse effects on the NRI segment and its specific outstanding values, or the requirement to consult with the National Park Service. A revised DEIS should substantively address these issues.

15. The DEIS fails to adequately identify potential project effects on protected National Forest roadless areas and the Whiskeytown-Shasta-Trinity National Recreation Area.

CWC-87

A portion of the boundaries of the Backbone and Devil's Rock roadless areas on the Shasta-Trinity National Forests parallel the existing reservoir's high water line. The action alternatives could flood a portion of the roadless areas, which are protected under the Roadless Area Conservation Rule.

CWC-88

While the DEIS admits to significant unavoidable impacts on National Forest lands and resources, as well as non-compliance with existing Forest Service management, it fails to describe the adverse impacts on federally protected roadless areas. The revised DEIS should include consideration of these impacts.

CWC-89

The DEIS fails to adequately consider the impacts of the dam raise alternatives on the Whiskeytown-Shasta-Trinity National Recreation Area (WSTNRA). The WSTNRA was established by Congress and President Kennedy in 1963 to:

> ...provide, in a manner coordinated with the other purposes of the Central Valley project, for the public outdoor recreation use and enjoyment of the Whiskeytown, Shasta, Clair Engle, and Lewiston reservoirs and surrounding lands in the State of California by present and future generations and the conservation of scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters... (16 USC Sec. 460q)

The DEIS documents the impact on recreation facilities, but fails to adequately identify the impacts on scenic, scientific, historic and other public land values the WSTNRA was established to conserve. Further, it is not clear that the impacts on

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CWC-89 CONTD

recreation and recreation infrastructure will be fully mitigated. Although owners of private resorts and other recreation facilities will be reimbursed for the fair market values of their property, they will not be reimbursed for the loss of income nor is there any guarantee that these owners will be able to replace their facilities to provide comparable services in the future.

CWC-90

CWC-91

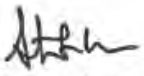
In addition, the DEIS fails to assess the impacts of moving existing facilities elsewhere on undeveloped National Forest lands. A revised DEIS must fully assess the impacts of the proposed dam raise on the all the purposes of the WSTNRA, as well as the actual impacts on private recreation facilities, and the impacts of proposed relocation of public and private facilities.

16. Summary

CWC-92

In summary, there are numerous deficiencies in the SLWRI DEIS. Friends of the River and the California Wilderness Coalition believe that a revised DEIS is required to correct these deficiencies and to allow for full disclosure to the public.

Sincerely,



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Responses to Comments from California Wilderness Coalition and Friends of the River

CWC-1: Comment noted.

CWC-2: Chapter 28, "DEIS Distribution List," lists the ten public libraries which have hard copies of the DEIS available for the public, including the following locations in the study area:

Bureau of Reclamation, Northern California Area Office
16349 Shasta Dam Boulevard
Shasta Lake, CA 96019

Dunsmuir Branch Library
5714 Dunsmuir Avenue
Dunsmuir, CA 96025

Shasta County Public Library,
Redding Library
1100 Parkview Avenue
Redding, CA 96001

In addition, as described in Chapter 28, "DEIS Distribution List," over 1,530 individuals, non-governmental organization, and private interested parties received an electronic version of the DEIS in the form of a DVD.

CWC-3: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CWC-4: Due to the considerable costs of reproduction, electronic copies are provided to everyone on the mailing list. The CWC and FOTR have been added to the mailing list.

Chapter 28, "DEIS Distribution List," lists the ten public libraries which have hard copies of the DEIS available for the public, including the following locations in the study area:

Bureau of Reclamation, Northern California Area Office
16349 Shasta Dam Boulevard
Shasta Lake, CA 96019

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Redding Library
1100 Parkview Avenue
Redding, CA 96001

In addition, as described in Chapter 28, "DEIS Distribution List," over 1,530 individuals, non-governmental organization, and private interested parties received an electronic version of the DEIS in the form of a DVD.

CWC-5: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan."

CWC-6: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan."**CWC-7:** Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan."

CWC-8: Modeling results show that there are significant project benefits to anadromous fish in critical and dry years under CP4, when Chinook populations are at greatest risk. By increasing production in these years, relative to the base conditions, the risk of extirpation of listed species is greatly reduced, and therefore provides a significant benefit to the run.

While the juvenile to adult return rates for all runs but winter-run Chinook salmon run in the Sacramento River are unknown, the increase in juvenile production during critical and dry water years would increase the likelihood of increased adult returns. This shows a significant benefit of the project because these are the years in which the Chinook salmon populations, as well as steelhead, are at the greatest risk, as described by NMFS in both their Draft and Final Recovery Plans (2009 and 2014).

Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

CWC-9: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

CWC-10: Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

CWC-11: The USFWS Coordination Act Report referenced by the commenter was based on outdated CalSim-II modeling that does not include the 2008 USFWS BO and 2009 NMFS BO operation Reasonable and Prudent Alternative requirements. Additionally, USFWS does not separate the benefits that the SLWRI provides, and specifically targets, for water years in which cold water would otherwise not be available - critical and dry years - particularly when these years follow other critical, dry and/or below normal water years. Combining all water years minimizes the benefits by including years in which Shasta Lake would be operated as it would without the project.

The riparian, floodplain and side channel restoration components are not mitigation for the SLWRI, but are restoration projects. While these can be conducted without raising the dam, fish will benefit significantly

more by having restored habitat, as well as a more reliable source of cold water when cold water would otherwise not be available.

Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

CWC-12: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CWC-13: The purpose of the project, as described in Chapter 1, "Introduction," Section 1.2.1, "Project Purpose and Objectives," of the Final EIS, is to improve operational flexibility of the Delta watershed system to meet specified primary and secondary project objectives. The two primary project objectives are to (1) increase the survival of anadromous fish populations in the Sacramento River, primarily upstream from the RBPP, and (2) increase water supply and water supply reliability for agricultural, M&I, and environmental purposes, to help meet current and future water demands, with a focus on enlarging Shasta Dam and Reservoir.

Primary project objectives are those which specific alternatives are formulated to address. The two primary project objectives are considered to have coequal priority, with each pursued to the maximum practicable extent without adversely affecting the other. The most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. The existing Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability.

Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival."

CWC-14: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the best way and most efficient way to meet both primary objectives is to implement the SLWRI.

CWC-15: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CWC-16: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements," Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

CWC-17: Shasta will continue to be operated under the required guidelines, as defined in the 2009 NMFS BO that includes working with

the four Fisheries and Operation Technical Teams (including the Sacramento River Temperature Technical Group) responsible for adjusting operations to meet contractual obligations for water deliveries and to minimize adverse effects on listed anadromous fish species. These groups provide recommendations to the Water Operations Management Team (WOMT), which then considers recommendations from multiple work teams to inform changes in water operations. Also see Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

CWC-18: Mitigation Measure Bot-7 in Chapter 12, "Botanical Resources and Wetlands," requires implementation of a riverine ecosystem mitigation and adaptive management plan to avoid and compensate for the impact of altered flow regimes on riparian and wetland communities. This adaptive management plan has been described in the Final EIS. See Master Comment Response CMS-1, "EIS Mitigation Plan."

CWC-19: Mitigation Measure Bot-7 in Chapter 12, "Botanical Resources and Wetlands," requires implementation of a riverine ecosystem mitigation and adaptive management plan to avoid and compensate for the impact of altered flow regimes on riparian and wetland communities. This adaptive management plan has been described in the Final EIS. See Master Comment Response CMS-1, "EIS Mitigation Plan."

CWC-20: The discussion of fisheries impacts in Chapter 11, "Fisheries and Aquatic Ecosystems," referenced by the commenter is specific to impacts to cold water habitat. Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CWC-21: Chapter 7, "Water Quality," and the associated Water Quality Technical Report provide a comprehensive discussion of the nature and location of historic mining activities and existing features as they relate to heavy metals and other water quality constituents. Under the No-Action Alternative, the existing mine drainage issues will continue consistent with abatement efforts of land owners and managers. With the exception of an isolated area near the Bully Hill mine complex, there are no abandoned or active mines that would be subject to inundation or disturbance if the SLWRI project is implemented.

Discussion of water quality impacts on beneficial uses (e.g., cold water habitat) is provided in Chapter 7, "Water Quality," specifically Impacts WQ-3 and WQ-6. Also refer to Master Comment Response DSFISH-5 "Fish and Wildlife Coordination Act Report."

CWC-22: The NMFS Final Recovery Plan states on page 151 of Table 5.5 "Mainstem Sacramento River Recovery Actions," "Develop and implement a river flow management plan for the Sacramento River downstream from Shasta and Keswick dams that considers the effects of climate change and balances beneficial uses with the flow and water temperature" (NMFS 2014). The Recovery Plan does not provide specific minimum flow requirements, but recommends the development of a new plan, and Reclamation must, until such time as a new plan is developed, follow the requirements established under the current BO.

CWC-23: During the planning stages (development of the Plan Formulation Report), it was identified that the biggest benefits were shown to Chinook salmon came when water temperatures were lowered rather than when flows were adjusted to meet the Anadromous Fish Restoration Program flow goals. Therefore, the CP4 was developed specifically to establish a cold water pool for fish benefits. This proved, through the SALMOD results, to have the highest juvenile production.

Under CP4, the additional 378,000 acre-feet of water in storage every year will essentially act as a buffer against rising temperatures in the spring and summer, allowing for colder releases from Shasta Reservoir during critical periods when anadromous fish are most at risk. The 378,000 acre-feet of additional storage will be reserved for the cold water pool alone, and cannot be accessed to meet contract demands, regardless of water year type or contractor demand. While releasing some of this stored water to improve flow conditions may be warranted at certain times, the resulting drawdown in storage would decrease the effectiveness of the cold water pool to act as a temperature buffer. Therefore, it is important to recognize the tradeoffs between using the additional storage to improve flow conditions or to improve temperature conditions. Modeling of CP4 for the DEIS focused on maintaining cold water storage as the highest priority, rather than on modifying flows alone, because according to NMFS, one of the key risks to Chinook Salmon populations is a "prolonged drought which depletes the cold water pool in Shasta Reservoir or some related failure to manage cold water storage" (NMFS 2009).

Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions."

CWC-24: SLWRI action alternatives are anticipated to benefit anadromous fish in the Sacramento River downstream from Shasta Dam.

Please see Chapter 11, "Fisheries and Aquatic Ecosystems." Please refer to Master Comment Response ALTD-2, "Alternative Development –

Anadromous Fish Survival," and Master Comment Response ALTR-1, "Range of Alternatives – General."

CWC-25: SLWRI action alternatives are anticipated to benefit anadromous fish in the Sacramento River downstream from Shasta Dam. Please see Chapter 11, "Fisheries and Aquatic Ecosystems." Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," and Master Comment Response ALTR-1, "Range of Alternatives – General."

CWC-26: Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," and Master Comment Response ALTR-1, "Range of Alternatives – General."

CWC-27: Please refer to Master Comment Response FISHPASS-1, "Fish Passage Above Shasta Dam."

CWC-28: Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions," and Master Comment Response DSFISH-3, "Fish Habitat Restoration."

CWC-29: The purpose of the project, as described in Chapter 1, "Introduction," Section 1.2.1, "Project Purpose Objectives," of the Final EIS, is to improve operational flexibility of the Delta watershed system to meet specified primary and secondary project objectives. The two primary project objectives are to (1) increase the survival of anadromous fish populations in the Sacramento River, primarily upstream from the RBPP, and (2) increase water supply and water supply reliability for agricultural, M&I, and environmental purposes, to help meet current and future water demands, with a focus on enlarging Shasta Dam and Reservoir.

Primary project objectives are those which specific alternatives are formulated to address. The two primary project objectives are considered to have coequal priority, with each pursued to the maximum practicable extent without adversely affecting the other. The most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. The existing Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability.

Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival."

CWC-30: Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions," and Master Comment Response DSFISH-3, "Fish Habitat Restoration."

CWC-31: Please refer to Master Comment Response DSFISH-3 "Fish Habitat Restoration,"f Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program, Doubling Goals and Biological Opinions," and Master Comment Response FISHPASS-1, "Fish Passage Above Shasta Dam."

CWC-32: Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

CWC-33: A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR 1503.4). Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process. This comment will be included as part of the record and made available to decision makers before final decision on the proposed project.

CWC-34: Chapter 12, "Botanical Resources and Wetlands," and Chapter 13, "Wildlife Resources," of the Final EIS were revised to enhance the discussion of sensitive and special status species, including impacts and mitigation measures.

CWC-35: These impacts were addressed in Chapter 13, "Wildlife Resources," Section 13.3.4, "Direct and Indirect Effects," of the EIS under Impact Wild-7, "Impacts on the Purple Martin and Its Nesting Habitat includes the analysis of impacts to purple martin." The Wildlife Resources Technical Report – Attachment 3 (Breeding Bird Survey Results – Breeding Bird Surveys 2007-2014) includes information on purple martin surveys and the Wildlife Resources Technical Report has been revised for the Final EIS to enhance the discussion of purple martin and its nesting habitat. Revisions were also made to Impact Wild-7 and Mitigation Measure Wild-7 in Chapter 13 of the Final EIS.

CWC-36: Reclamation does not intend to revise the DEIS. Chapter 12, "Botanical Resources and Wetlands," and Chapter 13, "Wildlife Resources," of the Final EIS were revised to enhance the discussion of sensitive and special status species, including impacts and mitigation measures.**CWC-37:** Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CWC-38: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CWC-39: As fully described in Chapter 12, "Botany," the riverine ecosystem mitigation and adaptive management plan would, "mitigate to the extent feasible any identified impacts of an altered Sacramento River flow regime on existing riparian and wetland communities, and

associated instream, riparian, and wetland habitat values for aquatic and terrestrial special-status species along the Sacramento River from Shasta Dam to Colusa (River Mile 144)." The goals of the plan, which will also serve as performance standards, will be to result in no net reduction in the average amount of any of the following along the Sacramento River from Shasta Dam to Colusa: (1) Channel migration in selected areas of natural vegetation dominated by native species, (2) Overbank inundation of natural vegetation dominated by native species in selected areas, and (3) Regeneration of early-successional riparian vegetation (e.g., cottonwood regeneration) in selected areas. The plan will reduce impacts to riparian habitat to less than significant through modeling or monitoring at representative locations to quantify impacts, evaluating feasible modifications to the procedures for operating Shasta Dam to reduce or eliminate adverse impacts and facilitate riparian habitat establishment, and implementing mitigation actions that would expand and improve riparian habitat.

CWC-40: The analysis in the DEIS was informed by the CALFED Ecosystem Restoration Program study from March 2008.

CWC-41: Comment noted.

CWC-42: Comment noted.

CWC-43: Comment noted.

CWC-44: Comment noted.

CWC-45: Comment noted.

CWC-46: Comment noted.

CWC-47: Comment noted.

CWC-48: Comment noted.

CWC-49: Comment noted.

CWC-50: Comment noted.

CWC-51: Comment noted.

CWC-52: Comment noted.

CWC-53: Comment noted.

CWC-54: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CWC-55: The Mitigation and Adaptive Management Plan will be developed in detail if an alternative is selected and a project is authorized by Congress. The Final EIS includes additional information related to many proposed mitigation measures, see the Preliminary Environmental Commitments and Mitigation Plan Appendix.

CWC-56: Mitigation Measure Bot-7 in Chapter 12, "Botanical Resources and Wetlands," requires implementation of a riverine ecosystem mitigation and adaptive management plan to avoid and compensate for the impact of altered flow regimes on riparian and wetland communities. This adaptive management plan has been described in the Final EIS. See Master Comment Response CMS-1, "EIS Mitigation Plan."

CWC-57: As discussed in Mitigation Measure Bot-7, the plan will be consistent with and will support implementation of the Senate Bill 1086 program, and will be developed in coordination with USFWS, NMFS, CDFW, and the Sacramento River Conservation Area Forum.

CWC-58: As discussed in Mitigation Measure Bot-7, the plan will be consistent with and will support implementation of the Senate Bill 1086 program, and will be developed in coordination with USFWS, NMFS, CDFW, and the Sacramento River Conservation Area Forum.

CWC-59: Mitigation Measure Bot-7 in Chapter 12, "Botanical Resources and Wetlands," requires implementation of a riverine ecosystem mitigation and adaptive management plan to avoid and compensate for the impact of altered flow regimes on riparian and wetland communities. This adaptive management plan has been described in the Final EIS. See Master Comment Response, CMS-1 "EIS Mitigation Plan."

CWC-60: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

CWC-61: Please refer to Master Comment Response WASR-3, "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River," Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," and Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-62: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-63: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-64: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-65: Comment noted.

CWC-66: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-67: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-68: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-69: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-70: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-71: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-72: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-73: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-74: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River."

CWC-75: The impact analysis under Impact WASR-1 in Chapter 25, "Wild and Scenic River Considerations for McCloud River," Section 25.4.3, "Direct and Indirect Effects," is sufficient; this impact analysis

was developed in close coordination with USFS, in its role as a cooperating agency.

Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River."

CWC-76: Please refer to Master Comment Response WASR-3, "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River," and Master Comment Response WASR-4, "CRMP's Responsibilities to Maintain the Outstandingly Remarkable Values of the McCloud River."

CWC-77: Please refer to Master Comment Response GEN-4, "Best Available Information," Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," Master Comment Response WASR-3, "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River," and Master Comment Response WASR-4, "CRMP's Responsibilities to Maintain the Outstandingly Remarkable Values of the McCloud River."

CWC-78: Please refer to Master Comment Response WASR-3, "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River."

CWC-79: Please refer to Master Comment Response WASR-3, "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River," and Master Comment Response WASR-4, "CRMP's Responsibilities to Maintain the Outstandingly Remarkable Values of the McCloud River."

CWC-80: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

CWC-81: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," and Master Comment Response CMS-1, "EIS Mitigation Plan."

CWC-82: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

CWC-83: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

CWC-84: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-85: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-86: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

CWC-87: The affected environment and impacts sections of Chapter 17, "Land Use and Planning," of the EIS has been revised to include a discussion of Forest Service roadless areas adjacent to Shasta Lake.

CWC-88: The affected environment and impacts sections of Chapter 17, "Land Use and Planning," of the EIS has been revised to include a discussion of Forest Service roadless areas adjacent to Shasta Lake.

CWC-89: The DEIS Chapter 19, "Aesthetics and Visual Resources," describes the visual impact on scenic land values throughout the primary study area which contains the Whiskeytown -Shasta-Trinity National Recreation Area (NRA). Chapter 17, "Land Use and Planning," considers the impacts on land use within the primary study area with consideration to the impacts on the NRA.

Please refer to Master Comment Response REC-1, "Effects to Recreation at Shasta Lake."

CWC-90: Please refer to Master Comment Response REC-4, "Relocation of Recreation Facilities," Master Comment Response REC-5, "Relocation of Private Recreation Facilities onto Federal Lands," and Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

CWC-91: Please refer to Master Comment Response REC-4, "Relocation of Recreation Facilities," Master Comment Response REC-5, "Relocation of Private Recreation Facilities onto Federal Lands," and Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

CWC-92: Please refer to Master Comment Response NEPA-1 "Sufficiency of EIS."

33.10.10 EMA, Inc.

EMAI

EMAI-1

On Mon, Jul 15, 2013 at 10:51 AM, Terry R. Thomas <trthomas@emacorp.com> wrote:
Name=Terry R. Thomas
e-mail=tandmthomas@gmail.com
title=Principal
Organization=EMA, Inc.
address=2520 Snow Lane
city=Redding
state=CA
zip=96003
comments=Please add to your mailing list and provide electronic format of all documents on CD/DVD if possible

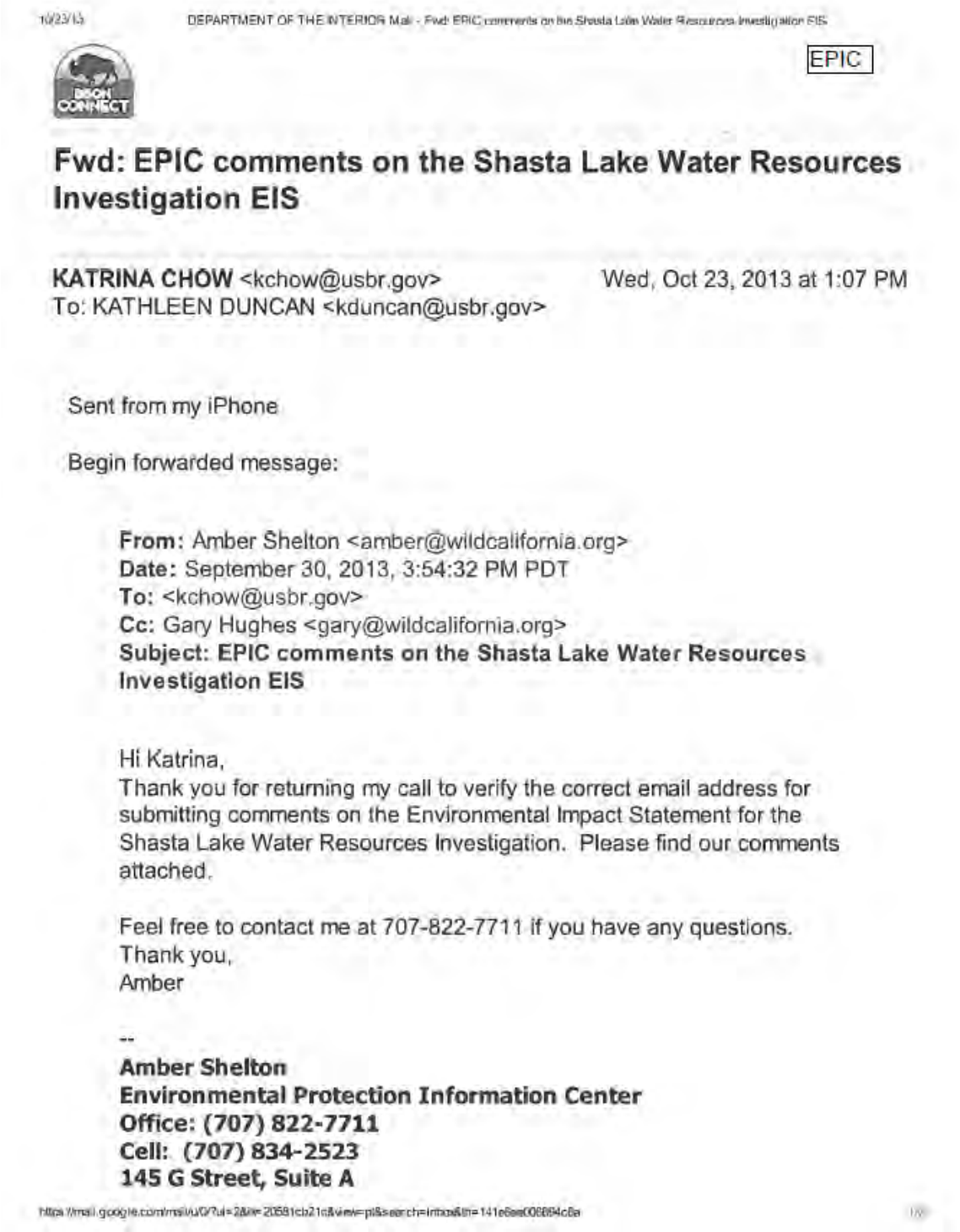
--

Terry R. Thomas, D.Env. Telephone: (530) 246-8117
Environmental Management Associates, Inc. Facsimile: (530) 246-8117
2520 Snow Lane Cell Phone: (530) 215-5351
Redding, CA 96003-3419 USA Email: trthomas@emacorp.com

Response to Comment from EMA, Inc.

EMAI-1: Please refer to Master Comment Response MAILINGLIST-1, "Addition to the Mailing List."

33.10.11 Environmental Protection Information Center



10/23/13 DEPARTMENT OF THE INTERIOR Mail - Fwd: EPIC comments on the Shasta Lake Water Resources Investigation EIS

EPIC

Fwd: EPIC comments on the Shasta Lake Water Resources Investigation EIS

KATRINA CHOW <kchow@usbr.gov> Wed, Oct 23, 2013 at 1:07 PM
To: KATHLEEN DUNCAN <kduncan@usbr.gov>

Sent from my iPhone

Begin forwarded message:

From: Amber Shelton <amber@wildcalifornia.org>
Date: September 30, 2013, 3:54:32 PM PDT
To: <kchow@usbr.gov>
Cc: Gary Hughes <gary@wildcalifornia.org>
Subject: EPIC comments on the Shasta Lake Water Resources Investigation EIS

Hi Katrina,
Thank you for returning my call to verify the correct email address for submitting comments on the Environmental Impact Statement for the Shasta Lake Water Resources Investigation. Please find our comments attached.

Feel free to contact me at 707-822-7711 if you have any questions.
Thank you,
Amber

--
Amber Shelton
Environmental Protection Information Center
Office: (707) 822-7711
Cell: (707) 834-2523
145 G Street, Suite A

https://mail.google.com/mail/u/0/?ui=2&ik=20581cb21c&view=pt&search=inbox&th=141e6ae00884c8a 1/2

Arcata, CA 95521
amber@wildcalifornia.org

EPIC_ShastaLakeWRI-EIS_FINAL.pdf
306K

epic

Keeping Northwest California wild since 1977

September 30, 2013

Katrina Chow - Project Manager
US Bureau of Reclamation
Planning Division,
2800 Cottage Way
Sacramento, CA 95825-1893
kchow@usbr.gov.us

Sent via email transmission

RE: Shasta Lake Water Resources Investigation Environmental Impact Statement

Dear Ms. Chow,

EPIC-1 The Environmental Protection Information Center (EPIC) works to protect and restore ancient forests, watersheds, coastal estuaries, and native species in Northern California. EPIC uses an integrated, science-based approach, combining public education, citizen advocacy and strategic litigation. On behalf of the 2,500 EPIC members, we respectfully request that the Bureau of Reclamation (BOR) abandon the proposal to raise the height of the Shasta Dam.

EPIC-2 The primary project objective of the Shasta Lake Water Resources Investigation is purported to be the increased survival of anadromous fish populations in the Sacramento River, but the Shasta Dam itself prevents Chinook salmon from entering cold water breeding streams that are on the other side of the dam, and the proposed action alternatives would inundate many prime fish spawning grounds. Instead of investing in a larger dam which will be counterproductive to salmon conservation objectives, the BOR should consider investing in a salmon ladder to allow

EPIC-3 the salmon to access their natural breeding habitat instead of inundating and destroying more spawning habitat.

EPIC-4 Flood damage in the Sacramento River will not be reduced by proposed action alternatives. The BOR will still only have 1.3 million acre-feet to buffer flooding, which is the same as the current capacity. The difference is that the water will be at a higher elevation. The proposed alternatives

EPIC-5 will not conserve, restore, or enhance ecosystem resources in the Shasta Lake area. Instead, it will result in "take" of many threatened and endangered plants and animals, will flood riparian areas, will facilitate more wasteful use patterns, and will result in water quality violations from

EPIC-6 construction operations. Multiple historical mining sites would be inundated and release toxics into the water. Furthermore, the proposed action alternatives will destroy existing recreational

EPIC-7

Environmental Protection Information Center
145 G Street, Suite A, Arcata, California 95521
Tel: (707) 822-7711
Fax: (707) 822-7712
www.wildcalifornia.org

EPIC RE: Shasta Lake WRI Environmental Impact Statement

EPIC-7 CONTD

opportunities and displace many established businesses and developments around Shasta Lake.

EPIC-8

Based on these findings alone, the proposed action alternatives do not meet most of the secondary project objectives, and **the EIR should therefore be reevaluated**.

EPIC-9

An additional 76,000 acre-feet of storage capacity would only provide less than 0.2% of statewide agricultural and urban water use in California. The proposed project will not satisfy the growing demand for additional water from Southern California under current use patterns. The BOR needs to consider alternatives that encourage conservation, not provide more incentives to abuse a scarce resource.

EPIC-10

The proposed action alternatives would result in significant environmental impacts to the McCloud, Pit and Sacramento Rivers. The Mcloud River, which is one of the best trout fisheries in the state, is of particular concern, because inundating significant reaches of the McCloud would destroy key fish habitat, again demonstrating that the proposed project is a threat to salmonid conservation objectives in Northern California watersheds.

EPIC-11

Furthermore, under the proposed action alternatives, the McCloud River would lose its eligibility to be listed as a Federal Wild and Scenic River, and the project would be in direct violation with the California Wild and Scenic Rivers Act, Public Resources Code, Section 5093.542, which states that "*the continued management of river resources in their existing natural condition represents the best way to protect the unique fishery of the McCloud River [and] maintaining the McCloud River in its free-flowing condition to protect its fishery is the highest and most beneficial use of the waters of the McCloud River..*"

EPIC-12

The McCloud River is also home to many sacred Native American sites belonging to the Winnemem Wintu tribe, who have already lost more than 90 percent of their lands when the Shasta Dam was constructed. The cultural considerations describing the inadequacies of this project cannot be understated. Raising the Shasta Dam would destroy 39 of their remaining sacred sites, and almost all of their remaining lands, including Children's Rock and Puberty Rock, which is used in coming-of-age ceremonies, and a burial place for victims of the Kaibai Creek Massacre. This is of significant cultural value to the already displaced Tribe, which has been seeking federal recognition for over a century.

EPIC-13

In an effort to facilitate the Shasta Dam expansion, the Westlands Irrigation District has purchased over 3,000 acres of land along the McCloud River to help the Bureau gain rights to expand the dam.Westlands has demonstrated a lack of environmental responsibility by supporting industrial agriculture techniques that depend on using high levels of pesticides, substances that eventually run off their farmlands and contaminate watercourses. Regardless of the outcome of the Shasta Dam expansion project, environmental standards should be put into place and waterways monitored for toxic runoff from adjacent farmlands to reduce cumulative impacts to water quality, aquatic habitat and wildlife. Additionally, these land-purchasing efforts should also be considered as part of the full scope and cumulative effects of the project.

EPIC-14

The Bureau of Reclamation is not providing the public with information that describes how the Shasta Dam raising project is related to other statewide water infrastructure projects that are connected with the intention of sending water from Northern California to Southern California.

2

EPIC RE: Shasta Lake WRI Environmental Impact Statement

EPIC-14 CONTD: Of particular concern is the proposal by California Governor Jerry Brown and the State of California, along with the Bureau of Reclamation, to build the Twin Tunnels Project that would construct two large tunnels in order to divert large amounts of water to supply corporate agricultural farms and fracking operations in the Southern region of the state, at the expense of California taxpayers.

EPIC-15: The National Environmental Policy Act requires that cumulative impacts from the related projects should be evaluated, considered and disclosed to the general public. The current Draft Environmental Impact Statement does not reflect this mandatory process and is therefore inadequate. The EIR must be revised to show the full scope of the project and the cumulative impacts relating to the multiple related projects.

EPIC-16: According to the BOR, the current infrastructure capacity is only being utilized about once every three years. Increased storage capacity will not achieve the project objectives or goals and will not create additional water.

EPIC-17: In fact, the dam raise will result in evaporation and loss of water.

EPIC-18: A brutal fact is that the water supply has been over-allocated. There is not enough water to satisfy the demands of Southern California and central valley demands, and still meet the needs of river ecosystems and Northern California residents.

EPIC-19: Current drought conditions are expected to worsen with the effects of global warming.

EPIC-20: The BOR needs to focus efforts on conservation, restoration, and climate change adaptation instead of investing in antiquated infrastructure projects.

EPIC-21: Freshwater ecosystems are the most endangered ecosystem type on the planet, and a growing body of science has determined that dams are one of the largest threats to these ecosystems, and the human communities that depend on them. The proposal to raise the Shasta dam goes against the best available science relating to conservation of the freshwater river ecosystems that the proposed project would affect.

EPIC-22: In summary, the Environmental Impact Statement is inadequate, and should be withdrawn. This costly, unnecessary development would cause more environmental, cultural and economic problems than it would solve, benefiting few farmers at the cost of California taxpayers, Northern California residents, and indigenous communities.

Please consider the above comments and make an educated decision to withdraw the proposal to raise the height of the Shasta Dam.

Respectfully,

Amber Shelton
Online Organizer and Program Assistant

Gary Graham Hughes
Executive Director

Responses to Comments from Environmental Protection Information Center

EPIC-1: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

EPIC-2: Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," and Master Comment Response ALTR-1, "Range of Alternatives – General."

EPIC-3: Please refer to Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," and Master Comment Response FISHPASS-1, "Fish Passage Above Shasta Dam."

EPIC-4: Please refer to Master Comment Response FM-6, "Effects to Downstream Flooding."

EPIC-5: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

EPIC-6: The EIS, Chapter 7, "Water Quality," includes a discussion of heavy metals and the associated impacts. Mitigation measures have been developed to ensure that the one known site (Bully Hill area) will be addressed. In addition Chapter 2, "Alternatives," of the EIS includes a comprehensive list of environmental commitments, including preparation of a Storm Water Pollution Prevention Plan to ensure compliance with relevant water quality requirements.

EPIC-7: Please refer to Master Comment Response REC-1, "Effects to Recreation at Shasta Lake," and Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

EPIC-8: Reclamation is unaware of where the language referenced is used in the EIS.

Please refer to Master Comment Response ALTR-1, "Range of Alternatives – General."

EPIC-9: As described in EIS Chapter 2, "Alternatives," and summarized in Table 2-24, "Summary of Major Benefits of Action Alternatives," under the various action alternatives total storage increases by 256,000 acre-feet (6.5 foot raise), 443,000 (12.5 foot raise), or 634,000 acre-feet (18.5 foot raise).

Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability," and Master Comment Response WSR-8, "Action Alternatives Don't Meet All Water Demands."

EPIC-10: Chapter 11, "Fisheries and Aquatic Ecosystems," of the EIS has been revised to include additional information on impacts to tributaries to Shasta Lake, including the Sacramento River and McCloud River upstream from Shasta Lake. Under CP3, about 2,189 feet of the

Upper Sacramento River would be subject to inundation. Under CP3, about 3,550 feet of the McCloud River would be subject to inundation.

While the commenter suggest that the DEIS discloses significant environmental impacts to the McCloud, Pit and Sacramento Rivers, this statement is incorrect with respect to the Pit River.

Chapter 25, "Wild and Scenic River Considerations for McCloud River," of the EIS discloses the impacts to the McCloud River and the relevant outstandingly remarkable values (e.g., wild trout fishery).

The commenter suggests that the SLWRI is a "threat to salmonid conservation objectives in Northern California watersheds." This statement is inconsistent with one of the primary objectives of the SLWRI – Increase the survival of anadromous fish populations in the Sacramento River.

EPIC-11: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

EPIC-12: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-2, "Federal Recognition."

EPIC-13: Please refer to Master Comment Response GEN-2, "Unsubstantiated Information," Master Comment Response GEN-4, "Best Available Information," and Master Comment Response GEN-7, "Rules and Regulations for Water Operations under Action Alternatives."

EPIC-14: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," and Master Comment Response FRACK-1, "Water Supply Used for Fracking."

EPIC-15: Please refer to Master Comment Response NEPA-1, "Sufficiency of the EIS," and Master Comment Response NEPA-2 "Cumulative Impacts."

EPIC-16: Please refer to Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir."

EPIC-17: Please refer to Master Comment Response RE-1, "Reservoir Evaporation."

EPIC-18: Please refer to Master Comment Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits."

EPIC-19: The important issue is the severity of future drought conditions. Please refer to Figures 3-120 through 3-122 in the Climate Change Modeling Appendix where it is shows that an enlarged Shasta can potentially mitigate the severity of future droughts.

Please refer to Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations."

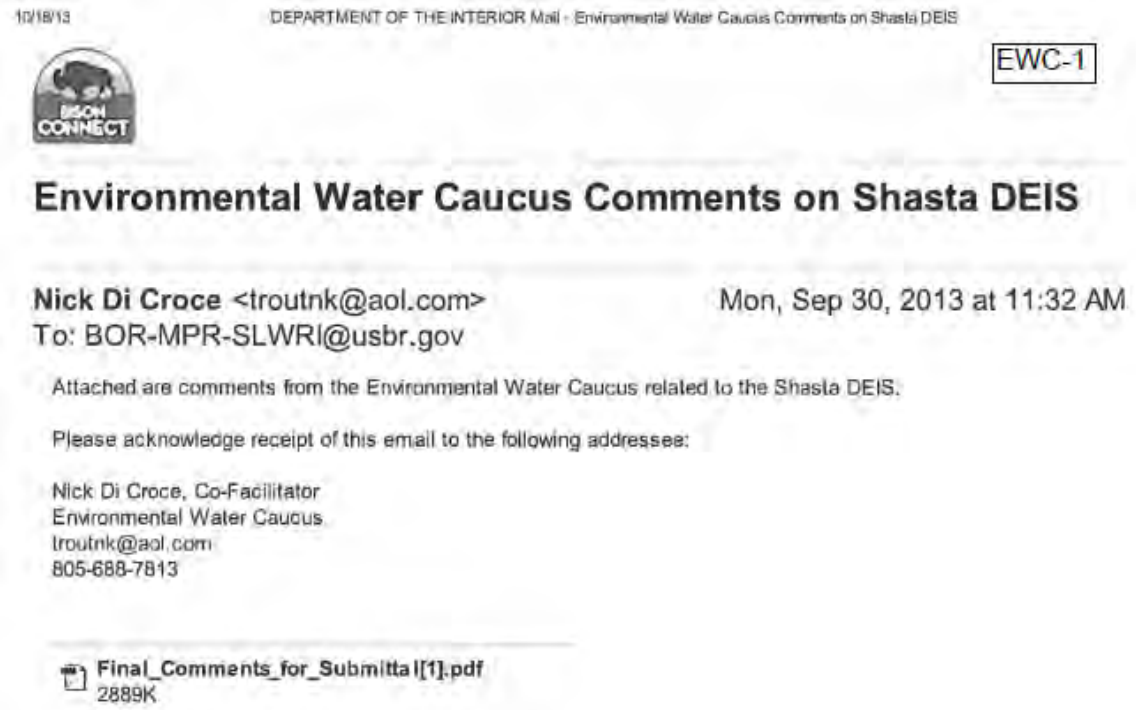
EPIC-20: Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development – Anadromous Fish Survival," and Master Comment Response ALTR-1, "Range of Alternatives – General."

EPIC-21: Please refer to Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts," and Master Comment Response GEN-4, "Best Available Information."

EPIC-22: The potential environmental consequences of the project alternatives as they relate to cultural resources, agriculture and important farmland and cultural resources are discussed in Chapter 14 "Cultural Resources," Chapter 10, "Agriculture and Important Farmland," and Chapter 24, "Environmental Justice."

Please refer to Master Comment Response NEPA-1, "Sufficiency of the EIS," and Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

33.10.12 Environmental Water Caucus



10/18/13 DEPARTMENT OF THE INTERIOR Mail - Environmental Water Caucus Comments on Shasta DEIS

EWC-1

Environmental Water Caucus Comments on Shasta DEIS

Nick Di Croce <troutnk@aol.com> Mon, Sep 30, 2013 at 11:32 AM
To: BOR-MPR-SLWRI@usbr.gov

Attached are comments from the Environmental Water Caucus related to the Shasta DEIS.

Please acknowledge receipt of this email to the following addressee:

Nick Di Croce, Co-Facilitator
Environmental Water Caucus
troutnk@aol.com
805-688-7813

Final_Comments_for_Submittal[1].pdf
2889K

ENVIRONMENTAL WATER CAUCUS RESPONSE LETTER TO THE U.S. BUREAU OF RECLAMATION FOR THE SHASTA LAKE WATER RESOURCES INVESTIGATION DEIS SEPTEMBER 30, 2013


Foothill
Conservancy


Butte Environmental Council
Protecting Butte County's Land, Air & Water Since 1975


CA Save Our Streams Council
Lower Sherman Island Duck Hunters Association


California
Water
Research


citizens
water watch
of Northern California


Santa Clarita Organization for Planning and the Environment (SCOPE)


Desal
Response
Group


food&waterwatch


SIERRA NEVADA ALLIANCE


CALIF. STRIPED
BASS ASSOC.


earth
LAW CENTER


epic
wildcalifornia.org


Institute for
Fisheries Resources
Unite. Protect. Restore


NORTHERN
CALIFORNIA COUNCIL
FEDERATION OF
FLY FISHERS


The Fish Sniffer

September 30, 2013

Katrina Chow, Project Manager
Shasta Lake Water Resources Investigation
United States Department of the Interior
Bureau of Reclamation, Mid-Pacific Region
2800 Cottage Way, MP-700
Sacramento, CA 95825

By email to: BOR-MPR-SLWRI@usbr.gov

Subject: Comments on Draft Environmental Impact Statement dated June 2013

The Environmental Water Caucus is submitting the following comments based on a review of the SLWRI DEIS.

EWC-1 We find the project a waste of public money, providing little additional water yield for an exorbitant price tag and which would be a travesty for American taxpayers.

EWC-2 In addition, the beneficial effect on salmon populations is illusionary

EWC-3 and amounts to an attempt to shift the cost burden to the public instead of having the real beneficiaries pay for their water supply.

EWC-4 In short, the project is a fraud and should be abandoned.

EWC-5 A recent Interior Department Inspector General Report found that under current repayment contractual terms, CVP agricultural service contractors would never pay off their debt for construction of the CVP. Approximately 52% of the CVP debt has been repaid with a remaining amount of $674 million.

EWC-6 If the entire $1.1 billion cost of enlarging Shasta Dam 18.5 feet were properly allocated to CVP customers instead of the taxpayers for illusory salmon benefits, this project would more than double the remaining repayment obligations of the CVP for a mere 88,000 acre-feet of additional CVP firm yield.

EWC-7 The stated purpose of enlarging Shasta Dam is to meet the two primary project objectives of increased survival of Sacramento River anadromous fish populations and to increase

3

EWC-7 CONTD water supply reliability for CVP agricultural, M&I, and environmental purposes. However, preferred alternative CP-4 and the other alternatives are fundamentally flawed in that they will not increase survival of anadromous fish in any substantial way, especially given the cost and the plethora of other viable projects recommended by the fishery agencies but not evaluated by Reclamation. Enlargement of Shasta Dam is not mentioned as one of over a thousand recommendations from the National Marine

EWC-8 Fisheries Service in the Draft Central Valley Salmon Recovery Plan. The proposed project is based on inflated and illusory benefits for natural salmon production in the

EWC-9 Sacramento River, as described in the attached comments, and cannot be justified as proposed.

EWC-10 The claimed benefits to salmon allow two thirds of the billion dollar project cost to be shifted to taxpayers and not the true beneficiaries – the CVP water contractors. The clear favorite and most "cost effective" Alternative CP- 4 is projected to produce 813,000

EWC-11 salmon smolts, which at a return rate of .13% will result in 1,057 adult salmon annually at a cost to the taxpayers of $654.9 million! That cost is a clear demonstration of the absurdity of undertaking this project.

Furthermore, Enlarging Shasta Reservoir by raising the dam from 6.5 to 18.5 feet will flood public lands managed by the Forest Service, encompassing segments of the upper Sacramento, McCloud, and Pit Rivers, Salt Creek, and several small tributary streams,

EWC-12 triggers several requirements and mandates in the National Wild & Scenic Rivers Act. Although the DEIS attempts to address Wild & Scenic River issues in Chapter 25, it fails to recognize the actual requirements of the Act and the true implications of the reservoir enlargement in regard to previous Forest Service studies and commitments made in the

EWC-13 1994 Shasta-Trinity National Forests Plan. Nor does the DEIS adequately address the impacts of reservoir enlargement and the legal implications of violating the California Public Resources Code.

The raising of Shasta Dam is a threat to the very existence of the Winnemem Wintu Tribe and the ability to bring back the salmon and a way of life that the Creator gave to the Tribe. The Winnemem Wintu's efforts are about preserving a beautiful natural world,

EWC-14 with abundant salmon, clean water, and ecologically healthy and diverse forests, that has been and continues to be flooded, logged, cut up by roads, mined, subdivided, sold, and destroyed acre by precious acre. The raising of Shasta Dam would, again, bring great harm to the World as the Winnemem Wintu know it. The DEIS fails to assess and acknowledge the full scope of the devastating and irreparable impacts this Project would have on the Winnemem Wintu Tribe.

EWC-15 Additionally, we find the following major issues that are explained in detail in the attached comments letter:

- Realistic and much more cost effective alternatives to meet the primary objectives

4

EWC-15 CONTD

are not considered or fully evaluated.

EWC-16

- Substantial funding for water conservation and recycling, retirement of drainage-problem lands, reoperation of Shasta Dam and Reservoir, and a host of projects recommended by the public and U.S. Fish and Wildlife Service were either not considered or rejected due to Reclamation's bias toward justifying an enlarged Shasta Dam.

EWC-17

- Failure to disclose the relationship between the SLWRI and BDCP and to accomplish an adequate cumulative impact analysis.

EWC-18

- Failure to provide information on water rights for use by the SWRCB.

EWC-19

- Failure to perform an adequate Benefit-Cost Analysis without inflated fishery benefits which would show a negative benefit value for the project.

EWC-20

- Failure to disclose the Bureau's petitions to the State Water Resources Control Board to extend the deadlines for compliance with water rights permits and for licensing of the water rights of the Central Valley Project.

EWC-21

- Failure to disclose the effects of the San Joaquin and Sacramento River outflows.

EWC-22

- Failure to disclose the Bureau's water transfer program (from north of Delta sellers to south of Delta contractors) and its reliance upon groundwater substitution by water right-holding transferors.

EWC-23

We request that you abandon this ill-conceived project and save the dollars, the environmental damage, and the affront to Native American interests that this project would generate if pursued by the Bureau of Reclamation.

David Nesmith
Co-Facilitator

Rick DeCrow
Co-Facilitator

5

EWC SPECIFIC COMMENTS ON SLWRI DEIS

Purpose and Need

Our organizations believe that it is egregiously wasteful of public taxpayer funds and other scarce resources including water by investing in the raising of Shasta Dam.

EWC-24

The proposed project for enlarging Shasta Dam has two primary project objectives: 1. To increase survival of Sacramento River anadromous fish populations, and; 2. To increase water supply reliability for CVP agricultural, M&I, and environmental purposes. These objectives appear to be merely acceptable pretenses for creating more storage capacity that would be used by the Bureau of Reclamation to try to meet Central Valley Project water service contract obligations. By its own numbers, the project will spend large sums of taxpayer funds to increase deliveries by only very small amounts. This makes the project's supply yield extremely expensive. Compared to other supply investments that could be made with these funds, this project is expensive and wasteful.

EWC-25

Figures 1 and 2 below document the quandary of chronic shortfalls in deliveries to contractors of California's state and federal water systems. In 1960, the California Department of Water Resources (DWR) announced its approach to the Delta and to providing additional imported water supplies. The Department announced then that the Delta had about an average of 3 million acre-feet annually available for export to state and federal water contractors of the San Joaquin Valley and southern California. This amount would hold until about 1981, according to DWR, by which it planned to build reservoirs on North Coast rivers like the Mad, the Van Duzen, the Eel, and the Trinity. About 5 million acre-feet was thought to come from those reservoirs for export to the Sacramento Valley to increase flows to the "Delta pool." From that "pool," surplus water could, DWR argued, be safely exported from the Delta.

EWC-26

Only the Trinity River Division of the CVP was completed. The other streams are now designated as wild and scenic and development of their flows for diversion has long been off the table.

Figure 1 below summarizes CVP south of Delta deliveries between 1985 and 2010. This chart also presents a line at the top that represents 3,488,246 acre-feet, the total amount of "annual entitlements" reported in the Bureau's Draft Hydrology, Hydraulics, and Water Management Technical Report.[1] There is a substantial gap between the amounts that

[1] US Bureau of Reclamation, Hydrology, Hydraulics, and Water Management Technical Report, Shasta Lake Water Resources Investigation, California, June 2013, Table 1-25, pp. 1-35 through 1-37

represent deliveries to contractors during this period and the original "annual entitlements" claimed by the parties to the CVP water service contracts. The average difference between contract "entitlements" and actual deliveries south of the Delta exceeds 1.119 million acre-feet per year.

EWC-26
CONTD

Figure 1. Source: US Bureau of Reclamation delivery data from the Central Valley Projects Operations Office online.

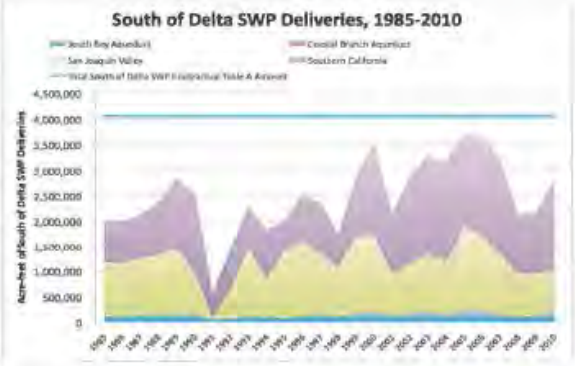


Figure 2. Source: California Department of Water Resources, Bulletin 132, various years.

Figure 2 summarizes State Water Project south of Delta deliveries between 1985 and 2010. This chart, similar to Figure 1, presents a line at the top that represents 4,056,205 acre-feet, the total Table A amounts in State Water Project contracts for deliveries south of the Delta. Here too there is a substantial gap between the amounts that represent deliveries to contractors during this period and the original "Table A" amounts claimed

7

EWC-26 CONTD

by the parties to State Water Project contracts. The average difference between total Table A amounts for south of Delta contractors and their actual deliveries exceeds 1.593 million acre-feet.

EWC-27

In addition, the California Water Impact Network has shown that total consumptive water rights claims for the Sacramento and Trinity River basins exceed annual average unimpaired flows by a factor of 5.6 acre-feet of claims per acre-foot of flow.[2] A similar ratio occurs in the San Joaquin River Basin. In order to meet Delta water quality standards, temperature control and flow needs of fish upstream, the paramount rights of the San Joaquin River Exchange Contractors south of the Delta, and in-basin entitlements of Sacramento Valley water rights holders, water in storage at Shasta is stretched thin at best, and is deficient of supply at worst.

EWC-28

While Shasta Lake is a federally-owned and operated facility, long-standing agreements for coordinated operations of both the state and federal projects, as well as for "joint point of diversion" by both projects' south Delta pumping plants, mean that operationally Shasta is used to help the State Water Project serve its customers. This is why it is relevant to include discussion of State Water Project contractor delivery performance. These coordinated operations are also reflected in the DEIS's discussion of impacts affecting both projects from raising Shasta Dam and enlarging Shasta Lake.

EWC-29

After 40 years of operation for the State Water Project and over 70 years of south of Delta exports for the Central Valley Project, the Bureau and DWR still have not fulfilled their contracts. Nor would any member groups of the Environmental Water Caucus want them to develop the North Coast rivers to enable these contracts to be fulfilled. Combined, the state and federal projects fail to meet on average about 2.7 million acre-feet of paper water every year; in dry or drought years, this figure increases dramatically.

Therefore, the most important purpose of the enlargement of Shasta Lake is to increase water deliveries to Central Valley Project customers south of the Delta. But this project does a poor job of that, as our comments indicate.

The Proposed Project Will Not Help Fish

EWC-30

However, the favored alternative CP-4 and the other alternatives are fundamentally

[2] Stroshane,T., *Testimony on Water Availability Analysis for Trinity, Sacramento, and San Joaquin River Basins Tributary to the Bay-Delta Estuary*, Submitted by the California Water Impact Network on behalf of California Sportfishing Protection Alliance, and AquAlliance on October 26, 2012, for Workshop #3: Analytic Tools for Evaluating Water Supply, Hydrodynamic, and Hydropower Effects of the Bay-Delta Plan. Accessible online at http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/docs/comments111312/tim_stroshane.pdf

EWC-27 CONTD

EWC-30 CONTD flawed in that they will not increase survival of anadromous fish in any substantial way, especially given the cost and the plethora of viable projects recommended by the fishery agencies that do not involve dam enlargement.

EWC-31 Numerous realistic and much more cost effective alternatives to meet the primary objectives to increase survival of Sacramento River anadromous fish populations and to increase water supply reliability for CVP agricultural, M&I, and environmental purposes are not considered or fully evaluated. Substantial funding for water conservation and recycling, retirement of drainage-problem lands, reoperation of Shasta Dam and Reservoir, and a host of projects recommended by the public and U.S. Fish and Wildlife Service were either not considered or rejected due to Reclamation's bias toward enlarging Shasta Dam.

EWC-32 Additionally, the alleged benefits to the anadromous salmon fish populations downstream of Keswick Dam from higher cold water carryover storage on October 1 are not enforceable. Nowhere in the document does Reclamation commit that the additional water stored for salmon will be under the control of the National Marine Fisheries Service, the California Department of Fish and Wildlife and/or the California State Water Resources Control Board.

EWC-33 Based on past experience, the modeling in the DEIS will not resemble actual operations and the additional storage will simply be used to provide larger water allocations for CVP contractors during any given year.

Shasta Dam Enlargement is Not a Salmon Recovery Action

EWC-34 The DEIS and Feasibility Study have both found that Alternative CP-4, raising Shasta Dam 18.5' and dedicating 378,000 of the additional storage to the cold water pool, is the most cost effective alternative.

EWC-35 While no environmentally-preferred alternative has been selected, it is clear that Reclamation supports CP-4 as the best justification for the project because putting two thirds of the costs on the taxpayers makes the project appear economically justifiable even though it is not.

EWC-36 However, enlarging Shasta Dam is not part of any plan for recovery of Sacramento River salmon. The concept of raising Shasta Dam for salmon benefits is not mentioned anywhere in any plans by the National Marine Fisheries Service, the U.S. Fish and Wildlife Service nor the California Department of Fish and Wildlife. In particular, NMFS' most recent draft Recovery Plan[3] for Sacramento River salmon does not include Shasta Dam enlargement.

EWC-37 The U.S. Fish and Wildlife Service (USFWS) has stated in its draft Fish and Wildlife Coordination Act Report (FWCAR) that: "*In about 90% of the years, there would be no*

EWC-36 CONTD [3] http://swr.nmfs.noaa.gov/recovery/centralvalleyplan.htm

benefit to anadromous fish survival." USFWS goes on to state that temperature-related mortality is only about 9% and that "*Predominate* (sic) *sources of mortality were due to superimposition, habitat constraints, the flushing or dewatering of redds, and entrainment in unscreened diversions. Restoration opportunities that could assist in reducing these causes of mortality have been removed from further consideration, raising the prospect that those species could suffer further declines or, at a minimum, gain no benefit.*"

EWC-37 CONTD

The Draft USFWS FWCAR stated that only Alternative CP-4 provided any fishery benefits, yet Reclamation continued to fully analyze other alternatives with phony salmon production benefits as if they would meet one of the primary goals of increasing survival of Sacramento River anadromous fish populations. All the while Reclamation rejected numerous suggestions from the USFWS to evaluate more viable activities to meet that primary goal of increased salmon survival that do not include enlarging Shasta Dam. USFWS clearly discouraged Reclamation from pursuing a dam enlargement-only list of alternatives and made a strong case[4] that numerous other options will better meet fishery restoration goals for the Sacramento River that are consistent with both the CALFED Record of Decision and the Central Valley Project Improvement Act Anadromous Fishery Restoration Program (CVPIA AFRP).

EWC-38

The USFWS points out that the so-called "benefits" of this project to salmon are largely inconsequential and include only one of many life history impacts to juvenile salmon in the Sacramento River, especially given the huge cost.

EWC-39

Furthermore, there is no enforcement mechanism mentioned anywhere in the large volume of documents about how any cold water pool reserved for salmon under any alternative would be actually reserved for salmon. USFWS also describes the problem in the FWCAR.[5] The description of CP-4 says quite clearly that CVP operational needs will take priority over the cold water for salmon (page 2-49):

EWC-40

"*The adaptive management plan may include operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, as long as there are no conflicts with current operational guidelines or adverse impact on water supply.*"

Reclamation makes no mention about including any terms and conditions in its water permits or Biological Opinions that would require reservation of the additional cold water

EWC-38 CONTD

[4] USFWS Draft FWCAR for SLWRI, pages v -viii.

EWC-40 CONTD

[5] Draft USFWS FWCAR for SLWRE, p vi:
"*Clarify whether and quantify the extent that the cold water pool (378,000 af) in CP4 would be used to augment flows to provide additional benefits for fish and wildlife species. Specify the authority for those augmented flows, and identify if those flows would be at the discretion of the Service, National Oceanic and Atmospheric Association, National Marine Fisheries Service (NOAA Fisheries); and California Department of Fish and Game (CDFG).*"

pool for salmon. It will simply become a larger pool of water for delivery in any water year. There is nothing in the DEIS or any of the planning documents to ensure that October 1 carryover storage in Shasta Lake will be any different than the No Action Alternative.

EWC-40 CONTD

It is clear from past experience that the fisheries benefits and modeling performed for this document will have no basis in reality if the project is built because there is no enforcement mechanism to ensure cold water is actually reserved for salmon. The additional storage would simply be provided to CVP water contractors as additional supply during any given year where additional water is stored. The reservoir would therefore have greater fluctuations during wetter years when additional water can be captured from the Dam enlargement and greater impacts than identified to recreation and other resources.

EWC-41

For instance, if extra water is stored in Shasta Lake from early in the season, but it ends up being a dry year, how would Reclamation ensure that San Joaquin Exchange Contractors and Sacramento River Water Right Contractors with priority water contracts would not obtain the cold water reserved for salmon?

EWC-42

This project is therefore, a sham foisted once again upon the taxpayers of the United States to have them pay for the dam enlargement while the beneficiaries do not pay their share. The allocation of $654.9 million in costs (Feasibility Report Table 5.2) on the public because of supposed fishery benefits is a hoax.

EWC-43

The USFWS has indicated that there are a lot of other projects, costing a lot less that would do much more for salmon survival, for example:

EWC-44

"The restoration of spawning and rearing habitat, improving fish passage, increasing minimum flows, and screening water diversions would likely result in greater increases in anadromous fish survival during the 91 percent of the years when temperature is not a limiting factor as well as address the secondary objective of Ecosystem Restoration." [6]

There is also a distinct possibility that Reclamation will operate an enlarged Shasta Dam to store more water in fall because there would be decreased likelihood of subsequent flood control spills. Reduction of fall flows in the Sacramento River below Keswick Dam would further impact fall run and late fall run Chinook spawning and incubation as well as dewater redds. Modeled operations are not the same as actual operations.

EWC-45

EWC-46

In summary, calling enlargement of Shasta Dam a project to increase Sacramento River salmon is simply a dishonest effort to economically justify the project. The problem is that it cannot be justified based on increasing salmon survival and therefore the overall

EWC-47

[6] USFWS FWCAR SLWRI, p. v

EWC-44 CONTD

EWC-47 CONTD

economic justification for enlarging Shasta Dam is not valid either.

Study Area Should Include Trinity River and Lower Klamath River

EWC-48

The Study area only includes the Trinity River above Lewiston Dam. Because the Trinity and Shasta Divisions of the CVP are integrated, the study area should include the Lower Klamath and Trinity rivers. Operations at Shasta Dam directly and indirectly affect the Trinity and Lower Klamath rivers as well as the Hoopa Valley and Yurok tribes which have federally reserved fishing rights held in trust by the Interior Department. The 2013 Flow Augmentation from Trinity and Lewiston dams into the Lower Klamath River is an example of how the two projects are integrated. In December 2012 and January 2013, Trinity River "spills" were redirected to the Sacramento River in lieu of Shasta Dam releases. An enlarged Shasta Lake may reduce Safety of Dams spills from Lewiston Dam into the Trinity River. Operations at Shasta Dam cannot be separated from Trinity River Division operations and should be fully analyzed.

Alternatives Do Not Meet One Primary Purpose – Salmon Survival

EWC-49

The two primary project objectives are to increase survival of Sacramento River anadromous fish populations and to increase water supply reliability for CVP agricultural, M&I, and environmental purposes, with an emphasis on enlarging Shasta Dam. Increasing survival of salmon by enlarging Shasta Dam is like fitting a square peg into a round hole and is not a reasonable justification for the project.

EWC-50

It is very telling that the National Marine Fisheries Service, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife and the CVPIA Anadromous Fisheries Restoration Program have identified over a thousand projects to increase salmon survival in the Sacramento River, yet none of those recommendations includes raising Shasta Dam for that purpose. On the other hand, the USFWS and others have suggested a variety of other projects to increase salmon survival, yet few were fully analyzed and incorporated into the various alternatives.

EWC-51

For instance, an alternative to retire drainage problem lands in the San Luis Unit of the CVP was never considered as a viable alternative to increase water supply reliability and improve salmon survival. Retirement of nearly 300,000 acres of drainage problem land in the San Luis Unit was analyzed in Reclamation's 2007 Final Environmental Impact Statement evaluation and Record of Decision for the San Luis Drainage Feature Re-evaluation (SLDFR). The CVP Least Cost Yield Increase Plan[7] identified that land fallowing was a "least cost" method of increasing CVP firm yield that could increase supplies by up to 1.2 million AF. Land fallowing could also be used to increase reservoir

EWC-51 CONTD

[7] See http://www.usbr.gov/mp/cvpia/docs_reports/docs/least_cost_cvp_yield_increase_plan.pdf

cold water storage for salmon.

EWC-51 CONTD

Reducing CVP demand by buying out agricultural lands with drainage problems has long been advocated by the California Environmental Water Caucus in our "California Water Solutions Now" and the "Responsible Exports Plan."[8] The National Economic Development Act analysis contained in the SLDFR Final EIS showed that only through land retirement could net economic benefits be realized for the San Luis Unit.[9] All other alternatives to continue irrigated agriculture were net losses to the United States economy.

EWC-52

According to the USFWS's FWCAR, only one alternative, CP-4, would provide any benefits to Sacramento River salmon. However, Reclamation analyzed four other alternatives; not one actually meets one of two primary project objectives, except to the extent that they provide minor benefits and minimal spending (compared to dam enlargement) on Sacramento River spawning gravel replenishment and other minor habitat enhancements.

Conversely, USFWS provided Reclamation with an extensive list of alternatives to enhance salmon survival and habitat without raising Shasta Dam, most of which were rejected.

EWC-53

USFWS Draft FWCAR (p 22):

> *"The Service believes that Reclamation should evaluate among the SLWRI alternatives the capability of improving flow and temperature conditions for anadromous fish in the Sacramento River between Keswick Dam and RBDD without raising Shasta Dam. This could be accomplished through operational changes at Shasta Dam combined with modifications to the TCD."*

EWC-54

As stated previously, none of the alternatives analyzed would provide actual salmon benefits because there is no enforcement mechanism to ensure that the additional cold water storage would actually be dedicated to salmon. No authority is given to fishery and regulatory agencies to determine use of the cold water pool reserved for salmon. Existing contractual commitments to senior CVP water contractors, including but not limited to Sacramento River Water Rights Contractors and San Joaquin River Exchange Contractors would have a priority over use of the additional storage, regardless of how Reclamation analyzes use of the additional cold water in this DEIS. Pressure would continue for Reclamation to provide increased water allocations to other CVP contractors because of increased available storage.

EWC-51 CONTD

[8] See http://www.ewccalifornia.org/home/index.php

[9] See Appendix N for Final EIS for San Luis Drainage Feature Re-evaluation, Table N-1-, p N-17, accessed at http://www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=2240

EWC-55

It is clear that the alternatives analyzed by Reclamation were a series of straw men to make enlargement of Shasta Dam under CP-4 appear cost effective at meeting primary project objectives by using phony benefits to salmon. The real costs fall upon the taxpayers and the salmon will not benefit to any substantial extent. Therefore, Reclamation should select the No Action Alternative as the most cost effective and environmentally preferred alternative.

Impacts Of Reservoir Enlargement On Potential Wild & Scenic Rivers

EWC-56

Enlarging Shasta Reservoir by raising the dam from 6.5 to 18.5 feet will flood public lands managed by the Forest Service encompassing segments of the upper Sacramento, McCloud, and Pit Rivers, Salt Creek, and several small tributary streams triggers several requirements and mandates in the National Wild & Scenic Rivers Act. Although the DEIS attempts to address Wild & Scenic River issues in Chapter 25, it fails to recognize the actual requirements of the Act and the true implications of the reservoir enlargement in regard to previous Forest Service studies and commitments made in the 1994 Shasta-Trinity National Forests Plan. Nor does the DEIS adequately address the impacts of reservoir enlargement and the legal implications of violating the California Public Resources Code.

EWC-57

The National Wild & Scenic Rivers Act requires consideration by all federal agencies of federal Wild & Scenic River protection for the McCloud, upper Sacramento, and Pit Rivers, and other reservoir tributaries as an alternative to the federal proposal to raise the dam and expand the reservoir.

Section 5(d)(1) of the National Wild & Scenic Rivers Act states:

"*In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic, and recreational river areas, and all river basin and project plan reports submitted to the Congress shall consider and discuss any such potentials. The Secretary of the Interior and the Secretary of Agriculture shall make specific studies and investigations to determine which additional wild, scenic, and recreational river areas within the United States shall be evaluated in planning reports by all Federal agencies as potential alternative uses of the water and related land resources involved.*"

This section of federal law clearly requires the Bureau of Reclamation to go beyond the simple reporting of past state and federal considerations of Wild & Scenic protection for the river segments affected by the SLWRI. It specifically requires consideration of Wild & Scenic protection in the context of and as an alternative to the proposed dam raise and reservoir enlargement, not only for the McCloud, but also for the upper Sacramento and Pit Rivers, and all other streams on public lands tributary to Shasta Reservoir. No such

EWC-57 CONTD

comprehensive assessment of Wild & Scenic Rivers is provided in the DEIS.

EWC-58

The Bureau should work with the Forest Service to include in a revised DEIS a comprehensive assessment specifically addressing the impacts of the dam raise and reservoir enlargement on the free flowing character and outstanding values of all rivers and streams tributary to the reservoir and include a range of alternatives that proposes Wild & Scenic protection with and without various reservoir enlargement alternatives.

For example, the Forest Service in the 1994 Shasta-Trinity National Forests Draft Plan found the upper Sacramento River from Box Canyon Dam to the Whiskeytown-Shasta-Trinity National Recreation Area to be eligible for federal protection, but the agency did not recommend it because of land ownership patterns along the river. But the river was also not actively threatened by reservoir expansion at that time. The Wild & Scenic Rivers Act requires the Forest Service and the Bureau to revisit potential Wild & Scenic protection of the upper Sacramento River in the context of the project outlined in the revised DEIS, as well as for other rivers and streams that may be affected by reservoir expansion.

EWC-59

The Bureau of Reclamation has previously recognized the clear mandate of the National Wild & Scenic Rivers Act to consider and evaluate potential Wild & Scenic Rivers as potential alternative uses to water and related land resources in the planning for water development. As part of its planning and study of the Auburn Dam project on the North and Middle Forks of the American River, the Bureau convened a multi-agency interdisciplinary team that determined segments of the river that would be flooded by the dam proposal to be eligible for Wild & Scenic protection in 1993 (letter dated March 17, 1993 from Susan E. Hoffman, Division of Planning and Technical Services Chief, U.S. Bureau of Reclamation Mid-Pacific Region). The study to determine if the eligible segments were suitable for designation was scheduled for Phase II and III of the American River Water Resources Investigation. This part of the study was never completed because soon after the eligibility finding, Congress rejected authorization of the Auburn Dam project.

The National Wild & Scenic Rivers Act requires consideration of federal Wild & Scenic River protection for the segments of the lower Sacramento River with significant federal lands downstream of Shasta Dam as an alternative to the federal proposal to raise the dam and expand the reservoir.

EWC-60

The lower Sacramento River between Anderson and Colusa has several segments with substantial federal public lands managed by the Bureau of Land Management (the Sacramento River Bend Area) and the U.S. Fish and Wildlife service (USFWS). Because the Shasta Dam raise and reservoir expansion will significantly modify flows through these segments and the DEIS notes that flow modification from the dam raise may have potentially significant impacts on the river's riparian and aquatic ecosystems and fish and

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EWC-60 CONTD

wildlife, the project triggers the section 5(d)(1) requirement that the federal segments of the lower river be studied and considered for potential federal protection as an alternative to the proposed water resources project. It should be noted that the BLM has already determined a 20-mile segment of the Sacramento River between Balls Ferry and Red Bluff to be eligible for federal protection. The revised DEIS should include Wild & Scenic studies of all the federal segments of the lower river.

EWC-61

The DEIS admits that all alternatives to raise the Shasta Dam and expand its reservoir will adversely affect the McCloud River's eligibility as a National Wild & Scenic River and will specifically harm the river's free flowing character, water quality, and outstandingly remarkable values.

In Chapter 25, the DEIS documents that raising Shasta Day by 6.5-18.5 feet will flood from 1,470 feet to 3,550 feet of the segment of the McCloud River eligible for National Wild & Scenic River protection. The DEIS also admits that this flooding will adversely affect the McCloud's free flowing character, water quality, and outstandingly remarkable Native American cultural, wild trout fishery, and scenic values.

EWC-62

The Environmental Water Caucus believes that even more of the eligible segment of the McCloud River will be harmed by all of the dam raise alternatives because the Bureau incorrectly identifies elevation 1,070 feet as the terminus of the McCloud segment identified by the Forest Service. In fact, the terminus of the eligible McCloud segment is simply defined by the Forest Service as "Shasta Lake". (LRMP FEIS, Appendix pgs. E-4, E-13) The Forest Service's map depicting the eligible segment of the McCloud shows that eligible segment ends at the McCloud River Bridge (FEIS Appendix E pg. 3-36). There is no mention of elevation 1,070 as the terminus of the eligible segment nor is there any reference in the LRMP to the McCloud's so called "transition reach". Hence, the impact of the dam raise and reservoir expansion is larger than documented in the DEIS.

EWC-63

Flooding the McCloud River violates the 1995 Shasta-Trinity National Forests Land and Resource Management Plan and Record of Decision in regard to protecting the McCloud River's eligibility as a potential National Wild & Scenic River.

The Forest Service recommended Wild & Scenic River protection for the McCloud River in its 1990 draft of the Shasta-Trinity National Forests Land and Resource Management Plan (LRMP). In response to concerns of river-side landowners, the Forest Service chose to pursue protection of the McCloud River's free flowing character and outstandingly remarkable values through a Coordinated Resource Management Plan (CRMP) developed by the Forest Service and other federal and state agencies and the riverside landowners. This decision is reflected in the 1995 final Shasta-Trinity National Forests LRMP and Record of Decision (ROD), which states:

"A Coordinated Resource Management Plan (CRMP) has been adopted for long

term management of the Lower and Upper McCloud River and Squaw Valley Creek. This agreement is between private land owners, the Forest Service, Pacific Gas & Electric, Nature Conservancy, CalTrout, and the DFG. This plan will effectively maintain the outstandingly remarkable values of this potential wild and scenic river. If for any reason the terms of the CRMP are not followed and the wild and scenic river eligibility is threatened, the Forest Service will recommend these segments for Federal Wild and Scenic designation." (1995 Final LRMP, page 3-23)

EWC-63 CONTD

"*If, after a period of good faith effort at implementation, the CRMP fails to protect the values which render the river suitable for designation then the Forest Service will consider recommendation to the national Wild and Scenic River System.*" (1995 ROD page 17)

EWC-64

The DEIS admits that raising the dam will periodically flood 1,470 feet of the eligible segment of the McCloud River, which would make the flooded segment ineligible for federal Wild & Scenic protection. (DEIS pg. 25-26) The EWC and its members believe that more of the eligible river would be flooded (see discussion below about the actual terminus of the eligible McCloud). Regardless, it is clear that the Bureau's proposal to raise Shasta Dam and expand its reservoir directly violates the intent of the CRMP and constitutes failure of the CRMP, and it also violates the protective management proposed in the LRMP. Therefore, the Forest Service is bound by its own ROD to consider and recommend federal protection for the river. This requirement is not reflected in the DEIS and it should be included in the revised DEIS.

EWC-65

EWC-66

The Bureau is misleading the public when it claims that raising the dam and expanding the reservoir will not conflict with the Shasta-Trinity National Forests LRMP because the portion of the McCloud that would be flooded is private land and not National Forest land. The Forest Service has the authority to study and recommend the river within its reservation boundary, as it did so in the 1990 draft LRMP. It has the authority to determine that expanding the reservoir and flooding an eligible segment of the McCloud reflect a de-facto failure of the CRMP and therefore triggers Forest Service reconsideration of its Wild & Scenic River recommendation for the McCloud. This important protection is a fundamental component of the LRMP, which means that the Bureau's proposal violates the LRMP.

EWC-67

All dam raise/reservoir enlargement alternatives violate the California Public Resources Code 5093.542 prohibiting the construction of a reservoir that would harm the McCloud's free flowing condition and extraordinary wild trout fishery upstream of the McCloud River Bridge.

In 1989, the California Legislature passed and the Governor signed legislation declaring that the McCloud River possesses extraordinary resources, including one the of the finest

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wild trout fisheries in the state, and that continued management of river resources in their existing natural condition represents the best way to protect the unique fishery of the McCloud, and that maintaining the McCloud in its free-flowing condition to protect its fishery is the highest and most beneficial use of the waters of the river.

EWC-67 CONTD

The legislation specifically prohibited any dam, reservoir, diversion, or other water impoundment on the McCloud River upstream of the McCloud River Bridge. It also prohibited any state agency cooperation, participation, or support for any dam, reservoir, diversion, or other water impoundment facility that could have an adverse effect on the free flowing condition of the McCloud River or on its wild trout fishery. These prohibitions and conditions are now memorialized in the California Public Resources Code (PRC) 5093.542.

EWC-68

The DEIS admits that all dam raise alternatives will have a significant unmitigated impact on the McCloud's free flowing condition and will have a potentially significant impact on the river's wild trout fishery (DEIS pg. 25-40). The DEIS suggests that the wild trout fishery impacts could be mitigated to less than significant levels but these mitigations remain to be determined.

EWC-69

Regardless, all the dam alternatives in the DEIS clearly violate state law. This has been recognized by the California Legislature and the Governor, which passed and signed water bond legislation prohibiting use of the bond funds to raise Shasta Dam.

SLWRI Environmental Justice, And American Indian Cultural Resources

EWC-70

We sing to the water. We sing to the fish.
We have done so since life began.
Pay attention to our ways.
You might just learn how
to save yourselves
from yours.

– Chief Caleen Sisk, Winnemem Wintu

EWC-71

The rights and interests of low-income communities, people of color communities, and Native American tribes, at times all one-in-the-same, must not be sacrificed wholesale at the mantle of corporate profit and unsustainable practices.

EWC-72

Environmental justice began as an idea, a reaction to a pattern of placing environmental burdens and negative land uses disproportionately in low-income, people of color communities that, through an era of formal racial apartheid, had been set up as sacrifice zones to be used for whatever purpose was most expedient to those who wielded greater power in the political system. Environmental justice became a social movement – a

movement of, for, and by the People – to challenge the status quo and assert the rights of all communities to a clean and healthy environment and self-determination. Notwithstanding that the finest principles to be born out of the Environmental Justice movement have not been wholly incorporated into the rule of law, using the regulatory framework that does exist, the DEIS rightly identifies a host of impacts to low-income, people of color communities, most especially Native American communities, for which there is no mitigating. (See Table 24-2 at 24-29.)

EWC-72 CONTD

Environmental justice dictates the right of every person to live, work, and play in a safe, healthy, and sustainable environment. Environmental justice demands that low-income, people of color and tribal communities participate as equal players in decisions that affect their local environment and health

However, in the context of Native American communities, most especially the Winnemem Wintu tribe, the concept of environmental justice is not wholly adequate to capture the insidious character of the loss that raising the Shasta Dam, in any of its proposed manifestations, would impose.(See 14-11: 6-14 [acknowledging the potential, permanent loss of at least an estimated 155 village sites ancestral to the Winnemem Wintu].) What is proposed here is something much deeper and we must call it out for what it is, for it harkens back to one of the most odious episodes in our Nation's history, marked by Native American dispossession and genocide as European settlers made their way Westward, often accompanied, if not preceded, by the U.S. military.

EWC-73

EWC-74

The Winnemem Wintu

The Winnemem Wintu Tribe is an historic, non-gaming Native California Tribe. The Winnemem Wintu's traditional territory includes the east side of the upper Sacramento River watershed, the McCloud River and Squaw Creek watersheds, and approximately 20 miles of the Pit River from the confluence of the McCloud River, Squaw Creek and Pit River up to Big Bend. Salmon, which have been eliminated upstream of the Shasta Dam since its construction, are an essential component of Winnemem Wintu culture and, once a staple food, remain an important source of protein, when accessible. Although 90 percent of the Winnemem Wintu's traditional lands are now submerged under the McCloud Reservoir and Shasta Reservoir, and salmon no longer breed upstream of Shasta Dam, the Winnemem Wintu Tribe have continuously maintained their spiritual, cultural, and traditional connection to their remaining accessible traditional tribal lands and waters.

EWC-75

In the years following statehood for California, the Winnemem Wintu lands were appropriated for resource exploitation. The Winnemem Wintu people omitted as a Federal recognition tribe, lack the economic infrastructure to address the extreme poverty that affects many of their members, and live with high unemployment, inadequate access to education and health care, and a host of other social problems. The ability of the

EWC-76

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EWC-76 CONTD

Winnemem Wintu Tribe to maintain cultural distinctiveness and cohesion is impacted adversely by their lack of access to tribal territory and lack of Federal recognition and would be impacted further still by losing access to their ceremonial grounds and sacred pools.

EWC-77

In 1851, the federal government and representatives from the Winnemem Wintu Tribe and other California Indian tribes signed the Treaty at Cottonwood Creek, ceding vast tribal lands to the federal government in exchange for reservation land, food, and clothing. Though this treaty was never ratified by the United States Senate, the federal government considered the land ceded, and began granting land, mineral, and resource rights to private parties in the Winnemem Wintu's historical homeland with no compensation to the Winnemem Wintu. Eventually, some of the Winnemem Wintu received Indian allotments that allowed them to remain on the McCloud River and other traditional sites. However, the majority of habitable allotments were flooded when Reclamation constructed Shasta Dam.

EWC-78

In 1941, Congress passed 55 Stat. 612, which gave the United States the right to take title to all tribal lands needed for the Central Valley Project and related infrastructure. The Act also promised that the Indians would be paid "just and equitable compensation" for the land taken, and that the sites of any "relocated cemeteries shall be held in trust by the United States for the appropriate tribe, or family." 55 Stat. 612 §§ 2, 4.

EWC-79

The Winnemem Wintu people were never provided "just and equitable compensation" for the United States government's massive appropriation of land for Shasta Reservoir. Even the Winnemem Wintu's sacred gravesites were violated. Reclamation moved approximately 183 Winnemem Wintu graves within a short two months from the impact area of the Shasta Dam to a new site, styled the "Shasta Reservoir Indian Cemetery," and violated 55 Stat. 612 by failing to hold this site in trust for the Winnemem Wintu. Since the Winnemem Wintu were never compensated for their land allotments that were taken by the government and flooded by the Shasta Dam, the Winnemem Wintu still own that land. Reclamation cannot proceed with any plans that would enlarge the Shasta reservoir without first settling the ownership of the land already flooded.

EWC-80

Due in large part to Reclamation's repeated violation of 55 Stat. 612, the Department of the Interior failed to include the Winnemem Wintu when the Department published its list of "federally recognized" tribes in 1978. In 2008, the California Legislature passed Assembly Joint Resolution 39, which urges Congress to restore federal recognition to the Winnemem Wintu, but Congress has failed to act on this request. Adding insult to injury, Reclamation cited the Winnemem Wintu's lack of federal recognition as a tribe to justify Reclamation's exclusion of the Winnemem Wintu from Reclamation's decision-making process, notwithstanding that Reclamation's proposal to raise Shasta Dam would have a disproportionate and devastating effect on the Winnemem Wintu, again.

EWC-81 The federal government's repeated uncompensated takings of Winnemem Wintu lands and destruction of their primary staple – the McCloud River's salmon – coupled with its unconscionable efforts to stymie the participation in the decision making process, demonstrates this injustice.

EWC-82 For the Winnemem Wintu, the raising of Shasta Dam is not just an intellectual issue of water allocation that affects farmers in the Valley or housing development in the South. Nor is it simply the power struggle between private development and public agencies charged with protecting public trust resources including fish, wildlife, and recreation. Instead, the raising of Shasta Dam is a threat to the very existence of the Winnemem Wintu Tribe and the ability to bring back the salmon and a way of life that the Creator gave to the Tribe. The Winnemem Wintu's efforts are about preserving a beautiful natural world, with abundant salmon, clean water, and ecologically healthy and diverse forests, that has been and continues to be flooded, logged, cut up by roads, mined, subdivided, sold, and destroyed acre by precious acre.

EWC-83 The raising of Shasta Dam would, again, bring great harm to the World as the Winnemem Wintu know it. The DEIS fails to assess and acknowledge the full scope of the devastating and irreparable impacts this Project would have on the Winnemem Wintu Tribe.

Indigenous Peoples' Rights Demand An End To The Shasta Lake Dam Raise

The United Nations' Declaration on the Rights of Indigenous Peoples (Declaration) recognizes and affirms the rights of indigenous peoples to their cultural, religious, and spiritual practices, to have private access to sacred sites (Arts. 12(1), 11(1)), as well as to maintain and strengthen their spiritual relationship with their traditionally held lands, territories, waters and coastal seas and other resources (Art. 25). With the Declaration, Native peoples have rights acknowledged by the international community of nations, including rights to sacred places both within existing reservation or territorial boundaries and beyond.

EWC-84 The United Nations Declaration on the Rights of Indigenous Peoples ("Declaration of Indigenous Rights") affirms that indigenous communities have the right to participate in the development or use of their traditional territories and resources.[10] Although the Declaration of Indigenous Rights is not binding on Reclamation, since it was nearly unanimously endorsed, it represents customary international law. It mandates that Reclamation and other government agencies cooperate in good faith with the Winnemem

[10]*See generally* U.N. Declaration on the Rights of Indigenous Peoples, G.A. Res. 61/295, art. 3, U.N. GAOR, 61st Sess., 107th plen. mtg., U.N. Doc. A/RES/61/295 (Sept. 13, 2007). Although the United States voted no, all but four of the U.N. member states voted in 2007 to support the Declaration of Indigenous Rights. In 2010, the State Department announced "support" for the Declaration of Indigenous Rights, but that support was qualified, as the United States proposed a different definition of "free, prior informed consent" than that laid out in the Declaration. *See* Announcement of U.S. Support for the United Nations Declaration of the Rights of Indigenous Peoples, *available at* http://www.state.gov/documents/organization/153223.pdf

EWC-84 CONTD

Wintu and other First Peoples. The Declaration further states that all indigenous peoples have a right to self-determination (art. 3), a right to their lands and natural resources (art. 26), a right to the conservation and protection of their environment (art. 29), and the right to maintain, develop, and participate in decisions regarding development on their lands (arts. 20, 23). It also mandates that countries obtain the "free and informed consent" of indigenous communities prior to approving any project that will affect that community's territory or resources. (See Declaration of Indigenous Rights, art. 32.) Reclamation should consider these factors and abide by these principles in its decision making process.

Impacts To Irreplaceable Cultural Resources Should Prevent Any Proposal To Raise Shasta Dam

EWC-85

Were the Shasta Dam raised to any of the heights currently under consideration, such a move would submerge the historic and present-day cultural and ceremonial land of the Winnemem Wintu Tribe. This would be yet another manifestation of discrimination against the Winnemem Wintu people; it would further displace the Winnemem Wintu people and place still more and, possibly, insurmountable obstacles in the way of the Winnemem Wintu people's spiritual and cultural practices, and, properly characterized, would be part and parcel of the cultural genocide perpetrated against the California Tribal population that claims the area now inundated by Shasta Lake as a result of the construction of Shasta Dam, of which the Winnemem Wintu people are part.

EWC-86

The Winnemem Wintu *must* have continued access to their historic communal sites for cultural and spiritual practices because their culture is inextricably tied to the land and waters; sites cannot simply be moved or replaced.[11] What is considered "abiotic" by the Western world is deeply and vibrantly alive for the Winnemem Wintu. Over many millennia, community members have developed intimate relationships with particular stones, mountains, meadows, and pools along the McCloud River that hold benevolent healing spirits.

EWC-87

Although 90 percent of the Winnemem Wintu's traditional lands are now submerged under Shasta Lake Reservoir, the Winnemem Wintu have continuously maintained their spiritual and cultural connections to their remaining unsubmerged lands. Ceremonial, medicinal and social activities linked to specific Winnemem Wintu sacred sites include the blessing and healing of sexually and physically abused women, training and initiation of traditional medicine people, the SudiSawal traditional hydrotherapy purification ceremony, the Blessing of the Hands ceremony, introduction of children to the spiritual worlds at Children's Rock, traditional place-specific baptism of Winnemem babies, traditional marriage ceremonies, fasting rituals, the Coming of Age ceremony for young women, the initiation rites for young men, the blessing of the acorn caps for young

EWC-86 CONTD

[11]Declaration of Indigenous Rights art. 25 recognizes the right of indigenous peoples "to maintain and strengthen their distinctive spiritual relationship" with their traditional territories.

EWC-87 CONTD

women, the traditional Spring Dekas ceremony, the ceremonial burial of babies' placentas and of hair during times of mourning, the traditional practice of gathering medicinal teas, foods and cooking materials at places of great sentiment and long-standing tradition, pilgrimages to sacred prayer rocks, the transmission of Coyote Stories from generation to generation and the visitation of ancestral dwelling places, burial grounds and massacre sites. These cultural practices form the foundation of the Winnemem Wintu's identity as a distinct people, and are anchored to the earth in specific places that will be affected by the proposed dam enlargement.

EWC-88

The DEIS mentions potential impacts to cultural resources, but Reclamation does not actually place much importance on protecting the Winnemem Wintu culture. Reclamation seems to think that the disproportionate adverse effects the dam raise would have on the Winnemem Wintu and their cultural resources are justified by benefits that will accrue *elsewhere*. This contemplated sacrifice of the Winnemem's culture for the benefits claimed for others is shocking in its disdain for the Winnemem Wintu community. The Reclamation fails to acknowledge that there is nowhere else in the world where Winnemem Wintu can learn to be Winnemem Wintu. The Winnemem Wintu have a right to sustainable traditional food sources and a right to practice their culture in their traditional territory. Reclamation must rectify its failure to address the

EWC-89

potential destruction of most of the Winnemem Wintu's remaining cultural sites by evaluating alternatives and mitigation measures that would prevent such losses, not one of which is identified in the DEIS.

What BOR is doing by ignoring the Winnemem Wintu's concerns and destruction of culture is the very definition of cultural genocide and environmental injustice.

EWC-90

Conclusion for SLWRI Environmental Justice, And American Indian Cultural Resources

In summary, raising the Shasta Dam is unconscionable because doing so would render the indigenous Winnemem Wintu tribes' sacred ceremonial land inaccessible, thereby, furthering the cultural genocide proscribed by international legal norms and our modern-day sense of what is moral and just and right.

Rare and Endangered Species

EWC-91

The No Action Alternative is the only alternative that protects existing habitat for a larger variety of rare, endemic, threatened, and endangered species. All of the action alternatives will cause significant impact to the limited remaining habitat for rare, threatened, endangered, and endemic species and their habitats.

For instance, the endemic Shasta Salamander, a California threatened species and an USFS sensitive and Survey and Manage species, only breeds in limestone caves, some of which will be within the inundation zone.

The Shasta Snow-Wreath, an endemic species that only has 21 occurrences, will lose 9 sites within the new inundation zone (43% of known occurrences). No amount of mitigation can make up for that lost habitat that exists only in that place on this planet Earth.

EWC-91 CONTD

The USFWS' FWCAR, (p. 176) summed it up succinctly as follows:

"The SLWRI would inundate the limited habitat of 8 rare species (e.g., Shasta snow-wreath, Shasta salamander, Shasta sideband snail, Wintu sideband snail, Shasta chaparral snail, Shasta hesperian snail, Shasta huckleberry, and western purple martin) 7 of which are endemic to the vicinity of Shasta Lake. Additional habitat would be disturbed by the relocation of campgrounds, roads, bridges, and facilities beyond the Inundation Zone. Thus, the raising of Shasta Dam and implementation of the SLWRI would result in the loss, degradation, and fragmentation of habitat and as a result, may require further evaluation by the Service of the factors threatening these 8 species pursuant to section 4 of the ESA. Additionally, the reduction in winter flows with the raising of Shasta Dam would result in adverse effects to riparian habitat along the Sacramento River and to sensitive aquatic species in the Delta."

Acid Mine Drainage/Water Quality

In addition to destroying limited remaining habitat for a number of species including California Fully Protected Species such as ringtail and rough sculpin, the inundation zone includes acid mine tailings with toxic levels of metals (zinc, cadmium, copper and lead) and other contaminants that will further expose remaining sensitive populations and water supplies to pollution.

EWC-92

USFWS FWCAR (p. 25):

"The raising of Shasta Dam could further exacerbate loading of acid mine drainage into Shasta Lake by inundating or elevating the water table near other abandoned mines and mine tailings. The inundation could increase the rate of loading of copper, cadmium, zinc, and mercury into the water column. During a site visit at Shasta Lake, acid mine drainage with a pH of 2 was observed near the Bully Hill Mine within the Inundation Zone of the SLWRI (P. Uncapher, NSR, pers. comm. 2007). Further loading of acid mine drainage and mercury into Shasta Lake would result in greater increases in toxic cadmium, copper, zinc, and mercury in fish and invertebrates in the lake. These toxic elements would then bioaccumulate within sensitive wildlife raptor species such as the

bald eagle and osprey that prey on fish in Shasta Lake. Shasta Lake has the highest concentration of breeding bald eagles in California and should be protected from the adverse affects of acid mine drainage."

EWC-92 CONTD

"The increased loading of cadmium, copper, zinc, and mercury in Shasta Lake could then be transferred downstream through Keswick Dam and into the only known spawning habitat for the endangered winter-run Chinook salmon (Moyle 2002). Of even greater concern is the potential effect that raising Shasta Dam could have on the ability of Keswick Reservoir to dilute acid mine drainage and mercury from the Iron Mountain Mine Superfund site (D. Welsh, Service, pers. comm. 2007). The dilution of acid mine drainage in Keswick Reservoir is essential to preserving vitally important spawning habitat downstream from Keswick Dam. Changes in the operation of Shasta Dam and Keswick Dam in the SLWRI could result in the release of cadmium, copper, zinc, and mercury from sediments in Keswick Reservoir into the water column and the transport of these toxic elements downstream into the Sacramento River (Finlayson et al. 2000; D. Welsh, Service, pers. comm. 2007). Increased levels of these toxic elements in the Sacramento River would be transported downstream into the Southern California water supply and into the Delta which is already impaired by high concentrations of mercury and other toxic heavy metals."

EWC-93

Considering that the benefits to the environment from enlarging Shasta Dam are weak at best, destruction of additional habitat for endemic, rare, threatened, and endangered species and degradation of water quality with toxic metals is not justified. Reclamation should select the No Action Alternative.

Central Valley Project Repayment

EWC-94

The economic justification for this project is based on unrealistic repayment assumptions, especially for CVP agricultural service contractors such as the Westlands Water District, which holds one of the largest single CVP water contracts. A recent Interior Department Inspector General Report found that under current repayment contractual terms, Westlands and other CVP agricultural service contractors would never pay off their debt for construction of the CVP.[12]

"We found that USBR's water rate setting policies do not ensure that an appropriate share of capital costs and prior-year funding deficits are repaid annually. Water deliveries to the CVP contractors have been highly variable from year to year. When

[12] Central Valley Project, California: Repayment Status and Payoff, Report No.: WR-EV-BOR-0003-2012. U.S. Department of Interior Inspector General, March 2013. http://www.doi.gov/oig/reports/upload/WR-EV-BOR-0003-2012Public.pdf

EWC-94 CONTD

actual water deliveries are less than projected deliveries, revenues are insufficient to recover the Federal investment in the project. When actual water deliveries exceed projected deliveries, however, existing contract provisions stipulate that excess revenues collected by USBR must be refunded to the contractors. As a result, USBR has not demonstrated steady progress toward recovery of Federal investments in the CVP."

EWC-95

The assumptions and conclusions that CVP agricultural service contractors will pay off their share of enlarging Shasta Dam is but one more fiction in this economically infeasible project. Increasing the debt of CVP water contractors to pay for a portion of this project is putting good money after bad- it will never be repaid.

EWC-96

The No Action Alternative will involve the smallest cost to society and should be selected as the Environmentally Preferred Alternative.

Presently, CVP water contractors lag on repaying the costs of existing CVP facilities, according to a March 2013 review by the US Department of the Interior, Office of Inspector General (IG).[13] The IG found:

- The current rate-setting process contributes to repayment uncertainty.[14]
- Contract provisions limit repayment of project costs.[15]
- By 2030, when CVP capital facilities are required by Congress to be paid off, repayment could be short by between $330 million to $390 million.[16]
- Municipal and industrial contractors face an annual operating and maintenance deficit of about $55 million annually by 2030 as well.[17]

EWC-97

- Power customers "will pay any costs above the irrigation contractors' ability to pay," meaning that when irrigation revenues fail to cover costs (such as when actual deliveries are less than projected deliveries), revenues from power sales within the CVP are used to reduce or eliminate those deficits.[18]

Table 1 summarizes the change in status of San Joaquin Valley water contractors repaying their allocated share of project costs. A 2008 study for the Delta Vision Blue Ribbon Task Force found that nearly $1.3 billion is owed by CVP contractors for the capital facilities

[12]Ibid.

[14]DOI, CVP Repayment Status, p. 4.

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[16]Ibid., p. 5.

[17]Ibid., pp. 6-7.

[18]Ibid., p. 7

26

of the project. Of this amount, San Joaquin Valley and Sacramento contractors have together repaid about 21.5 percent of this cost.

Table 1
San Joaquin Valley Central Valley Project Repayment
Change in Status
2008 to 2013 ($Millions)

Year	Allocated Capital Cost to Repay	Repayments as of 9/30/2006 and 9/30/2011	Cumulative Capital Relief	Net Capital Costs (i.e., remaining to be repaid)	Percent of Costs Repaid
(columns)	A	B	C	D = (A - B - C)	E = (B/A * 100)
Irrigation Contractor Totals					
2008	$955	$185	$1	$769	19.4%
2013	$1,004	$485	$2	$518	48.3%
Municipal & Industrial Contractor Totals					
2008	$38	$10	$0	$28	26.3%
2013	$92	$63	$0	$30	67.7%
San Joaquin Valley Totals					
2008	$993	$195	$1	$797	19.6%
2013	$1,096	$547	$2	$548	49.9%
Grand Totals, CVP					
2008	$1,285	$277	$33	$975	21.5%
2013	$1,323	$602	$47	$674	48.3%

Sources: Entrix, Inc., *Overview on Central Valley Project Financing, Cost Allocation, and Repayment Issues*, provided to the Delta Vision Blue Ribbon Task Force, September 18, 2008, Table 4, p. 17. Accessible online 15 July 2013 at http://deltavision.ca.gov/ConsultantReports/CVP_Financing_and_Repayment_Summary_9-18-08.pdf; US Department of Interior, Bureau of Reclamation, Mid-Pacific Region Office, "Schedule of Construction Costs Allocation by Contractor," Schedule A-2Bb, December 2012.

EWC-97
CONTD

Table 1 reveals a shifting picture of CVP cost repayment by the contractors. Just five years ago, San Joaquin Valley irrigation contractors had repaid just 19.4 percent of their allocated costs of $955 million, but within five years, Bureau accounting records indicate that collectively they have now repaid nearly half of their project costs (48.3 percent)

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even though their allocated capital costs rose to just over $1 billion. The surge in repayments was led by Friant-Kern and Madera Canal-area contractors, neither of who would benefit directly from Shasta Dam raise supplies.

By contrast, CVP irrigation contractors on the west side of the San Joaquin Valley continue to lag on repayment of their allocated CVP costs. The irrigators of the Delta-Mendota Canal and Pool units, the San Luis unit (both Fresno and Tracy), and the Cross Valley Canal in Kern County all have repaid less than 27 percent of allocated project costs, though facilities like the Delta Mendota Canal and the San Luis Canal have existed since the 1950s and 1960s. This appears to be the case despite the fact that irrigation contractors with these CVP units by law pay no interest on their contracts (while municipal and industrial contractors do).

EWC-97 CONTD

Along the San Luis Canal where Westlands Water District is the primary irrigation contractor, just 22.7 percent of the nearly $460 million in allocated capital costs for the Canal unit have been repaid, leaving about 77 percent that must be repaid by 2030 under congressional repayment requirements, now just 18 years away. This amounts to about $355 million, or about $20 million per year between now and 2030.

Mitigation

Under the National Environmental Policy Act, mitigation is required to be identified, but it is not required to be implemented. For instance the Trinity River Mainstem Fishery Restoration EIS/EIR and Record of Decision (Interior 2000) identified that increased drawdown of Trinity Lake would require mitigation in the form of extended boat ramps. However, despite the best efforts of Trinity Lake recreational users and residents, no boat ramps have ever been extended, nor are there plans to implement any such projects. Mitigation from Reclamation is a hollow promise.

EWC-98

Therefore, another part of this project is phantom mitigation- impacts that are identified and promises to mitigate those impacts are the same as the promises made to the Winnemem Wintu for federal recognition and compensation for loss of land below the existing inundation zone.

EWC-99

Recreation

All of the alternatives involve relocation of key recreational facilities. In the case of CP-4, it will involve modifying or replacing 9 marinas, 6 public boat ramps, 6 resorts, 328 campsites/day-use sites/RV sites, 2 USFS facilities, 11.6 miles of trail, and 2

EWC-100

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EWC-100 CONTD

trailheads.

EWC-101

The DEIS concludes that by relocating those facilities, impacts will be insignificant. However, the conclusion is based on an assumption that the annual fluctuation in the reservoir will remain the same, with higher minimum and maximum levels, on average.

EWC-102

The assumption of a similar drawdown rate cannot be supported because there is no mechanism to ensure that water reserved in the reservoir for salmon or other purposes will remain there. Existing contractual commitments to senior CVP water contractors, including but not limited to Sacramento River Water Rights Contractors and San Joaquin River Exchange Contractors would have a priority over use of the additional storage, regardless of how Reclamation analyzes use of the additional cold water in this DEIS.

EWC-103

Pressure would continue for Reclamation to provide increased water allocations to other CVP contractors because of increased available storage.

EWC-104

Therefore, the relocation of a significant portion of Shasta Lake's recreational facilities to higher ground will cause significant impacts because of increased fluctuation in reservoir levels.

EWC-105

Additionally, the disruption from relocation of numerous key facilities and the period during construction and transition will result in decreased visitor days and decreased recreational benefits that could last for years.

EWC-106

Reclamation should select the No Action Alternative as the most cost effective and least damaging to recreation. There are no recreational benefits from enlarging Shasta Dam.

Shasta/BDCP Operations

EWC-107

The Shasta Dam Draft EIS fails to provide any analysis of the proposed project's relationship to the Delta Tunnels project. While the Draft EIS, in Chapter 3, Table 3-1, lists the Bay Delta Conservation Plan as one of many "qualitative assessment actions related to water/natural resource management and restoration" in its cumulative impacts analysis, the Delta Tunnels project should be analyzed as part of the "quantitative" projects in the list. For one thing, the Bay Delta Conservation Plan (BDCP) process has invested in countless modeling exercises that look at many quantitative variables. BDCP's Conservation Measure 1 also contains quantitative water quality and flow parameters for modeling its performance under a wide variety of circumstances.

EWC-108

This omission is crucial, because together the Shasta Raise project along with the Delta Tunnels project explains the main purpose and need for the Shasta Raise project. Together, their most important impacts may be on the Delta and on the effort to improve water supply reliability of the Central Valley Project and the State Water Project.

EWC-109

The Delta Tunnels project would have three 3,000 cfs intakes along the Sacramento River in the north Delta between the communities of Courtland and Hood that would deliver better-quality (lower salinity) Sacramento River into two 40 foot-diameter tunnels that would extend 35 miles directly to the Banks Pumping Plant where these flows would be lifted into the California Aqueduct, or via intertie (or via Joint Point of Diversion operations) to the Delta Mendota Canal for south of Delta delivery. In short, the Delta Tunnels project would add a new point of diversion in the Delta to the State Water Project's Banks Pumping Plant. BDCP documents make clear that the Delta Tunnels project would be owned and operated as part of the State Water Project. When there is capacity in the Tunnels, however, BDCP documents state DWR's intention that the Bureau could have DWR "wheel" water deliveries to its CVP contractors through the Tunnels.

EWC-110

The Hydrology, Hydraulics, and Water Management chapter makes no mention of this possibility. The Bureau should clearly analyze in this Draft EIS the "hydraulics" and "water management" impacts of the interrelationship of the Shasta Dam Raise and the Delta Tunnels projects. Shasta Dam operations govern a majority of the flows that occur in the Sacramento River Basin (along with Oroville and Folsom dams); the Delta Tunnels would divert water from the Sacramento for export.

EWC-111

If the Bureau intends to avoid incorporating the Delta Tunnels project from its cumulative impact analysis for improved salmon performance and water supply reliability, then the agency should state its reasons for omitting such a logical and timely analysis.

California Environmental Quality Act Jurisdiction

Our organizations recognize that the Draft EIS states that "This document has been prepared in accordance with the California Environmental Quality (CEQA) and could be used by State of California (State) permitting agencies that would be involved in reviewing and approving the project."

EWC-112

The DEIS mentions in Chapter 2 and in other "subject" chapters how NEPA requirements differ from CEQA requirements when it comes to the comparative baseline, and even incorporates both "existing conditions" as 2005 conditions into some aspects of the analysis, even though NEPA only requires a No Action (Project) Alternative. The impact analyses of each chapter in the DEIS however treat only the No Action Alternative. At best, this is confusing.

EWC-113

Why has the Bureau of Reclamation chosen not to make this Draft EIS also a formal Draft Environmental Impact Report under the California Environmental Quality Act? In the interests of full disclosure, we believe a clear explanation of the Bureau's reasoning on this point is warranted.

EWC-114

The California Environmental Water Caucus (EWC) appreciates that the Bureau makes the effort to prepare the document as though it is an EIR, and that the Bureau believes the document could be used by state permitting agencies that must review and approve the project, such as the State Water Resources Control Board. Our organizations are skeptical that the document will adequately fulfill the Board's needs for information, especially as it pertains to the Bureau's Shasta Dam water rights permits.

Hydrology, Hydraulics, and Water Management

EWC-115

The Bureau concludes in this chapter that the five comprehensive plans and the No Action Alternative would have either no impact, impacts that are less than significant, or even beneficial.

EWC-116

However, this chapter fails utterly to disclose:

- It is largely San Joaquin River flows that are exported at the South Delta pumps; it is questionable that Shasta flows are used for export.

EWC-117

- The Bureau of Reclamation's Shasta Dam water rights permits are part of overall Central Valley Project time extension requests that the State Water Board will consider as part of
- Phase 4 (Implementation phase) of the Bay-Delta Water Quality Control Plan process now under way, and

EWC-118

- The relevance of the Bay Delta Conservation Plan and its proposed Delta Tunnels project as a well-known and reasonably foreseeable project to Shasta Dam operations.

These failures are described in detail in the following sections:

EWC-119

Failure To Disclose How Rarely The San Joaquin River Reaches Delta Outflow And Is Routinely Exported Through State And Federal Pumps Near Tracy, And Conversely, How Most Of Delta Outflow And Western Delta Salinity Control Is The Domain Of Sacramento River Flows Controlled By Upstream Sacramento River Basin Reservoir Operations.

EWC-120

Omitted from the affected environment section of this chapter is any account of the known hydrodynamic fate of San Joaquin River flows in the presence of Delta export pumping by the federal Central Valley Project and the State Water Project. The fate issue affects the Bureau's understanding of the San Joaquin River's actual hydraulic connection or connectivity to the rest of Delta inflows and Delta outflow. These hydraulic relationships in turn affect the dynamic size of the low salinity zone on which many listed species in the Bay-Delta Estuary depend. They also affect the volume of Delta outflow, rates of fish entrainment and death at the export pumps, survival of migrating salmon

smolts and the survival of sensitive open water (pelagic) fish like longfin smelt, Delta smelt, and threadfin shad.

EWC-120 CONTD

Two different modeling studies show that the fate of San Joaquin River flows during late winter into spring months is in the hands of the Delta export pumps. Both studies show that less than 1 percent of San Joaquin River water passing Vernalis ever reaches Chipps Island as part of Delta outflow. Well over 80 to 90 percent of San Joaquin River flows are instead exported at the state and federal pumps near Tracy.[19]

EWC-121

Omission of information about the fate of existing San Joaquin River flows means the public cannot discern from the Draft EIS on the Shasta Dam Raise and Reservoir Enlargement whether the San Joaquin River is hydraulically connected to the rest of the Bay-Delta Estuary and eventually whether the Board's proposed flow objectives for the River's tributaries will actually protect fish beneficial uses once they pass Vernalis.

EWC-122

This also means that the public cannot discern what actual hydraulic and hydrodynamic role the Sacramento River, and consequently Shasta Dam operations, plays in the Delta now and in the future.

EWC-123

A third study by the California Department of Water Resources was performed as part of complying with a modified Cease and Desist Order before the State Water Resources Control Board in 2011. The Department agreed to study "low head pumping" as a method for controlling salinity at key compliance monitoring stations during the summer irrigation season when interior South Delta salinity objectives must be met. The goal for the study was to determine what flows and at which locations low head pumping would significantly reduce or eliminate the salinity objective violations by the Department and the Bureau.

The most important factor in South Delta salinity, the Department acknowledged, was the sources of water reaching each south Delta compliance monitoring site. From modeling results, the Department found that 83 to 93 percent of the salty water reaching the interior South Delta compliance monitoring sites originated from the San Joaquin River.[20] These

EWC-120 CONTD

[19] Flow Science Incorporated, Evaluation of the fate of San Joaquin River Flow, Water Years 1964 and 1988, prepared for the San Joaquin River Group Authority, June 2, 2005, Table 2 and Figures 1 through 4; and Jim Wilde, Michael Mierzwa, and Bob Suits, Using Particle Tracking to Indicate Delta Residence Time, poster presentation for the CalFed Science Conference, October 23-25, 2006, Step 2 data for June 15, 2003 through July 23, 2003. Accessible online at http://baydeltaoffice.water.ca.gov/modeling/deltamodeling/presentations/DeltaResidenceTimeMethodology_wildej.pdf.

EWC-123 CONTD

[20] California Department of Water Resources, Low Head Pump Salinity Control Study, prepared to meet requirements of the State of California State Water Resources Control Board, Water Rights Order WR 2010-0002, Condition A.7, April 2011, Tables III.3 through III.6 and Figures III.5 and III.6; cost data shown in Tables ES.1 and ES.2. Accessible online at: http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/docs/lhscs_rpt.pdf.

EWC-123 CONTD

compliance points are in close proximity to both the Central Valley Project's Jones Pumping Plant and the State Water Project's Banks Pumping Plant.

EWC-124

Yet the Bureau's Shasta Dam Raise Draft EIS strongly implies, without demonstrating, that the water stored in Shasta Lake is important to South of Delta export deliveries to CVP and even State Water Project contractors south of the Delta for deliveries. This suggests a paradox: On one hand, the San Joaquin River is by far the major source of all exports from the south Delta pumping plants (in-Delta return flows are the other, much smaller component); neither Sacramento River flows nor San Francisco Bay tidal flows account for more than 1 percent in DWR's analysis. On the other hand, the EWC asks the Bureau to please explain in Chapter 6 (Hydrology, Hydraulics and Water Management) of the DEIS how Shasta Dam releases, including those from enlarged reservoir alternatives, are related to Delta exports to CVP and SWP service areas, particularly during the irrigation season.

Failure to disclose the direct quantitative relationship between enlarged Shasta Dam operations and the proposed Delta Tunnels project contained in the proposed Bay Delta Conservation Plan; this means that the cumulative impact analysis is inadequate.

EWC-125

The Bureau of Reclamation is among the proponents of the Bay Delta Conservation Plan (BDCP), together with the California Department of Water Resources, and several CVP and SWP water contractors. BDCP is a proposed habitat conservation plan under the state and federal endangered species acts. Its centerpiece water facility is the Delta Tunnels Project (sometimes referred to as the "Twin Tunnels project").

EWC-126

Failure To Provide Information In The Draft EIS On The Shasta Dam Raise That Would Facilitate Review By The State Water Resources Control Board Of Both Shasta Dam Water Rights Permits And The Relationship Of Those Permits To Other Storage, Diversion, And Rediversion Permits Of The CVP And Even Of The SWP.

EWC-127

Because the individual water facilities comprising both the federal Central Valley Project and the State Water Project are operated as a coordinated whole, any changes to their operations such as introduction of the Delta Tunnels project and the raising of Shasta Dam would necessitate review by the State Water Resources Control Board of the Bureau's Central Valley Project water rights permits.

EWC-128

The Hydrology, Hydraulics, and Water Management chapter correctly identifies the State Water Resources Control Board as the agency responsible for regulating water rights and water quality in the Delta and Central Valley basins. But the chapter and the rest of the Draft EIS fail utterly to identify the specific water rights issues that could arise in association with each and every comprehensive plan alternative.

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The State Water Board summarized its water rights role when it commented recently on the 2013 administrative draft of the Bay Delta Conservation Plan EIR/EIS, and into which the Environmental Water Caucus introduce some relevant paraphrasing:

"Before the State Water Board may approve a change in a water right permit or license...including a change in the point of diversion specified in the permit or license, the Board must find that the change will not injure any legal user of water. (Water Code § 1702.) Information concerning the extent, if any to which fish and wildlife would be affected by the change shall also be considered. (Water Code § 1701.2.) The State Water Board has an independent obligation to consider the effect [of a proposed water facility, in this case the Shasta Dam Raise and the Delta Tunnels project] on public trust resources and to protect those resources where feasible (National Audubon Society v. Superior Court (1983), 33 Cal. 3d 419), and to prevent the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water (Cal. Const., art. X, § 2; Water Code § 275). Pursuant to its authority under the Water Code the State Water Board may request additional information outside of the CEQA process to meet the State Water Board's public trust and other obligations. Accordingly, while [interested] parties may determine that CEQA does not require an analysis of all of the issues pertaining to water right change petition approval (including impacts to other legal users of water and public trust resources), it would assist the State Water Board in its consideration [of the proposed projects, Shasta Dam Raise and the Delta Tunnels] if the [environmental impact document] discussed these issues."[2]

EWC-129

EWC-130 The Bureau of Reclamation is surely well aware that it is settled law that the Bureau is to obey California water rights law through the operations of its water facilities and projects within state boundaries.

EWC-131 So while the Bureau claims its Draft EIS is written to comply with CEQA for use by state permitting authorities, it is clear that the absence of any water rights implications from the analysis anywhere in the Draft EIS is inadequate for the needs of analyzing water rights.

EWC-132 **Failure To Disclose The Bureau's Petitions To The State Water Resources Control Board To Extend The Deadlines For Compliance With Water Rights Permits And For Licensing Of The Water Rights Of The Central Valley Project.**

EWC-133 California's appropriative water rights doctrine requires that all holders of appropriative water rights, including those issued as permits and licenses by the State Water Board, be put to beneficial use diligently and continuously. In 2009, the Bureau submitted and the

EWC-134

EWC-129 CONTD [2] State Water Resources Control Board, Comments on the Second Administrative Draft Environmental Impact Report/Environmental Impact Statement for the Bay-Delta Conservation Plan, July 5, 2013, p.2.

EWC-134 CONTD

Board began processing petitions to extend the deadline for CVP water rights, including those for Shasta Dam and Reservoir.

EWC-135

Many parties protested the Bureau's petitions to the State Water Board, including petitions from EWC member groups Friends of the River, California Water Impact Network, California Sportfishing Protection Alliance, and AquAlliance. Among the issues raised in the protests were:

- Full application of the pumping rates as found in the permits would exacerbate poor fishery conditions.

EWC-136

- Full collection to storage in the project reservoirs would exacerbate harm to habitat conditions.

EWC-137

- Full application of water service to permitted places-of-use in the western San Joaquin Valley would exacerbate poor water quality conditions and may hasten irreversible salinization of downslope agricultural lands.

EWC-138

- Reclamation has been "cold storaging" a portion of its water rights.

EWC-139

The Board has also written the Bureau in 2009 that the Bureau should avoid piecemealing its time extension requests. The Board expressed at that time its preference that the

EWC-140

Bureau and DWR present a comprehensive environmental document that would cover both the Bay Delta Conservation Plan and the time extension request petitions.[22]

EWC-141

It is evident from the absence of water rights considerations in the Shasta Lake Draft EIS relevant to the time extension petitions for CVP water rights that the Bureau is not mindful of the protests of its CVP permits and the State Water Board's concerns for timely processing of the petitions. For the Bureau to have the Draft EIS on the Shasta Dam Raise be useful before the State Water Board, it must also address all water rights protest issues.

EWC-142

Failure To Disclose The Bureau's Water Transfer Program (From North Of Delta Sellers To South Of Delta Contractors) And Its Reliance Upon Groundwater Substitution By Water Right-Holding Transferors.

EWC-140 CONTD

[22] "Reclamation should collaborate with DWR regarding preparation of a comprehensive document. The environmental analysis required for the petitions is an evaluation of potential changes in operation of the CVP facilities, impacts to cold water pools, potential impacts to required downstream flows for maintenance of public trust resources, water quality, etc., associated with diverting the full face value of Reclamation's permits. It should become apparent within the next 180 days whether the BDCP EIR/EIS will evaluate these issues. If the required evaluation is not included in that document, Reclamation will need to timely enter into a Memorandum of Understanding (MOU) to prepare an appropriate CEQA document." Letter of Victoria A. Whitney, Deputy Director for Water Rights, to Richard J. Woodley, US Bureau of Reclamation, Permitted Applications 5625, et al., of US Bureau of Reclamation, Central Valley Project, December 23, 2009, p. 2.

EWC-143

Shasta operations are integral to the Bureau's water transfer programs. When the Bureau and DWR establish and operate water transfer programs during dry years (as they did in 2013), they rely heavily on senior water rights holders and "settlement contractors" of the Sacramento River Basin. Arranged transfers occur when these water right holders or settlement contractors forego diverting surface flows from the Sacramento River released from Shasta Dam. Those waters flow on to the Delta where a "like amount" is diverted at the CVP and/or SWP pumps as capacity permits for buyers of the water south of the Delta.

In 2013 (a dry water year in the Sacramento Basin and a "critically dry" year in the San Joaquin River Basin), these transfers result in "like amounts" of groundwater pumping by the water sellers in the Sacramento River Basin so that they can still irrigate crops they had otherwise planned to water with surface supplies.

EWC-144

The Draft EIS fails to acknowledge and incorporate into its analysis of project impacts the documented relationship of surface and subsurface water resources in the Sacramento River Basin.

EWC-145

The California Environmental Water Caucus is deeply concerned that the combined purpose and needs for Shasta Dam Raise and the Delta Tunnels project are intended not only to increase water supply reliability for water contractors under ordinary circumstances, but also to facilitate water transfers that require exporting of Sacramento River surface supplies from the Delta to complete the transfers. This strategy is short-sighted because in a sustained dry period, continuing groundwater substitution water transfers could result in local or region-wide severing of the connection of groundwater supplies and flows with surface flows in Sacramento River basin streams. This could result in gaining streams (that is, rivers and creeks fed by groundwater) becoming losing streams (where surface flows seek a new hydraulic gradient by percolating underground to the falling water table).

EWC-146

The risk of permanent dependence on groundwater substitution water transfers, especially in long-run drought conditions, is that this severing will become permanent and catastrophic for Sacramento River basin water resources, fish populations, and riparian ecosystems generally.

EWC-147

At a minimum, the Hydrology chapter's cumulative impact analysis should address the potential for groundwater supply (overdraft) resulting from reliance on groundwater substitution transfer programs in forecasted extended 21st century dry periods that appear in the Climate Change Modeling appendix.

Air Quality and Climate

EWC-148 Chapter 5 (Air Quality and Climate) of the Draft EIS is inadequate. It asserts there are no sensitive receptors for air quality in the vicinity, but fails to demonstrate that is the case. Sensitive receptors are defined by the Air Resources Board:

> Sensitive individuals refer to those segments of the population most susceptible to poor air quality (i.e., children, the elderly, and those with pre-existing serious health problems affected by air quality). Land uses
>
> Where sensitive individuals are most likely to spend time include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities (sensitive sites or sensitive land uses).[23]

EWC-149

EWC-150 First, the Bureau's analysis of air quality impacts fails to define a radius or compass rose of wind directional tendencies within which sensitive receptors might be affected by construction effects of the proposed project. Second, Chapter 5 fails to characterize what sensitive receptors are in the vicinity of the Primary Study Area. Third, it fails to show where they are located to indicate that they are or are not within the Primary Study Area. Fourth, it fails to state how far from Shasta Dam's construction and other land-clearing operational sites the sensitive receptors are, and d) fails to state why they are far enough away from the project site to warrant no significant impacts or mitigation needs.

EWC-151 The analysis is also inadequate because it fails to facilitate ready comparison of air quality criteria used by Shasta County Air Quality Management District with construction-generated emissions from each comprehensive plan alternative and then fails to show how many days of violations (if any) would occur based on construction activity. Simply incorporating the criteria recommended for use in impact analysis by SCAQMD, as shown on page 5-29 of the DEIS would solve this problem.

EWC-152 Chapter 5 correctly recognizes that there are no established criteria of significance for greenhouse gas (GHG) emissions under CEQA or NEPA practices. This means that the Bureau cannot rule out the possibility that emission of any greenhouse gases (GHGs) during construction of the Shasta Dam Raise. The Bureau summarizes on page 5-22 a number of thresholds and criteria that could be used to assess the GHG impacts of construction and operation activities of the Shasta Dam Raise. They include:

- Zero (i.e., all emissions are significant)
- 900 metric tons of carbon dioxide equivalent (MT CO_2e) per year (which would capture about 90 percent of residential and nonresidential discretionary development)

EWC-149 CONTD [23] California Air Resources Board, Air Quality and Land Use Handbook: A Community Health Perspective. April 2005, p. 13. Accessible online 29 August 2013 at http://www.arb.ca.gov/ch/handbook.pdf.

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Table 2
Annualized Unit Cost of Shasta Dam Raise Alternatives

	CP1	CP2	CP3	CP4	CP5
Total Capital Cost ($ millions)	$967	$1,068	$1,242	$1,250	$1,272
Total Annualized Cost ($ millions)	$44	$51	$54	$56	$61
Total Production of Fish (thousands of fish)	61	379	207	813	378
Acre-feet of Storage Capacity (TAF)	256	443	634	634	634
Acre-feet of Supply Yield (TAF)	47.3	77.8	63.1	47.3	113.5
Ratio of New Yield to New Capacity	0.18	0.18	0.10	0.07	0.18
Cost of Annual Yield per Acre-foot	$930	$656	$856	$1,184	$537

Source: US Bureau of Reclamation, Draft Plan Formulation Appendix, Shasta Lake Water Resources Investigation, California, June 2013, Tables 5-9 and 5-10, pp. 5-110 and 5-111; and California Environmental Water Caucus.

EWC-152 CONTD

- 10,000 MT CO_2e per year (a potential Air Resources Board mandatory reporting level for California's cap-and-trade program)25,000 MT CO_2e per year (currently ARB's mandatory reporting level for the statewide emissions inventory program).

The Bureau opts to use the most relaxed criterion, 25,000 MT CO_2e per year as its criterion for evaluating GHG emissions from Shasta Dam Raise construction activity.

EWC-153

Chapter 5 underestimates GHG emissions in the construction phase of the proposed alternatives. The air quality impact analysis fails to incorporate all relevant greenhouse gas emissions associated with cement production needed for the dam. This information should be readily available from other sources and should be incorporated, along with estimates of how much concrete each alternative will need poured how much GHGs in carbon dioxide equivalents would be generated. Without it, the Bureau fails to disclose a complete and reasonable estimate of how much concrete would be needed in the Dam Raise's construction and of GHG emissions associated with each alternative, and the current analysis is therefore inadequate.

EWC-154

In addition, Chapter 5 also inflates greenhouse gas emission savings by using fossil fuel power plants as analytic offsets but fails to acknowledge that fossil fuel plants provide baseline loads while hydropower tends to meet peak time load needs because hydro generation can be easily ramped up to meet heavy load peaks.

Costs/Benefits

EWC-155

Unit Costs. The Shasta Lake Water Resources Investigation report states that the costs of project alternatives will range from $967 million to $1.27 billion, and that annualized costs of the project (amortized over 100 years, according to the Bureau[24]) will range between $44 million and $61 million.

EWC-156

As shown in Table 2, the expanded reservoir these amounts are intended to purchase range from an additional 256,000 acre-feet to 634,000 acre-feet of new storage capacity. Supply yields from the additional storage capacity are considerably less, ranging from 47,300 acre-feet for comprehensive plans 1 and 4 up to 113,500 acre-feet per year on average for CP 5. Table 1 calculates a ratio of the new supply yield to the new storage capacity for each comprehensive plan. These ratios range between 0.07 to 0.18, meaning that yield from this project represents about 7 to 18 percent of new storage created.[25]

EWC-158

Table 1 shows that the unit cost of the supply yielded by the proposed project would range between $537 per acre-foot for CP2 to $1,184 per acre-foot for CP4. The Bureau's fish production modeling (SALMOD) in the analysis of the proposed project, shows that fish do better when they have more water of appropriate temperatures flowing to benefit them. But this is still an expensive way to encourage fish production and stimulate recovery of one of Nature's more important natural services to society.

EWC-159

State and federal laws already exist requiring that the migratory fish populations of the federal Anadromous Fish Restoration Program be doubled over the 1967-1991 population average for each species and salmonid run using already available AFRP recovery plans.[26] Instead of using technology, money and engineering, we should be using our governments' police power to require that salmon be produced toward full recovery.

EWC-160

Funds for the Shasta Dam raise and reservoir enlargement should be reprogrammed to Bureau programs that assist local cities, communities, and water districts with investing

EWC-155 CONTD

[24] US Bureau of Reclamation, Draft Attachment 1 Cost Estimates for Comprehensive Plans, Engineering Summary Appendix, Shasta Lake Water Resources Investigation, California, June 2013, Cost summaries for each comprehensive plan, Attachment pages 1-1 through 1-6.

EWC-157

[25] This could make investment in expanded reservoir capacity nearly as bad a purchase by the Bureau as was New Melones Dam and reservoir in the 1970s. The Bureau recently reported that actual carryover storage at New Melones occurs just 39 percent of the time, and averages 21,048 acre-feet per year, less than 1 percent of New Melones' 2.4 million acre-feet of storage capacity. See United States Department of the Interior, Comments: Draft Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay-Sacramento/San Joaquin Delta Estuary: San Joaquin River Flows and Southern Delta Water Quality (SED), March 29, 2013, pp. 3-4. Accessible online 26 August 2013 at http://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/baydelta_pdsed/docs/comments032913/amy_aufdemberge.pdf.

EWC-159 CONTD

[26] California Fish and Game Code Section 6902(a); and the Central Valley Project Improvement Act of 1992, Section 3406(b)(1), accessible online 30 August 2013 at .

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in water supply projects that will help the State of California meet the goals contained in the Delta Reform Act of 2009.[27]

Net Economic Benefits of the Project Under Climate Change The Climate Change Modeling Appendix relies on five basic ensemble climate change scenarios (Q1 through Q5) that were assembled from 112 general circulation models recommended by the Intergovernmental Panel on Climate Change. These models have been "downscaled" for use at the regional level to estimate a range of potential impacts on the potential of the proposed project to improve water supply reliability. The analysis relies on Comprehensive Plan 5 as the alternative to be tested in the climate change comparisons.

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The Appendix's authors analyze future impacts of the project by distilling down climate change scenarios to three, thereby attempting to bracket the range of potential climate change outcomes.[28]

To evaluate some of the economic impacts of climate change trends on the state's water system (CVP and SWP) with and without the enlargement of Shasta reservoir, four models were employed. Figures 3-100 through 3-103 summarize each model's estimation of the change in net economic benefits from Comprehensive Plan 5. For three of the four models, the outlook is at best mixed. In Silicon Valley, net benefits could range from no change under a slow growth and cooler/wetter scenario (SGQ4) to $37 million per year in a fast-growth and drier/hotter climate scenario (EGQ2).

EWC-162

It is unclear from the DEIS what effect the $1.2 billion price tag of CP5 will have on rates for contractors within the San Felipe Project (which include Santa Clara Valley Water District and San Benito County Water District). They receive their water from the west end of San Luis Reservoir. Santa Clara Valley Water District is working on a "low point" intake project to lower the

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[27] California Water Code Section 85021, stating: "The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts."

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[28] It should be pointed out that just 13 years into the 21st century, none of the 15 downscaled models in the Bureau's climate change methodology are ruled out. The Bureau has produced a simplified analysis (Q1 through Q5) that themselves represent "central tendencies" of the 112 models in each quadrant of possible climate outcomes. So there is equal probability drier/hotter climate results in the future as wetter/cooler. Q5 is a central tendency grouping of the other four quadrants. It is sometimes referred to in the text of the Climate Change Modeling Analysis as a "consensus" climate scenario, but there is really no basis for a consensus here. Q5, because of its emphasis on the central tendencies of the four quadrant scenarios, really approximates "current trends" without climate change—which has the problem of approximating "stationarity" in the climate results. Stationarity in this context means that "natural systems fluctuate within an unchanging envelope of variability, a staple assumption of water resource engineering. Scientists have demonstrated that stationarity "has long been compromised by human disturbances in river basins" and now anthropogenic climate change and oceanic-scale temperature oscillations make stationarity untenable as an assumption about future climate conditions. P.C.D. Milly, Julio Betancourt, Malin Falkenmark, Robert M. Hirsch, Zbigniew W. Kundzewicz, Dennis P. Lettenmaier, and Ronald J. Stouffeer, "Stationary is Dead: Whither Water Management?" Science, 319: 573-574, 1 February 2008.

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elevation at which the San Felipe Project takes water from San Luis. The Shasta Raise project will be an added expense for which San Felipe Project contractors will be responsible in the years ahead. Elsewhere in the Climate Change Modeling Appendix, CVP San Luis storage performance is shown to worsen in the years to come to the point of "dead pool" (water inaccessible with existing reservoir intakes or by gravity release), with or without the raising of Shasta Dam.

EWC-164

The climate change scenarios (where change is really at work in the modeling process in EGQ2 and SGQ4) show that, in Figure 3-144 (p. 3-116), "avoided water quality costs for Silicon Valley will have small negative benefits (i.e., net costs) over the long term. In Figure 3-145, agricultural net revenues in the Central Valley service areas of the CVP and SWP see only a modest range of net benefits from about negative $300,000 (i.e., a net cost) per year in the near term to a high of $6 million per year in net benefits in the long run of a high-growth and drier/hotter climate scenario. California's agricultural economy is about $30 to $40 billion in overall size, so this net benefit to agricultural customers of the CVP and SWP is only about one-one-thousandth (1/1000) of one percent of the California's agricultural economy—vanishingly small, in other words.

EWC-165

Other findings for the economic net benefits of the Shasta Dam Raise and Reservoir Enlargement project are similarly vanishingly small, yet would likely involve rate increases to both CVP urban and agricultural customers that they may prefer to avoid.

EWC-166

These findings also strongly suggest that were an honest and adequate Benefit-Cost Analysis performed on this proposed project (for which CP4 appears to be the Bureau's preferred alternative), its ratio of benefits to costs would be well under 1.0. This would be strong grounds for rejecting the project and spending scarce taxpayer funds on other more cost-effective alternatives.

EWC-167

The California Environmental Water Caucus urges the Bureau to perform an honest and adequate Benefit-Cost Analysis of the CP5 alternative.

Climate Change, the State's Water System, and the Shasta Dam Raise Project

EWC-168

Tables 3 through 6 below distill climate change modeling results from the Climate Change Modeling Appendix concerning statewide water system operations, unmet water demand, and Delta water quality compliance effects of Comprehensive Plan 5. These tables, based on graphical interpretation of probability exceedances plots in the Bureau's Climate Change Modeling Appendix, reveal that:

EWC-169

- The Shasta Dam Raise project (CP5) will not implement a "big gulp/little sip" hydraulic strategy that has been discussed widely. In half of all years, the ranges of reservoir storage for water supply and carryover, and for Delta export pumping actually decrease by increasing at the bottom and decreasing at the top of the

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range. These findings suggest modest increases in system-wide water supply reliability (but they come at the expense of the top end of most reservoir storage and Delta export ranges), especially in drier years. Storage increases that are found are nowhere near the amounts needed to meet unmet demand found elsewhere in the Appendix. (See Tables 3, 4, and 6.)

EWC-170

- The Shasta Dam Raise project (CP5) will contribute only slightly to reduction of unmet water demand. Climate change scenarios without the proposed project show a range of unmet demand from 2.7 to 8.2 million acre-feet. With the Shasta Dam Raise project, the Modeling Appendix forecasts a reduction ranging between 5,000 and 33,000 acre-feet per year. This range is generally just a fraction of 1 percent of the overall unmet water demand. (See Table 5.)

EWC-171

- The Shasta Dam Raise project will only marginally decrease the risk of "dead pool" storage conditions at the state water system's reservoirs, and actually increases the risk of dead pools in south-of-Delta reservoirs. Dead pools occur when water levels in reservoirs become inaccessible by existing reservoir intakes or by gravity release. Dead pool conditions without the Shasta Dam Raise project are expected in the Modeling Appendix at all state water system reservoirs except for Oroville. However, with the Shasta Dam Raise project, the Modeling Appendix suggests only marginal decreases in dead pool storage risks at the end of September, including Oroville. And the risk of dead pools for both state and federal portions of San Luis Reservoir actually increase. (See Table 5.)

EWC-172

EWC-173

EWC-174

The Bureau fails in the Draft EIS to provide a clear statement of the Shasta Dam Raise project's ability to meet both its stated objective of improving water supply reliability, and if so, by how much. The Bureau has done analysis that can only be applied to one of the five alternatives. If the best this project can accomplish is to reduce unmet water demand by 5,000 to 33,000 acre-feet in the 21st century, that increment of water will be extremely costly to provide through the Shasta Dam Raise project. (Recall from Table 1 above that CP5 costs over $1.2 billion with an annualized capital and operating cost of $61 million per year.) The incremental cost of reducing this unmet demand with CP5 would lie somewhere between $1,800 and $12,000 per acre-foot, an extraordinarily expensive source of new water for attempting to drought-proof the state's modern water system.

Table 3

Climate Change Effects on California Water System Storage

End of May (Water Supply Availability)

State Water System Component	Climate Change Modeled Effect Without Shasta Dam Raise	Climate Change Modeled Effect With Shasta Dam Raise
Shasta	Half the time: 2.2 to 4.55 MAF; median range between 3.6 to 4.55 MAF	Half the time: 2.75 to 5.2 MAF/ median range between 3.7 to 5.2 MAF
Folsom	490 to 800 TAF/ median range between 660 to 800 TAF	560 to 800 TAF/ media range between 660 to 780 TAF
Oroville	1.8 to 3.4 MAF/ median range between 2.3 to 3.3 MAF	1.9 to 3.4 MAF/ median range between 2.5 to 3.3 MAF
New Melones	650 TAF to 2.15 MAF/ median range between 1.25 to 2.0 MAF	700 TAF to 2.25 MAF/ median range between 1.3 to 2.0 MAF
Millerton	350 to 520 TAF/ median range between 420 to 520 TAF	360 to 520 TAF/ median range between 460 to 500 TAF
CVP San Luis	410 to 820 TAF/ median range between 5380 to 730 TAF	420 to 800 TAF/ median range between 5380 to 620 TAF
SWP San Luis	490 to 890 TAF/ median range between 600 to 780 TAF	490 to 870 TAF/ median range between 650 to 750 TAF

Note: Initial range of reservoir storage volumes are graphical interpretations of exceedance plots presented in the climate change modeling appendix. They represent the range of water volumes attainable between the lowest exceedance plot and the highest plot for each climate change scenario occurring between the 25th and 75th percent exceedances (in other words, half of all years examined in the model runs). Thus, what is reported here are water volumes and X2 positions that span the climate change scenarios in half of all years. The median values reported in this table are simply the range of medians from the same exceedance plots from lowest to highest. For median values of these exceedance plots, half of plot's values will be above the median and half will be below.

Source: Graphical interpretation of Figures 3-61 through 3-83; and Figures 3-119 through 3-140, in US Bureau of Reclamation, *Shasta Lake Water Resources Investigation, Draft Climate Change Modeling Appendix*, June 2013.

Table 4

Climate Change Effects on California Water System Storage End of September (Carryover Supplies)

State Water System Component	Climate Change Modeled Effect Without Shasta Dam Raise	Climate Change Modeled Effect With Shasta Dam Raise
Shasta	Half the time: 750 TAF to 3.75 MAF; median range between 2.2 to 3.75 MAF	1.4 to 4.3 MAF/ median range between 2.5 to 4.3 MAF
Folsom	150 TAF to 800 TAF/ median range between 460 to 800 TAF	280 to 800 TAF/ median range between 500 to 800 TAF
Oroville	900 TAF to 3.2 MAF/ median range between 1.4 to 2.6 MAF	1.1 to 3.1 MAF/ median range between 1.6 to 2.5 MAF
New Melones	400 TAF to 2.0 MAF/ median range between 1.4 to 1.8 MAF	600 TAF to 1.95 MAF/ median range between 1.2 to 1.7 MAF
Millerton	150 to 240 TAF/ median range between 175 to 220 TAF	160 to 240 TAF/ median range between 175 to 220 TAF
CVP San Luis	40 TAF (Dead pool) to 230 TAF/ median range between 40 TAF (Dead pool) to 100 TAF	40 TAF (Dead pool) to 220 TAF/ median range between 40 TAF (Dead pool) to 110 TAF.
SWP San Luis	160 to 550 TAF/ median range between 280 to 450 TAF	170 to 540 TAF/ median range between 310 to 460 TAF

Note: Initial range of reservoir storage volumes are graphical interpretations of exceedance plots presented in the climate change modeling appendix. They represent the range of water volumes attainable between the lowest exceedance plot and the highest plot for each climate change scenario occurring between the 25th and 75th percent exceedances (in other words, half of all years examined in the model runs). Thus, what is reported here are water volumes and X2 positions that span the climate change scenarios in half of all years. The median values reported in this table are simply the range of medians from the same exceedance plots from lowest to highest. For median values of these exceedance plots, half of plot's values will be above the median and half will be below.

Source: Graphical interpretation of Figures 3-61 through 3-83; and Figures 3-119 through 3-140, in US Bureau of Reclamation, *Shasta Lake Water Resources Investigation, Draft Climate Change Modeling Appendix*, June 2013.

Table 5
Comparison of Climate Change Modeling Effects on Dead Pool Storage Conditions and Impact of Shasta Dam Raise

State Water System Component	Climate Change Modeled Effect Without Shasta Dam Raise	Climate Change Modeled Effect With Shasta Dam Raise
Unmet Demand	2.7 to 8.2 million acre-feet/year (DEIS, Figure 3-83, p. 3-73)	Reduction in unmet demand of 5,000 to 33,000 acre-feet/year (DEIS Figure 3-141, p. 3-114)
Storage Performance		
Shasta	Dead pool at end of September 3% to 22% of the time (i.e., up to one in every five years)	Dead pool at end of September 3% to 16% of the time (i.e., up to one in every six years)
Folsom	Dead pool at end of September 3% to 22% of the time (i.e., up to one in every five years)	Dead pools at end of September 2% to 13% of time (i.e., up to one in every eight years)
Oroville	No dead pool conditions expected.	Dead pool at end of September no more than about 2 percent of the time.
New Melones	Dead pool at end of May 2% to 6% of the time; dead pool at end of September up to 12% of the time (one in eight years on average)	Dead pools at end of May up to about 5 percent of the time; dead pools at end of September up to about 8 percent of the time (i.e., up to about one in every 12 years)
Millerton	Dead pool at end of September between 4% and 13% of the time (i.e., up to one in every eight years on average)	Dead pool at end of September 4% to 8% of the time.
CVP San Luis	Dead pool at end of September between 25% and 50% of the time (i.e., one in every two to four years) under most climate scenarios	Dead pool at end of September about 25 to 73% of the time (i.e., from about one in four to about three in every four years)
SWP San Luis	Dead pool at end of September between 2% and 4% of the time.	Dead pool about 4 percent of the time.

Note: Initial range of reservoir storage volumes are graphical interpretations of exceedance plots presented in the climate change modeling appendix. They represent the range of water volumes attainable between the lowest exceedance plot and the highest plot for each climate change scenario occurring between the 25th and 75th percent exceedances (in other words, half of all years examined in the model runs). Thus, what is reported here are water volumes and X2 positions that span the climate change scenarios in half of all years. The median values reported in this table are simply the range of medians from the same exceedance plots from lowest to highest. For median values of these exceedance plots, half of plot's values will be above the median and half will be below.

Source: Graphical interpretation of Figures 3-61 through 3-83; and Figures 3-119 through 3-140, in US Bureau of Reclamation, *Shasta Lake Water Resources Investigation, Draft Climate Change Modeling Appendix*, June 2013.

Table 6
Comparison of Climate Change Modeling Effects on Delta Export Operations,
Delta Outflow, Salinity Control, and Impact of Shasta Dam Raise

Delta Facility or Compliance Point	Climate Change Modeled Effect Without Shasta Dam Raise	Climate Change Modeled Effect With Shasta Dam Raise
Banks Pumping Plant Exports (SWP)	1.4 MAF to 3.6 MAF in half of all years (i.e., 25th to 75th exceedance probabilities); median exports of between 1.8 MAF to 3.0 MAF per year.	1.6 MAF to 3.4 MAF in half of all years; median exports of between 2.1 to 2.9 MAF
Jones Pumping Plant Exports (CVP)	1.3 MAF to 2.75 MAF in half of all years; median exports of between 2.0 to 2.6 MAF	1.7 to 2.4 MAF in half of all years; median exports of between 2.1 to 2.6 MAF
Combined Exports to South of Delta	2.7 MAF to 6.35 MAF in half of all years; median exports of between 3.8 to 5.6 MAF	3.3 MAF to 5.8 MAF in half of all years; median exports of between 4.2 to 5.3 MAF
Delta Outflow	5 MAF to 29 MAF in half of all years; median Delta outflow of between 7 and 15 MAF	6 MAF to 28 MAF in half of all years; media Delta outflow of between 7.5 to 15 MAF
X2 Position (i.e., location of 2.0 EC salinity in kilometers east of Golden Gate, measuring position of the low-salinity zone of the Delta estuary)	61 km to 83 km in half of all years; median X2 position of between 65 and 78 km	62 km to 82 km in half of all years; median X2 position of between 65 to 77 km.

Note: Initial range of export and outflow volumes and X2 positions are graphical interpretations of exceedance plots presented in the climate change modeling appendix. They represent the range of water volumes attainable between the lowest exceedance plot and the highest plot for each climate change scenario occurring between the 25th and 75th percent exceedances (in other words, half of all years examined in the model runs). Thus, what is reported here are water volumes and X2 positions that span the climate change scenarios in half of all years. The median values reported in this table are simply the range of medians from the same exceedance plots from lowest to highest. For median values of these exceedance plots, half of plot's values will be above the median and half will be below.

Source: Graphical interpretation of Figures 3-61 through 3-83; and Figures 3-119 through 3-140, in US Bureau of Reclamation, *Shasta Lake Water Resources Investigation, Draft Climate Change Modeling Appendix*, June 2013.

EWC-175

The following Environmental Water Caucus affiliated organizations support the comments and recommendations shown in the attached letter to the US Bureau of Reclamation on the Shasta Lake Water Resources Investigation DEIS dated June, 2013.

The corresponding logos are shown at the front of this document.

Gary Adams
California Striped Bass Association

Sara Aminzadeh
Policy Director
California Coastkeeper

Dan Bacher
Editor
Fish Sniffer

Colin Bailey
Executive Director
Environmental Justice Coalition for Water

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Executive Director
Restore the Delta

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California Save Our Streams Council

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Sierra Nevada Alliance

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Robyn DiFalco
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Diana Jacobs
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Chief Caleen Sisk
Spiritual Leader
Winnemen Wintu Tribe

Cecily Smith
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Esmeralda Soria
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California Rural Legal Assistance Foundation

Craig Tucker
Karuk Tribe

Barbara Vlamis
Executive Director
AquAlliance

Bob Wright
Senior Counsel
Friends of the River

EWC-175

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Responses to Comments from Environmental Water Caucus

EWC-1: Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest, and Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

EWC-2: Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects" describes in detail the impacts and benefits to the fisheries in the Sacramento River and Delta.

Please refer to Master Comment Response GEN-2, "Unsubstantiated Information."

EWC-3: A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR Part 1503.4). Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

This comment is related to the preliminary cost allocation analysis completed for the Draft Feasibility Report (which was released to the public in February 2012).

Please refer to Master Comment Response COST/BEN-5, "Potential Project Financing."

EWC-4: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

EWC-5: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

EWC-6: A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR Part 1503.4). Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

This comment is related to the preliminary cost allocation analysis completed for the Draft Feasibility Report (which was released to the public in February 2012). Please refer to Master Comment Response COST/BEN-5, "Potential Project Financing."

EWC-7: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

EWC-8: Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," Master Comment Response DSFISH-3, "Fish Habitat Restoration," Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan,

Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

EWC-9: Reclamation acknowledges that there are multiple stressors to anadromous fish populations that the project does not - and cannot - address, and that the project alone is not sufficient to ensure the viability of anadromous fish populations. However, the project does provide benefits to fish at critical times, and as such could be an important part of the larger restoration effort. In particular, modeling results show that CP4 provides significant benefits to anadromous fish in critical and dry years, when Chinook populations are at greatest risk of temperature related mortality. By increasing production in these years, relative to the base conditions, the risk of extirpation of listed species is greatly reduced, and the project therefore provides a significant benefit to the species/run.

Please refer to Master Comment Response GEN-2, "Unsubstantiated Information."

EWC-10: This comment appears to be related to allocation of costs to project beneficiaries, which is outside the scope of the DEIS. A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR Part 1503.4(b)). As described in Master Comment Response COST/BEN-5, "Potential Project Financing," an updated cost allocation was included in the SLWRI Final Feasibility Report. This comment was included as part of the record and made available to decision makers before a final decision on the proposed project.

Please refer to Master Comment Response GEN-4, "Best Available Information."

EWC-11: This comment appears to be related to allocation of costs to project beneficiaries, which is outside the scope of the DEIS. Per, NEPA 40 CFR 1502.23, "…the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations." Accordingly, the DEIS does not identify a most "cost effective" alternative. As described in Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," and Master Comment Response COST/BEN-5, "Potential Project Financing," updated evaluations related to economic feasibility and cost allocation was included in the SLWRI Final Feasibility Report. A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR 1503.4(b)). This comment will be included as part

of the record and made available to decision makers before a final decision on the proposed project.

EWC-12: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response WASR-3, "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River."

EWC-13: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

EWC-14: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-8, "Native American Connection to Salmon."

EWC-15: Please refer to Master Comment Response ALTR-1, "Range of Alternatives General," Master Comment Response P&N-1, "Purpose and Need and Objectives."

EWC-16: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response P&N-1, "Purpose and Need and Objectives."

EWC-17: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," and Master Comment Response EI-7, "Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS."

EWC-18: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-19: Please refer to Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," and Master Comment Response GEN-4, "Best Available Information."

EWC-20: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-21: All operations simulation modeling in the DEIS was performed with the latest version of the CalSim-II simulation model, the best available tool for modeling joint CVP/SWP system operations in California. The assumptions in the modeling used in support of this document included the NMFS 2009 *BO and Conference Opinion on the Long-Term Operations of the CVP and SWP* (2009 NMFS BO) and USFWS 2008 *Formal Endangered Species Act Consultation on the*

Proposed Coordinated Operations of the CVP and SWP (2008 USFWS Biological Opinion (BO)) as well as the most recent versions of all other regulatory conditions. Specific details of the assumptions included in the CalSim-II modeling are included in the Modeling Appendix. In the modeling many other water supply and water quality requirements must be met to allow exports. Delta wide requirements are met with the additional releases from the enlarged Shasta reservoir allowing additional pumping. The results of this modeling include the system response to the project including changes in reservoir storages, releases, stream flows, and Delta exports. These results are summarized in the EIS Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.1, "Environmental Consequences and Mitigation Measures," and text with full results included in the Modeling Appendix.

EWC-22: None of the action alternatives evaluated in the DEIS would have any effect on the water transfer program between north of Delta and south of Delta contractors and therefore is not evaluated in the DEIS.

EWC-23: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record," and Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

EWC-24: Comment noted.

Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

EWC-25: Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," Master Comment Response COST/BEN-3, "Estimated Increased Water Supply Reliability Under Action Alternatives," Master Comment Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits," and Master Comment Response P&N-1, "Purpose and Need and Objectives."

EWC-26: Please refer to Master Comment Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits."

EWC-27: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-28: The CVP operates in conjunction with the SWP according to the Coordinated Operations Agreement (COA) between Reclamation and DWR, which is described in the DEIS Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.2, "Regulatory Framework." As described in the DEIS, COA defines how Reclamation

and DWR share their joint responsibility of meeting Delta water quality standards and the water demands of senior water right holders, and how the agencies share surplus flows. Operations related to the Joint Point of Diversion (JPOD), referring to the CVP and SWP use of each other's pumping facilities in the south Delta, are also described in DEIS Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.2, "Regulatory Framework." DWR prepares State Water Project Delivery Reliability Reports that are updated biannually and published on DWR's Bay-Delta Office website at http://baydeltaoffice.water.ca.gov/swpreliability/. The most recent finalized version of this report is the "State Water Project Final Delivery Reliability Report 2011," which was released in June 2012. As described in the SWP Reliability Report and evidenced by COA and the JPOD, Reclamation and DWR work closely to coordinate their operations to make the most efficient use of the common water supply available to the CVP and SWP to meet regulatory requirements and optimize delivery capability for both projects.

EWC-29: Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," and Master Comment Response P&N-1, "Purpose and Need and Objectives."

EWC-30: Effects to Chinook salmon, including beneficial effects, are discussed in EIS Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects." As described in the EIS, all action alternatives would generally result in improved flow and water temperature conditions for Chinook salmon in the upper Sacramento River downstream from Shasta Dam. This would benefit anadromous fish survival in the upper Sacramento River. Potential benefits of SLWRI action alternatives are described in EIS Chapter 2, "Alternatives," Section 2.3, "Action Alternatives," and Section 2.5, "Summary of Potential Benefits of Action Alternatives.

Please refer to Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," and Master Comment Response ALTR-1, "Range of Alternatives General," Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

EWC-31: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response P&N-1, "Purpose and Need and Objectives," Master Comment Response ALTS-1, "Alternative Selection," Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," and Master Comment

Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits."

EWC-32: Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions," and Master Comment Response GEN-7, "Rules and Regulations for Water Operations under Action Alternatives."

EWC-33: Water supply reliability benefits of each action alternative were estimated using CalSim-II, which is the best tool available, using standard methodologies that are consistent with the current regulatory framework. For information related to the CalSim-II model used for evaluations in the EIS, please see EIS Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.1, "Methods and Assumptions," and the Modeling Appendix, Chapter 2, "CalSim-II." Please refer to Master Comment Response DSFISH-2, "Fisheries Models and Tools," and Master Comment Response GEN-4, "Best Available Information."

EWC-34: Per, NEPA 40 CFR 1502.23, "…the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations. Accordingly, the Draft EIS does not identify a "most cost effective" alternative. A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR Part 1503.4). As described in Master Comment Response COST/BEN-2 - "Comments Related to the SLWRI Feasibility Report," evaluations related to economic feasibility was included in the SLWRI Final Feasibility Report. This comment was included as part of the record and made available to decision makers before a final decision on the proposed project.

Please refer to Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report."

EWC-35: This comment appears to be related to allocation of costs to project beneficiaries, which is outside the scope of the DEIS. A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR Part 1503.4(b)). As described in Master Comment Response COST/BEN-5, "Potential Project Financing," an updated cost allocation was included in the SLWRI Final Feasibility Report. This comment was included as part of the record and made available to decision makers before a final decision on the proposed project.

Please refer to Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," and Master Comment Response ALTS-1, "Alternative Selection."

EWC-36: Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

EWC-37: Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

EWC-38: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response ALTR-1, "Range of Alternatives General," Master Comment Response ALTS-1, "Alternative Selection," Master Comment Response DSFISH-3, "Fish Habitat Restoration," Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements," Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

EWC-39: Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

EWC-40: Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions," Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

EWC-41: Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions," Master Comment Response DSFISH-2, "Fisheries Models and Tools," and Master Comment Response REC-9, "Relationship Between Recreation and Shasta Lake Water Levels."

EWC-42: CP4 and CP4A are alternatives with a dedicated cold water pool. A detailed discussion on management of the cold-water pool for anadromous fish is presented in Chapter 2, "Alternatives," Section 2.3.6,

"CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability." It is explained in the EIS that Reclamation would work cooperatively with the SRTTG (Sacramento River Temperature Task Group) to determine the best use of the cold-water pool each year under an adaptive cold water management plan. Reclamation would manage the cold-water pool and operate Shasta Dam each year based on recommendations from the SRTTG. Because adaptive management is predicated on using best available science and new information to make decisions, a monitoring program would be implemented as part of the adaptive management plan. SRTTG members would conduct monitoring, develop monitoring protocols, and set performance standards to determine the success of adaptive management actions."

EWC-43: Please refer to Master Comment Response COST/BEN-5, "Potential Project Financing," and Master Comment Response GEN-4, "Best Available Information."

EWC-44: Please refer to Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response FISHPASS-1, "Fish Passage Above Shasta Dam," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

EWC-45: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

EWC-46: All operations simulation modeling in the DEIS was performed with the latest version of the CalSim-II simulation model, the best available tool for modeling joint CVP/SWP system operations in California. For information related to the CalSim-II model used for evaluations in the EIS, please see EIS Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.1, "Methods and Assumptions," and the Modeling Appendix, Chapter 2, "CalSim-II." While it is impossible to accurately predict the future the "modeled" results of any specific simulation, as included in the analysis, represent the best available set of anticipated system operations under the assumed set of hydrology, water demands, physical facilities, and regulatory conditions included in the simulation.

Please refer to Master Comment Response GEN-4, "Best Available Information," and Master Comment Response ALTR-1, "Range of Alternatives General."

EWC-47: Please refer to Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," and Master Comment Response GEN-4, "Best Available Information."

EWC-48: CALSIM is the best available tool to represent CVP/SWP operations. Operations modeling was performed using the CalSim II simulation model, the best available tool for predicting CVP/SWP system-wide water operations. Details on the CalSim II model and the assumptions included in all simulations can be found in the Modeling Appendix, Chapter 2, "CalSim-II." The CalSim-II model includes simulation of Trinity and Lewiston Lakes and the Clear Creek diversion from Lewiston Lake to the Sacramento River basin. Table 6-7 in Chapter 6, "Hydrology, Hydraulics and Water Management," shows changes in Trinity River flows simulated using CalSim-II, under the project alternatives in both existing and future conditions. On a long-term average basis, there would be a marginal increase in Trinity River flows under the project alternatives as shown in Table 6-7. For detailed information on project operational impacts to fisheries in the Trinity River please review Section 11.3.3, "Direct and Indirect Effects" in Chapter 11, "Fisheries and Aquatic Ecosystems."

EWC-49: Comment noted.

EWC-50: Please refer to Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," and Master Comment Response ALTR-1, "Range of Alternatives General."

EWC-51: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development –Anadromous Fish Survival," and Master Comment Response GEN-1, "Comment Included as Part of the Record."

EWC-52: Each of the alternatives provide benefits, to varying degrees, to anadromous fish in critical and dry years, when Chinook populations are at greatest risk of mortality. By increasing production in these years, relative to the base conditions, the risk of extirpation of listed species is reduced. In addition, the alternatives development process considered multiple additional proposals for improving conditions for anadromous fish. Refer to Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects" for additional details.

Please refer to Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response DSFISH-3, "Fish Habitat Restoration," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

EWC-53: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. Under the SLWRI, Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability, and vice versa.

Please refer to Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response P&N-1, "Purpose and Need and Objectives," and, Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

EWC-54: Shasta will continue to be operated under the required guidelines, as defined in the NMFS 2009 BO that includes working with the four Fisheries and Operation Technical Teams (including the Sacramento River Temperature Task Group) responsible for adjusting operations to meet contractual obligations for water deliveries and to minimize adverse effects on listed anadromous fish species. These groups provide recommendations to the Water Operations Management Team (WOMT), which then considers recommendations from multiple work teams to inform changes in water operations.

The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. Under the SLWRI, Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability, and vice versa.

Please refer to Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response ALTR-1, "Range of Alternatives General."

EWC-55: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record," Master Comment Response GEN-4, "Best Available Information," and Master Comment Response ALTS-1, "Alternative Selection."

EWC-56: Please refer to Master Comment Response WASR-3, "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River," Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System," and Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

EWC-57: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

EWC-58: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response WASR-3, "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River."

EWC-59: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

EWC-60: Please refer to Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

EWC-61: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River."

EWC-62: Please refer to Master Comment Response GEN-4, "Best Available Information."

EWC-63: Please refer to Master Comment Response WASR-3, "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River," and Master Comment Response WASR-4, "CRMP's Responsibilities to Maintain the ORVs of the McCloud River."

EWC-64: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," Master Comment Response GEN-2, "Unsubstantiated Information."

EWC-65: Please refer to Master Comment Response WASR-3, "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River," and Master Comment Response WASR-4, "CRMP's Responsibilities to Maintain the ORVs of the McCloud River."

EWC-66: Please refer to Master Comment Response WASR-3, "The Shasta-Trinity National Forest LRMP and Protection of the Eligibility of the McCloud River as a Wild and Scenic River," and Master Comment Response WASR-4, "CRMP's Responsibilities to Maintain the ORVs of the McCloud River."

EWC-67: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

EWC-68: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response CMS-1, "EIS Mitigation Plan."

EWC-69: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

EWC-70: A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR Part 1503.4). Many comment authors expressed personal opinions, histories or experiences which are not appropriately addressed as part of the NEPA process. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

EWC-71: Please refer to Master Comment Response CR-5, "Environmental Justice."

EWC-72: Please refer to Master Comment Response EJ-1, "Potential Effects to Disadvantaged Communities."

EWC-73: Please refer to Master Comment Response CR-5, "Environmental Justice," and Master Comment Response CR-15, "National Historic Preservation Act Section 106 Consultations."

EWC-74: Please refer to Master Comment Response CR-3, "Current Effects to Cultural Resources," and Master Comment Response CR-2, "Federal Recognition."

EWC-75: Please refer to Master Comment Response CR-2, "Federal Recognition," Master Comment Response CR-3, "Current Effects to Cultural Resources," Master Comment Response CR-8, "Native American Connection to Salmon," and Master Comment Response CR-11, "Cultural Resources and NEPA."

EWC-76: Please refer to Master Comment Response CR-3, "Current Effects to Cultural Resources," and Master Comment Response CR-2, "Federal Recognition."

EWC-77: Please refer to Master Comment Response CR-2, "Federal Recognition."

EWC-78: Please refer to Master Comment Response CR-3, "Current Effects to Cultural Resources," and Master Comment Response CR-2, "Federal Recognition."

EWC-79: Please refer to Master Comment Response CR-3, "Current Effects to Cultural Resources," and Master Comment Response CR-2, "Federal Recognition."

EWC-80: Please refer to Master Comment Response CR-2, "Federal Recognition," and Master Comment Response CR-5, "Environmental Justice."

EWC-81: Please refer to Master Comment Response CR-2, "Federal Recognition," and Master Comment Response CR-15, "National Historic Preservation Act Section 106 Consultations."

EWC-82: Chapter 1, "Introduction," Section 1.6, "Areas of Controversy," of the DEIS acknowledges that Native American concerns and cultural resources remain an area of controversy. The Record of Decision on the SLWRI will include the plan formulation evaluation as well as the FEIS, comments on the DEIS and responses to comments on the DEIS. The decision-maker will have a full picture of the public interests involved in the selection of an alternative to recommend to Congress for authorization.

As stated in Chapter 1, "Introduction," Section 1.1.1, "Project Purpose andObjectives" of the Final EIS, the Project purpose is to improve operational flexibility of the Sacramento-San Joaquin Delta watershed system to meet specified primary and secondary project objectives including increasing survival of anadromous fish populations in the Sacramento River and increasing water supply and water supply reliability for agricultural, M&I, and environmental purposes, to help meet current and future water demands (primary objectives); and to conserve, restore and enhance ecosystem resources in the Shasta Lake area and the upper Sacramento River, reduce flood damage downstream, develop additional hydropower generation capabilities at Shasta Dam, maintain and increase recreation opportunities at Shasta Lake and maintain or improve water quality conditions downstream (secondary objectives). The DEIS examines the full range of impacts on the human environment of five action alternatives and a no action alternative.

Chapter 14, "Cultural Resources" identifies impacts from inundation of Traditional Cultural Properties and Sacred Land Filings, which include Winnemem Wintu places of traditional, ceremonial, and sacred uses. See "Impact Culture-2" in Section 14.3.4, "Mitigation Measures" for "CP1," "CP2," "CP3," "CP4," and "CP5," which are identified as significant and unavoidable, with no feasible mitigation identified.

Please refer to Master Comment Response CR-8, "Native American Connection to Salmon," and Master Comment Response CR-2, "Federal Recognition."

EWC-83: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-15, "National Historic Preservation Act Section 106 Consultations."

EWC-84: Please refer to Master Comment Response CR-6, "United Nations Declaration on "The Rights of Indigenous Peoples."

EWC-85: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-5, "Environmental Justice."

EWC-86: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-6, "United Nations Declaration on "The Rights of Indigenous Peoples."

EWC-87: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources."

EWC-88: Chapter 1, "Introduction," Section 1.6, "Areas of Controversy," of the DEIS acknowledges that Native American concerns and cultural resources remain an area of controversy. The Record of Decision on the SLWRI will include the plan formulation evaluation as well as the FEIS, comments on the DEIS and responses to comments on the DEIS. The decision-maker will have a full picture of the public interests involved in the selection of an alternative to recommend to Congress for authorization.

As stated in Chapter 1, "Introduction," Section 1.1.1, "Project Purpose Objectives" of the Final EIS, the Project purpose is to improve operational flexibility of the Sacramento-San Joaquin Delta watershed system to meet specified primary and secondary project objectives including increasing survival of anadromous fish populations in the Sacramento River and increasing water supply and water supply reliability for agricultural, M&I, and environmental purposes, to help meet current and future water demands (primary objectives); and to conserve, restore and enhance ecosystem resources in the Shasta Lake area and the upper Sacramento River, reduce flood damage downstream, develop additional hydropower generation capabilities at Shasta Dam, maintain and increase recreation opportunities at Shasta Lake and maintain or improve water quality conditions downstream (secondary objectives). The DEIS examines the full range of impacts on the human environment of five action alternatives and a no action alternative.

Chapter 14, "Cultural Resources" identifies impacts from inundation of Traditional Cultural Properties and Sacred Land Filings, which include Winnemem Wintu places of traditional, ceremonial, and sacred uses. See "Impact Culture-2" in Section 14.3.4, "Mitigation Measures" for "CP1," "CP2," "CP3," "CP4," and "CP5," which are identified as significant and unavoidable, with no feasible mitigation identified.

Please refer to Master Comment Response CR-5, "Environmental Justice."

EWC-89: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-11, "Cultural Resources and NEPA."

EWC-90: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-5, "Environmental Justice."

EWC-91: The Botanical Resources and Wetlands Technical Report and Chapter 12, "Botanical Resources and Wetlands," include updated information on Shasta snow-wreath. Surveys were completed to map population sizes and locations to accurately quantify the impacts to Shasta snow-wreath populations from the dam raise and lake inundation. Chapter 12, Section 12.3.4, "Direct and Indirect Effects," Impact Bot-2: Loss of MSCS Covered Species and Impact BOT-3: Loss of USFS Sensitive, BLM Sensitive, or CRPR Species include the analysis of impacts to Shasta snow-wreath. Mitigation measures were developed in cooperation with the USFWS, USFS, and BLM, and were updated in Section 12.3.5, "Mitigation Measures," of the EIS.

The Wildlife Resources Technical Report – Attachment 10, "Terrestrial Mollusk Survey Report," contains information on terrestrial mollusk surveys including the level of effort, methods, and results. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect Effects," Impact Wild-12: Impacts on Special-Status Mollusks (Shasta Sideband, Wintu Sideband, Shasta Chaparral, and Shasta Hesperian) and Their Habitat includes the analysis of impacts to special-status terrestrial mollusks. In addition, the EIS was revised to enhance the impact analysis and mitigation measures in Section 13.3.5 for special-status terrestrial mollusks.

The Wildlife Resources Technical Report Attachment 3, "Breeding Bird Survey Results – Breeding Bird Surveys 2007-2014," includes information on purple martin surveys including the level of survey effort, methods, and results. The Wildlife Resources Technical report was revised to enhance the discussion of purple martin. In Chapter 13, "Wildlife Resources," of the EIS, Section 13.3.4, "Direct and Indirect

Effects," Impact Wild-7: Impact on the Purple Martin and its Nesting Habitat includes the revised analysis of impacts to purple martin. In addition, the EIS was revised to enhance the mitigation measures in Section 13.3.5 for purple martin and its nesting habitat.

Impact Wild-1: Take and Loss of Habitat for the Shasta Salamander in Chapter 13 addresses impacts to Shasta Salamander. In the Final EIS, mitigation measures were enhanced to reduce impacts to Shasta salamander. Where surveys for special status species have not been completed to meet established protocols, Reclamation's approach is to assume presence of these species within areas of potential habitat. The Final EIS was revised to include an enhanced discussion of the affected environment, impact analysis, and mitigation measures.

The Botanical Resources and Wetlands Technical Report Attachment 6, "Botanical Survey Report 2002-2014," includes information on Shasta snow-wreath (*Neviusia cliftonii*) and Shasta huckleberry (*Vaccinium* sp.) surveys.

EWC-92: Chapter 7, "Water Quality," and the associated Water Quality Technical; Report provide a comprehensive discussion of the nature and location of historic mining activities and existing features as they relate to heavy metals and other water quality constituents. Under the No-Action Alternative, the existing mine drainage issues will continue consistent with abatement efforts of land owners and managers. With the exception of an isolated area near the Bully Hill mine complex, there are no abandoned or active mines that would be subject to inundation or disturbance if the SLWRI project is authorized.

The discussion of fisheries impacts in Chapter 11, "Fisheries and Aquatic Ecosystems," referenced by the commenter is specific to impacts to cold water habitat. Discussion of water quality impacts on beneficial uses (e.g., cold water habitat) is provided in Chapter 7, "Water Quality," specifically Impacts WQ-3 and WQ-6.

EWC-93: Please refer to Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts."

EWC-94: Please refer to Master Comment Response COST/BEN-5, "Potential Project Financing."

EWC-95: This comment is related to historical CVP repayment and potential project beneficiaries' payment capacity. Please see Master Comment Response COST/BEN-5, "Potential Project Financing."

EWC-96: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

EWC-97: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

EWC-98: Please refer to Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts," Master Comment Response GEN-1, "Comment Included as Part of the Record," and Master Comment Response CMS-1 "EIS Mitigation Plan."

EWC-99: Please refer to Master Comment Response CMS-1, "EIS Mitigation Plan," and Master Comment Response CR-2, "Federal Recognition."

EWC-100: Please refer to Master Comment Response REC-4, "Relocation of Recreation Facilities."

EWC-101: Please refer to Master Comment Response REC-9, "Relationship Between Recreation and Shasta Lake Water Levels."

EWC-102: A detailed discussion on management of the cold-water pool for anadromous fish is presented in Chapter 2, "Alternatives," Section 2.3.6, "CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability." It is explained that Reclamation would work cooperatively with the SRTTG (Sacramento River Temperature Task Group) to determine the best use of the cold-water pool each year under an adaptive cold water management plan. Reclamation would manage the cold-water pool and operate Shasta Dam each year based on recommendations from the SRTTG. Because adaptive management is predicated on using best available science and new information to make decisions, a monitoring program would be implemented as part of the adaptive management plan. SRTTG members would conduct monitoring, develop monitoring protocols, and set performance standards to determine the success of adaptive management actions.

Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

EWC-103: The No-Action Alternative and action alternatives do not include changes to existing CVP or SWP contract terms or existing water rights. SLWRI does not supersede existing laws or regulations and does not exempt any actions from compliance with applicable laws, including NEPA or ESA. The Federal, State, and local regulatory framework for the SLWRI is generally described in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.4, "Regulatory Framework," of the DEIS. Chapters 4-25 contain more detailed discussions of the

"Regulatory Framework" by resource area. In addition, Chapter 26, "Other Required Disclosures," further describes the Federal and State laws, rules and regulations, Executive Orders, and compliance requirements that may be required if an alternative is selected for implementation.

EWC-104: The number of facilities affected can be found in the DEIS Chapter 18, "Public Access and Recreation," Table 18-4, 18-7, and 18-9 "Talley of Shasta Lake Recreation Facilities Substantially Affected by (CP1-CP3)" respectively. Recreation facility relocation would occur to coincide with the filling of the enlarged lake to minimize recreation facilities outages. While there may be short periods of outages at a particular facility, these outages would be planned such that at least one or more of each type of facility would remain open at any one time. Mitigation Measure REC-2 "Provide Information About and Improve Alternate Recreation Access and Opportunities to Mitigate the Temporary Loss of Recreation Access and Opportunities During Construction at Shasta Dam" would allow for notification to the public of outages during construction. Overall, short –term construction impacts are balanced against the long-term improvement in recreation opportunities to provide an increase in recreation opportunities at a cost of some disruption during constructing and filling of an enlarged Shasta Lake. After the project is completed the reservoir fluctuation will remain similar to current conditions.

Please refer to Master Comment Response REC-9, "Relationship Between Recreation and Shasta Lake Water Levels," Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir," and Master Comment Response RAH-2, "Reservoir Surface Area with Reservoir Enlargement."

EWC-105: Please refer to Master Comment Response REC-3, "Effects to Tourism at Shasta Lake," Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity," and Master Comment Response REC-1, "Effects to Recreation at Shasta Lake."

EWC-106: Please refer to Master Comment Response REC-1, "Effects to Recreation at Shasta Lake."

EWC-107: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," and Master Comment Response EI-7, "Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS."

EWC-108: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan."

EWC-109: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," and Master Comment Response EI-7, "Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS."

EWC-110: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," and Master Comment Response EI-7, "Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS."

EWC-111: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," and Master Comment Response EI-7, "Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS."

EWC-112: Chapter 2, "Alternatives," describes the baselines for comparison. Multiple baselines are used to allow for informed decision-making by describing the 1) differences in the no-action/no-project alternative as compared to the action alternatives and 2) existing conditions as compared to the action alternatives. Efforts were made to simplify the document as much as feasible while meeting the needs to disclose environmental effects to the extent required to meet current legal requirements for full disclosure, including multiple baselines.

Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

EWC-113: Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

EWC-114: Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

EWC-115: Comment noted.

EWC-116: Please refer to Master Comment Response TA-1, "Interrelationship Between Shasta Dam Operations, San Joaquin River Flows, and Delta Exports."

EWC-117: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-118: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," and Master Comment Response EI-7, "Bay Delta Conservation Plan Too

Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS."

EWC-119: The purpose of this EIS is to disclose and evaluate potential impacts to the environment from project implementation. In the Delta the environment is the flow and salinity at any given time and location and not the source of the water molecules that happen to be present.

The Sacramento- San Joaquin delta is a complex system of inter-connected channels. These channels are hydraulically connected with flows driven by inflows from the Sacramento, San Joaquin and other rivers and streams, CVP/SWP and numerous other in-delta exports, and ocean tidal stage from the outlet to the Pacific Ocean. A mass balance analysis of CalSim-II results shows that Sacramento River water is frequently exported, particularly in July-December when exports are relatively high, and San Joaquin River flows are relatively low. The citation provided ("Using Particle Tracking to Indicate Delta Residence Time") also shows that Sacramento River water passing by Freeport is exported, both supporting the fact that the Sacramento River is hydraulically connected to the entire delta, including the South delta and the CVP/SWP export pumps. The existing flow and salinity standards recognize this fact and do not specify the source of the water molecules at any specific location only that the molecules that are at that location meet the standards and provide the desired level of protection to the ecosystem.

All system operations modeling was performed using the CalSim II CVP/SWP simulation model, the best available tool for predicting system-wide water operations throughout the Central Valley. Details on the CalSim-II model and the assumptions included in all simulations can be found in the Modeling Appendix, Chapter 2, "CalSim-II." As described in the Modeling Appendix, Chapter 2, "CalSim-II," the CalSim-II model includes an Artificial Neural Network (ANN) that is based on the DSM2 simulation model, the best available model of the hydrodynamic and salinity conditions in the Delta. DSM2 is also described in the Modeling Appendix, Chapter 7, "Delta Hydrodynamic Model." In the ANN, as in DSM2, additional inflows from the Sacramento River and the CVP/SWP exports from the south Delta affect flows and salinities throughout the delta. This process recognizes and applies the hydraulic connectivity between the delta channels to determine system operations that meet the flow and salinity standards at all location in the delta.

The results of the analysis show that additional Sacramento River inflow from Shasta Reservoir enlargement allows for increases in exports while still meeting all applicable flow, salinity, and stage requirements at

various locations throughout the Delta, and maintaining the level of protection implicit in the formulation of the standards.

Please refer to Master Comment Response TA-1, "Interrelationship Between Shasta Dam Operations, San Joaquin River Flows, and Delta Exports."

EWC-120: The purpose of this EIS is to disclose and evaluate potential impacts to the environment from project implementation. In the Delta the environment is the flow and salinity at any given time and location and not the source of the water molecules that happen to be present. The referenced studies do not address the overall hydrodynamics and salinity of the Sacramento-San Joaquin Delta system, the studies simply address of the issue of the source of the specific water molecules that make up the CVP and SWP exports. This type of analysis was not performed in support of the EIS as it is not relevant to the impact analysis.

The Sacramento- San Joaquin Delta is a complex system of inter-connected channels. These channels are hydraulically connected with flows driven by inflows from the Sacramento, San Joaquin and other rivers and streams, CVP/SWP and numerous other in-delta exports, and ocean tidal stage from the outlet to the Pacific Ocean. A mass balance analysis of CalSim-II results shows that Sacramento River water is frequently exported, particularly in July-December when exports are relatively high, and San Joaquin River flows are relatively low. The citation provided ("Using Particle Tracking to Indicate Delta Residence Time") also shows that Sacramento River water passing by Freeport is exported, both supporting the fact that the Sacramento River is hydraulically connected to the entire delta, including the South delta and the CVP/SWP export pumps. The existing flow and salinity standards recognize this fact and do not specify the source of the water molecules at any specific location only that the molecules that are at that location meet the standards and provide the desired level of protection to the ecosystem.

All system operations modeling was performed using the CalSim II CVP/SWP simulation model, the best available tool for predicting system-wide water operations throughout the Central Valley. Details on the CalSim-II model and the assumptions included in all simulations can be found in the Modeling Appendix, Chapter 2, "CalSim-II." As described in the Modeling Appendix, Chapter 2, "CalSim-II," the CalSim-II model includes an Artificial Neural Network (ANN) that is based on the DSM2 simulation model, the best available model of the hydrodynamic and salinity conditions in the Delta. DSM2 is also described in the Modeling Appendix, Chapter 7, "Delta Hydrodynamic Model." In the ANN, as in DSM2, additional inflows from the Sacramento River and the CVP/SWP exports from the south delta affect

flows and salinities throughout the delta. This process recognizes and applies the hydraulic connectivity between the delta channels to determine system operations that meet the flow and salinity standards at all location in the delta.

The results of the analysis show that additional Sacramento River inflow from Shasta Reservoir enlargement allows for increases in exports while still meeting all applicable flow, salinity, and stage requirements at various locations throughout the Delta, and maintaining the level of protection implicit in the formulation of the standards.

Please refer to Master Comment Response TA-1, "Interrelationship Between Shasta Dam Operations, San Joaquin River Flows, and Delta Exports."

EWC-121: The purpose of this EIS is to disclose and evaluate potential impacts to the environment from project implementation. In the Delta the environment is the flow and salinity at any given time and location and not the source of the water molecules that happen to be present.

The Sacramento- San Joaquin delta is a complex system of inter-connected channels. These channels are hydraulically connected with flows driven by inflows from the Sacramento, San Joaquin and other rivers and streams, CVP/SWP and numerous other in-delta exports, and ocean tidal stage from the outlet to the Pacific Ocean. A mass balance analysis of CalSim-II results shows that Sacramento River water is frequently exported, particularly in July-December when exports are relatively high, and San Joaquin River flows are relatively low. The citation provided ("Using Particle Tracking to Indicate Delta Residence Time") also shows that Sacramento River water passing by Freeport is exported, both supporting the fact that the Sacramento River is hydraulically connected to the entire delta, including the South delta and the CVP/SWP export pumps. The existing flow and salinity standards recognize this fact and do not specify the source of the water molecules at any specific location only that the molecules that are at that location meet the standards and provide the desired level of protection to the ecosystem.

All system operations modeling was performed using the CalSim II CVP/SWP simulation model, the best available tool for predicting system-wide water operations throughout the Central Valley. Details on the CalSim-II model and the assumptions included in all simulations can be found in the Modeling Appendix, Chapter 2, "CalSim-II." As described in the Modeling Appendix, Chapter 2, "CalSim-II," the CalSim-II model includes an Artificial Neural Network (ANN) that is based on the DSM2 simulation model, the best available model of the hydrodynamic and salinity conditions in the Delta. DSM2 is also

described in the Modeling Appendix, Chapter 7, "Delta Hydrodynamic Model." In the ANN, as in DSM2, additional inflows from the Sacramento River and the CVP/SWP exports from the south delta affect flows and salinities throughout the delta. This process recognizes and applies the hydraulic connectivity between the delta channels to determine system operations that meet the flow and salinity standards at all location in the delta.

The results of the analysis show that additional Sacramento River inflow from Shasta Reservoir enlargement allows for increases in exports while still meeting all applicable flow, salinity, and stage requirements at various locations throughout the Delta, and maintaining the level of protection implicit in the formulation of the standards.

Please refer to Master Comment Response TA-1, "Interrelationship Between Shasta Dam Operations, San Joaquin River Flows, and Delta Exports."

EWC-122: Please refer to Master Comment Response TA-1, "Interrelationship Between Shasta Dam Operations, San Joaquin River Flows, and Delta Exports."

EWC-123: Please refer to Master Comment Response TA-1, "Interrelationship Between Shasta Dam Operations, San Joaquin River Flows, and Delta Exports."

EWC-124: All operations simulation modeling in the DEIS was performed with the latest version of the CalSim-II simulation model, the best available tool for modeling joint CVP/SWP system operations in California. The assumptions in the modeling used in support of this document included the 2008/2009 BO's as well as the most recent versions of all other regulatory conditions. Specific details of the assumptions included in the CalSim-II modeling are included in Table 2-1 in Chapter 2, "CALSIM," of DEIS Modeling Appendix. In the modeling many other water supply and water quality requirements must be met to allow exports. These Delta wide requirements are met with the additional releases from the enlarged Shasta reservoir allowing additional pumping. The results of this modeling include the system response to the project including changes in reservoir storages, releases, stream flows, and Delta exports. These results are summarized in the text with full results included in Chapter 6, "Hydrology, Hydraulics and Water Management."

Please refer to Master Comment Response GEN-4, "Best Available Information," and Master Comment Response EI-7, "Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS."

EWC-125: Thank you for your comment. Please see Master Comment Response Gen-1, "Comment Included as Part of the Record." DWR, Reclamation, USFWS, and NMFS jointly prepared the Draft EIR/EIS for the BDCP, which was released to the public on December 13, 2013. As described in the Executive Summary of the BDCP Draft EIS/EIR, BDCP proponents include only DWR and six SWP and CVP water contractors.

EWC-126: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-127: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-128: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-129: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-130: Please refer to Master Comment Response WR-1, "Water Rights"

EWC-131: Please refer to Master Comment Response WR-1, "Water Rights," and Master Comment Response CEQA-1, "CEQA Compliance."

EWC-132: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-133: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-134: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-135: Please refer to Master Comment Response WR-1, "Water Rights."

EWC-136: Chapter 13, "Wildlife Resources," Section 13.3.4, "Direct and Indirect Effects," describes impacts to downstream wildlife resources from each of the action alternatives.

Please refer to Master Comment Response WR-1, "Water Rights."

EWC-137: As stated in DEIS Chapter 10, "Agricultural Resources," Section 10.1.2, "Important Farmland," the San Joaquin Valley lost 66 percent of its irrigated farmland to long-term land idling in Fresno,

Kings, and Kern counties. The Fresno County decrease—more than 56,000 acres—was particularly notable and is associated with salinity and drought-related land retirement on the west side of the valley. As stated in Chapter 10, Section10.3.4 "Direct and Indirect Effects," the action alternatives would help reduce estimated future agricultural water shortages in the CVP/SWP service areas by increasing dry and critical year water supplies for agricultural deliveries. Chapter 7, "Water Quality," Section 7.1 "Overview of Water Quality Conditions," describes that soil salinity is an issue in the CVP service areas.

EWC-138: Reclamation is exercising its water rights in accordance with the terms and conditions of its water right permits, applicable water rights decisions, and state and federal law.

EWC-139: Comment noted.

EWC-140: Please refer to Master Comment Response BDCP-1, “Relationship of the SLWRI to the Bay Delta Conservation Plan,” and Master Comment Response WR-1, “Water Rights.”

EWC-141: Reclamation works with the State Board on all issues related to its water right petitions, including protests.

Please refer to Master Comment Response WR-1, “Water Rights.”

EWC-142: Chapter 6, “Hydrology, Hydraulics, and Water Management,” Section 6.2, “Regulatory Framework” of the DEIS describes how State Water Resources Control Board (SWRCB) approval policies require water transfers from north of Delta to south of Delta be consistent with the Joint Point of Diversion and D-1641 Water Rights Decisions. Water transfers are regulated by the SWRCB and must comply with the California Water Code Sections 1725-1732 and transferees must demonstrate that there is no harm to other users in the Basin, including fish and wildlife resources. None of the action alternatives evaluated in the DEIS would have any effect on the water transfer program between north of Delta and south of Delta contractors and therefore is not evaluated in the DEIS.

EWC-143: Please refer to Master Comment Response GEN-1, “Comment Included as Part of the Record.”

EWC-144: Chapter 6, “Hydrology, Hydraulics, and Water Management,” Section 6.1.7 “Groundwater Resources” of the DEIS describes groundwater levels and budget and groundwater quality for the Shasta Lake and vicinity, the Upper Sacramento River area, the Lower Sacramento River and Delta area, and the CVP/SWP service areas. Chapter 6 “Hydrology, Hydraulics, and Water Management,” Section 6.2.1 “Regulatory Framework” of the DEIS describes the Federal, State,

and local regulatory framework for the SLWRI, as it relates to that resource area. Chapter 6 “Hydrology, Hydraulics, and Water Management,” Section 6.3.2 “Criteria for Determining Significance of Effects” of the DEIS describes the manner in which potential impacts on groundwater resources are evaluated. As described in Chapter 6, “Hydrology, Hydraulics, and Water Management,” Sections 6.3.3, “Direct and Indirect Effects,” and 6.3.4, “Mitigation Measures,” of the DEIS, no groundwater resources mitigation measures are proposed for the action alternatives because no potentially significant impacts have been identified (Impact H&H-12 “change in groundwater levels”). Impact H&H-13 (“change in groundwater quality") could result in beneficial impacts, so no mitigation is needed.

EWC-145: Chapter 6 “Hydrology, Hydraulics, and Water Management,” Section 6.2 “Regulatory Framework” of the DEIS describes how State Water Resources Control Board (SWRCB) approval policies require water transfers from north of Delta to south of Delta be consistent with the Joint Point of Diversion and D-1641 Water Rights Decisions. Water transfers are regulated by the SWRCB and must comply with the California Water Code Sections 1725-1732 and transferees must demonstrate that there is no harm to other users in the Basin, including fish and wildlife resources. None of the action alternatives evaluated in the DEIS would have any effect on the water transfer program between north of Delta and south of Delta contractors and therefore is not evaluated in the DEIS.

EWC-146: Chapter 6 “Hydrology, Hydraulics, and Water Management,” Section 6.2 “Regulatory Framework” of the DEIS describes how State Water Resources Control Board (SWRCB) approval policies require water transfers from north of Delta to south of Delta be consistent with the Joint Point of Diversion and D-1641 Water Rights Decisions. Water transfers are regulated by the SWRCB and must comply with the California Water Code Sections 1725-1732 and transferees must demonstrate that there is no harm to other users in the Basin, including fish and wildlife resources. None of the action alternatives evaluated in the DEIS would have any effect on the water transfer program between north of Delta and south of Delta contractors and therefore is not evaluated in the DEIS.

EWC-147: The Climate Change Modeling Appendix provides an assessment of the potential to achieve the objectives of the SLWRI under projected future climate change. See Master Comment Response CC-1, “Climate Change Uncertainty and Related Evaluations,” for a description of the differences between the Appendix and the information used in the DEIS chapters. Please refer to Master Comment Response NEPA-2, “Cumulative Impacts.”

EWC-148: The potential exposure to sensitive receptors to substantial pollutant concentrations is discussed under Impact AQ-3 (CP1), in Chapter 5, "Air Quality and Climate." The analysis explains "there are no sensitive receptors near the dam raise areas" and recognizes that "there may be sensitive receptors near the some of the lands that would be cleared before inundation by the expanded reservoir." On the same page the analysis states, "There are no sensitive receptors within one-half mile of the dam site, and sensitive receptors would not be exposed to diesel PM from that source" (i.e., construction activity at the dam site).

The commenter provides no evidence that any particular sensitive receptor was overlooked. The commenter also provides no evidence that the air quality effects at specific, more-distance sensitive receptors should have been analyzed in greater detail.

EWC-149: The commenter provides ARB's definition of air quality sensitive receptors.

EWC-150: The commenter provides no suggestion about the approach that should be followed or a source of wind data representative of meteorological conditions at the project site. Page 1-3 of the Air Quality and Climate Technical Report in the Physical Resources Appendix explains that "the predominant wind direction and speed, measured at the Red Bluff Station, is from the north-northwest at 9 miles per hour (ARB 1994)." It is questionable, however, whether the wind conditions at the project site are similar to those in Red Bluff given the varying topography and surface roughness characteristics. To the knowledge of Reclamation and its consultants, there is no wind data collected in closer proximity to the project site. Thus, there is no data Reclamation could use to define a radius or wind rose of wind directional tendencies representative of the project site.

The commenter also states that the air quality analysis fails to indicate whether sensitive receptors are located in the Primary Study Area. Whether receptors are located inside or outside the Primary Study Area is less important than their proximity to activities that generate TAC emissions. Because it would not make sense to apply the same study area for all resource topics (i.e., air quality, noise, geology, agriculture), page 5-1 the EIS explains that the primary study area for the air quality analysis has two primary study areas—local and regional. The area of local concern includes areas proximate to where high levels of construction activity would occur. The area of regional concern is defined by the affected air basins and Figure 5-1 shows the locations of both the air basins and Shasta County Air Quality Management District's (SCAQMD) jurisdiction.

The commenter also argues that the analysis fails to show the precise locations of sensitive receptors and substantiate why they are far enough from the emissions sources to warrant a less-than-significant impact conclusion. Impact AQ-3 (CP1), which begins on page 5-41 of the DEIS, discusses the potential for construction activities to expose sensitive receptors to substantial concentrations of CO, PM10, PM2.5, and toxic air contaminants (TAC). The analysis focuses on the intensity in which emissions would be generated and the effectiveness of the required dust control measures, as well as the exhaust control measures that would be required by SCAQMD Rule 2:7. Because it was determined that the emissions sources would be adequately controlled a detailed examination of the particular locations of the nearest sensitive receptors and dispersion characteristics of the area is not needed.

The commenter provides no evidence that any particular sensitive receptor was overlooked. The commenter also provides no evidence that the air quality effects at specific, more-distance sensitive receptors should have been analyzed in greater detail.

EWC-151: The commenter claims that the analysis fails to show a ready comparison between the levels of construction-generated emissions for the project and the air quality criteria used by SCAQMD.

The analysis of criteria air pollutants and precursors generated during construction activity under CP1 is in Chapter 5, "Air Quality and Climate," Section 5.3.4, "Direct and Indirect Effects," of the Draft EIS. Daily mass emission levels are estimated for each project element of CP-1 and summarized in Table 5-4. Chapter 5 states, "As seen in Table 5-4, ROG, NOX, and PM emissions for several of the individual project elements could exceed applicable Shasta County thresholds, which would result in a significant impact." Thus, the mass emission thresholds recommended by SCAQMD and the Tehama County Air Pollution Control District (TCAPCD) shown in Chapter 5 were used to determine significance.

The commenter also claims that the analysis fails to show how many days of violations, if any, would occur based on construction activity. The precision in which the analysis can estimate the number of days mass emission thresholds would be exceeded is limited based on the accuracy of the projected construction schedule for each CP. Nonetheless, Figures 5-2 through 5-8 show how the maximum daily construction emissions of each criteria air pollutant and precursor are projected to change over the course of the construction schedule.

EWC-152: The commenter questions why the GHG analysis uses the mass emission threshold of 25,000 MT CO_2e/year after providing a review of some other, smaller mass emission thresholds that are

discussed in a 2008 white paper by the California Air Pollution Control Officers Association (CAPCOA 2008). There are multiple reasons why the GHG analysis applied a threshold of 25,000 MT CO_2e/year. First, in the disclaimer to its white paper CAPCOA openly states, "This paper is intended as a resource, not a guidance document. It is not intended, and should not be interpreted, to dictate the manner in which an air district or lead agency chooses to address greenhouse gas emissions in the context of its review of projects under CEQA" (CAPCOA 2008). CAPCOA's disclaimer further states, "This paper is intended as a resource, not a guidance document. It is not intended, and should not be interpreted, to dictate the manner in which an air district or lead agency chooses to address greenhouse gas emissions in the context of its review of projects under CEQA." This statement accurately reflects the fact that the approaches and project-specific thresholds for evaluating GHGs by government agencies and CEQA practitioners have rapidly evolved since the passage of AB 32 and continues to do so. Also, CAPCOA's publication specifically focuses on the use of various thresholds for CEQA documents and includes no mention of NEPA. This distinction is important given that Reclamation wrote the DEIS primarily to comply with NEPA.

The Council on Environmental Quality (CEQ) has provided draft guidance for federal lead agencies, such as Reclamation, to address impacts of GHG emissions in NEPA analyses. CEQ's draft guidelines include the following section:

If a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO2 equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. For long-term actions that have annual direct emissions of less than 25,000 metric tons of CO2 equivalent, CEQ encourages federal agencies to consider whether the action's long-term emissions should receive similar analysis. CEQ does not propose this as an indicator of a threshold of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs (CEQ 2010: p. 1-2).

While CEQ suggests that an emissions level that 25,000 MT CO2e/year is "an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public," Reclamation has decided to apply this level as the threshold for determining whether the net change in GHG emissions associated with project alternatives would be significant.

Furthermore, the commenter does not provide any evidence or reasoning to suggest that a smaller mass emission threshold would be more appropriate for this particular project or projects of this type.

EWC-153: Please refer to Master Comment Response AQ-4, "Greenhouse Gas Emissions Associated with Cement Production."

EWC-154: The commenter challenges the assumption in the GHG analysis that fossil fuel based-power plants would be used to generate electricity if the increase in hydropower generation does not occur. The commenter suggests this assumption is invalid because "fossil fuel plants provide baseline loads while hydropower tends to meet peak time load needs because hydro generation can be easily ramped up to meet heavy load peaks." While it is true that most baseload generation is provided by fossil fuel-based power it is also true that most peaker power plants, which are power plants that generally run only when there is a high demand, are fossil fuel-based. According to the recent list of operational power plants in California provided by the CEC, there are 1,237 operating power plants in California (0.1 MW or greater) and all 49 of the listed peaker plant are powered by natural gas or diesel (CEC 2013). (Also, none of the 366 listed hydroelectric plants are listed as peaker plants.) Please refer to Master Comment Response AQ-1, "Offsetting Greenhouse Gas Emissions with Increased Hydropower," for an explanation about why it was assumed that fossil fuel-based power would be generated but for the increased hydropower production at Shasta Dam.

EWC-155: Comment noted.

EWC-156: This comment appears to be related to allocation of costs to project beneficiaries, which is outside the scope of the DEIS. A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR Part 1503.4(b)). The commenter's calculation of "Cost of Annual Yield per Acre-foot" is inconsistent with the cost allocation process described in the Federal planning process identified in the U.S. Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G). As described in Master Comment Response COST/BEN-5, "Potential Project Financing," an updated cost allocation was included in the SLWRI Final Feasibility Report. This comment was included as part of the record and made available to decision makers before a final decision on the proposed project.

EWC-157: Comment noted.

EWC-158: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response P&N-1, "Purpose and Need and Objectives," Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions," and Master Comment Response DSFISH-3, "Fish Habitat Restoration."

EWC-159: Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

EWC-160: SLWRI alternatives include measures to reduce reliance on the Delta. SLWRI action alternatives include a water conservation program, under the "Reduce Demand" management measure common to all action alternatives. This program would help reduce reliance on imported water supplies, including those from the Delta. The water conservation program would be for new water supplies that would be created by the project to augment current water use efficiency practices. The proposed program would consist of a 10-year initial program to which Reclamation would allocate approximately $1.6 million to $3.8 million to fund water conservation efforts. Funding would be proportional to additional water supplies delivered and would focus on assisting project beneficiaries (agencies receiving increased water supplies because of the project), with developing new or expanded urban water conservation, agricultural water conservation, and water recycling programs. Program actions would be a combination of technical assistance, grants, and loans to support a variety of water conservation projects, such as recycled wastewater projects, irrigation system retrofits, and urban utilities retrofit and replacement programs. The program could be established as an extension of existing Reclamation programs, or as a new program through teaming with cost-sharing partners. Combinations and types of water use efficiency actions funded would be tailored to meet the needs of identified cost-sharing partners, including consideration of cost-effectiveness at a regional scale for agencies receiving funding.

SLWRI will not alter current reliance on the Delta in regards to water contracts and regulations. Water operations under SLWRI action alternatives are described in DEIS in Chapter 2, "Alternatives," Section 2.3, "Action Alternatives." SLWRI action alternatives do not include changes to any rules and regulations that govern operations at Shasta Dam in the form of flood control requirements, flow requirements, water quality requirements, and water supply commitments that govern operations at Shasta Dam. Also SLWRI action alternatives do not include increases in CVP or SWP water contract amounts.

Estimated increases in water supply deliveries under SLWRI action alternatives would be due to an increase in the reliability of CVP and SWP water supplies resulting in a reduction in previously unmet contract amounts.

Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

EWC-161: The Q5 climate projections is not the "central tendencies of the four quadrant scenarios" rather it is formed from ensemble members not included in the other 4 quadrant scenarios. (See appendix reference Reclamation (2013) for a detailed explanation of the methods used to develop socioeconomic-climate scenarios used in the sensitivity analyses). The purpose of forming the Q1 through Q5 ensemble informed projections is to address a wide range of potential future climates so that the effects of future climate uncertainty can be addressed in the sensitivity analysis. The socioeconomic-climate scenarios employed in the Climate Change Modeling appendix are non-stationary projections of future conditions. Please refer to figures 3-1 through 3-6 in the Climate Change Modeling Appendix for examples of non-stationary socioeconomic scenarios and figure 3-9 for an example of non-stationary climate projections. Because inter-annual variability is not well simulated by GCMs, the inter-annual variability present in the climate projections was based on the variability present in the historical hydrology sequence. See Reclamation (2011a) for more detailed discussions of GCM projection limitations.

Three bracketing socioeconomic climate scenarios were presented in the appendix however all projections plus a no climate change projection were simulated. The five ensemble informed climate projections are formed from independent groups of individual projections. The "central tendency" projection includes those projections bounded by the 25th to 75th percentiles of all projections for changes in temperature and precipitation. The remaining 4 representative projections were formed from the 10 near projections to the 10th and 90th percentiles of projections of changes in temperature and precipitation. For more details on the methods used to develop the climate projections see Reclamation (2013) in the Climate Change Modeling appendix. The socioeconomic-climate scenarios employed in the Climate Change Modeling appendix are non-stationary projections of future conditions. See figures 3-1 through 3-6 for examples of non-stationary socioeconomic scenarios and figure 3-9 for an example of non-stationary climate projections. Because inter-annual variability is not well simulated by GCMs, the inter-annual variability present in the

climate projections was based on the variability present in the historical hydrology sequence. See Reclamation (2011a) for more detailed discussions of GCM projection limitations.

Please refer to Master Comment Response CC-2, "Climate Change Projections."

EWC-162: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

EWC-163: Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," Master Comment Response COST/BEN-5, "Potential Project Financing," and Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations."

EWC-164: The comment appears to be based on numbers extracted from the Climate Change analysis. The purpose of the climate change analysis is to address a wide range of potential future climates so that the effects of future climate uncertainty can be addressed in the sensitivity analysis. The results presented in the document were developed using a different set of assumptions, input data, and modeling tools and should not be directly compared to results of the modeling and analysis performed to support impact analysis in the EIS.

The socioeconomic-climate scenarios employed in the Climate Change Modeling appendix are non-stationary projections of future conditions. Please refer to figures 3-1 through 3-6 in the Climate Change Modeling Appendix for examples of non-stationary socioeconomic scenarios and figure 3-9 for an example of non-stationary climate projections. Because inter-annual variability is not well simulated by GCMs, the inter-annual variability present in the climate projections was based on the variability present in the historical hydrology sequence. See Reclamation (2011a) for more detailed discussions of GCM projection limitations.

Three bracketing socioeconomic climate scenarios were presented in the appendix however all projections plus a no climate change projection were simulated. The five ensemble informed climate projections are formed from independent groups of individual projections. The "central tendency" projection includes those projections bounded by the 25th to 75th percentiles of all projections for changes in temperature and precipitation. The remaining 4 representative projections were formed from the 10 near projections to the 10th and 90th percentiles of projections of changes in temperature and precipitation. For more details on the methods used to develop the climate projections see Reclamation (2013) in the Climate change Modeling Appendix. The

socioeconomic-climate scenarios employed in the Climate Change Modeling appendix are non-stationary projections of future conditions. See figures 3-1 through 3-6 for examples of non-stationary socioeconomic scenarios and figure 3-9 for an example of non-stationary climate projections. Because inter-annual variability is not well simulated by GCMs, the inter-annual variability present in the climate projections was based on the variability present in the historical hydrology sequence. See Reclamation (2011a) for more detailed discussions of GCM projection limitations.

Please refer to Master Comment Response CC-2, "Climate Change Projections."

EWC-165: Please refer to Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," Master Comment Response COST/BEN-5, "Potential Project Financing."

EWC-166: As described in Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," evaluations of economic feasibility were not included in the DEIS, because they are not required under NEPA. Accordingly, a cost-benefit analysis was not included in the DEIS. Additionally, a preferred alternative was not identified in the DEIS, and is not required under NEPA. A preliminary cost-benefit analysis was included in the SLWRI Draft Feasibility Report, which was released to the public in February 2012. Estimated costs and benefits of action alternatives presented in the Draft Feasibility Report were determined by comparison of the with-project (action alternative) and without-project (No-Action Alternative) conditions, consistent with the Federal planning process identified in the U.S. Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G). Evaluations in the SLWRI Final Feasibility Report, including economic feasibility evaluations, were updated based on alternatives refinements and updated CVP and SWP operational assumptions included in the SLWRI DEIS, including the 2008 Long-term Operation BA, 2008 USFWS BO, and 2009 NMFS BO. Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," and Master Comment Response GEN-4, "Best Available Information."

EWC-167: As described in Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," evaluations in the SLWRI Final Feasibility Report were updated based on alternatives refinements and updated CVP and SWP operational assumptions included in the SLWRI DEIS, including the 2008 Long-Term Operation BA, 2008 USFWS BO, and 2009 NMFS BO. Updated cost-benefit

analyses for all comprehensive plans, including CP5, will be included as part of these updated evaluations. Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," and Master Comment Response GEN-4, "Best Available Information."

EWC-168: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

EWC-169: Please refer to Master Comment Response WSR-8, "Action Alternatives Don't Meet All Water Demands."

EWC-170: The comment appears to be based on numbers extracted from the Climate Change analysis. The purpose of the climate change analysis is to address a wide range of potential future climates so that the effects of future climate uncertainty can be addressed in the sensitivity analysis. The results presented in the document were developed using a different set of assumptions, input data, and modeling tools and should not be directly compared to results of the modeling and analysis performed to support impact analysis.

The socioeconomic-climate scenarios employed in the Climate Change Modeling appendix are non-stationary projections of future conditions. Please refer to figures 3-1 through 3-6 in the Climate Change Modeling Appendix for examples of non-stationary socioeconomic scenarios and figure 3-9 for an example of non-stationary climate projections. Because inter-annual variability is not well simulated by GCMs, the inter-annual variability present in the climate projections was based on the variability present in the historical hydrology sequence. See Reclamation (2011a) for more detailed discussions of GCM projection limitations.

Three bracketing socioeconomic climate scenarios were presented in the appendix however all projections plus a no climate change projection were simulated. The five ensemble informed climate projections are formed from independent groups of individual projections. The "central tendency" projection includes those projections bounded by the 25th to 75th percentiles of all projections for changes in temperature and precipitation. The remaining 4 representative projections were formed from the 10 near projections to the 10th and 90th percentiles of projections of changes in temperature and precipitation. For more details on the methods used to develop the climate projections see Reclamation (2013) in the Climate change Modeling Appendix. The socioeconomic-climate scenarios employed in the Climate Change Modeling appendix are non-stationary projections of future conditions. See figures 3-1 through 3-6 for examples of non-stationary socioeconomic scenarios and figure 3-9 for an example of non-

stationary climate projections. Because inter-annual variability is not well simulated by GCMs, the inter-annual variability present in the climate projections was based on the variability present in the historical hydrology sequence. See Reclamation (2011a) for more detailed discussions of GCM projection limitations.

Please refer to Master Comment Response CC-2, "Climate Change Projections."

EWC-171: The operations of enlarged Shasta have little effect on storage conditions in the south-of-Delta reservoirs. Please refer to figures 3-125 through 3-132 in the Climate Change Modeling Appendix. Both CVP and SWP San Luis Reservoir storage is slightly less with enlarged Shasta in both May and September because enlarged Shasta reservoir operations are intended to maintain higher storage levels in enlarged reservoir to increase the cold water pool in Shasta for the benefit of anadromous fish in the upper Sacramento River. Consequently, with less water generally available for south-of Delta export, CVP & SWP San Luis storage levels tend to be reduced.

EWC-172: Please refer to Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master Comment Response ALTR-1, "Range of Alternatives General."

EWC-173: Please refer to Master Comment Response ALTR-1, "Range of Alternatives General," and Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts."

EWC-174: It appears that the "5,000 to 33,000 acre-feet" referenced by the commenter may be based on evaluations in the DEIS Climate Change Modeling Appendix. As described in Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations, evaluations," included in the Climate Change Modeling Appendix were conducted for sensitivity analysis purposes only, and do not form the basis of any quantitative or qualitative direct or indirect effect evaluations, including evaluations of beneficial effects, in each resource area chapter. Estimated non-monetized benefits of action alternatives are presented in DEIS Chapter 2, "Alternatives," Section 2.3, "Action Alternatives," and Section 2.5, "Summary of Potential Benefits of Action Alternatives." Estimated non-monetized benefits presented in the DEIS were determined by comparison of the with-project condition to the No-Action Alternative, consistent with the Federal planning process identified in the U.S. Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G). As described in the DEIS, estimated increases in average annual CVP and SWP deliveries during

dry and critical years under SLWRI action alternatives range from about 47,300 acre-feet (for CP1) to about 113,500 acre-feet (for CP5). Estimated increases in average annual CVP and SWP deliveries under SLWRI action alternatives range from about 31,000 acre-feet (for CP1) to about 75,900 acre-feet (for CP5).

It also appears that this comment is related to allocation of costs to project beneficiaries, which is outside the scope of the DEIS. A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR Part 1503.4(b)). As described in Master Comment Response COST/BEN-5, "Potential Project Financing," an updated cost allocation were included in the SLWRI Final Feasibility Report.

EWC-175: Comment Noted.

33.10.13 Friends of the Delta Watershed

FOTDW1

Fwd: Thank you for signing the "Please Save the Delta Watershed and Submit Public Comments to Stop the Raising of Shasta Dam" petition

KATRINA CHOW <kchow@usbr.gov> Wed, Oct 23, 2013 at 1:10 PM
To: KATHLEEN DUNCAN <kduncan@usbr.gov>

Sent from my iPhone

Begin forwarded message:

From: Rose Flame <mysecretfires@gmail.com>
Date: September 30, 2013, 7:25:31 PM PDT
To: Victoria Robinson <robinson.victoria@epa.gov>
Cc: Katrina Chow <kchow@usbr.gov>, Pete Lucero <plucero@usbr.gov>, Michael Connor <mlconnor@usbr.gov>, "hswriter@frontiernet.net" <hswriter@frontiernet.net>, Anhthu Hoang <hoang.anhthu@epa.gov>, Jeff <jkiser@ci.anderson.ca.us>, Les Baugh <lbaugh@co.shasta.ca.us>, Gary Cadd <white.bear@sbcglobal.net>, Charles Alexander <sushibar007@hotmail.com>, Kevin Bundy <kbundy@biologicaldiversity.org>, <news@khsltv.com>, news <news@krcrtv.com>, "Kelly Frost, Sr" <Kelly@reddingradio.com>, "Ross, Bruce" <bross@redding.com>, Damon Arthur <darthur@redding.com>, "Frank J. Strazzarino, Jr." <info@reddingchamber.com>, <antlersrvpark@campingshastalake.com>, <Lesa@lakeshasta.com>, Gracious A Palmer <graciouspalmer2009@yahoo.com>, Rosy Kalfus <rosy.kalfus@moveon.org>, Eric Lundy <Eric.Lundy@moveon.org>, <organizations@moveon.org>, Liz Warren <LizWarrenMail@earthlink.net>, S Young <mahalo3366@yahoo.com>, Omer Shalev <Shalev.Omer@epa.gov>
Subject: Fwd: Thank you for signing the "Please Save the Delta

Watershed and Submit Public Comments to Stop the Raising of Shasta Dam" petition

http://www.winnememwintu.us/

Dear Victoria Robinson,

FOTDW1-1 Please help us ask the Bureau of Reclamation to extend the public comment period for the Shasta Lake Water Resource Investigation Draft Environmental Impact Statement (EIS) . The citizens of Shasta County have been recognized as an environmental justice community by the Environmental Appeals Board. That status gains us consideration from your Office of Environmental Justice regarding this Draft EIS. Again, please help us; by working with the Bureau of Reclamation to assist in outreach with our affected community your office will be promoting democracy and benefiting humanity.

Celeste Draisner
Friends of the Delta Watershed
530-223-0197

---------- Forwarded message ----------
From: **Carla Thompson** <carla.thompson2008@att.net>
Date: Mon, Sep 30, 2013 at 9:08 AM
Subject: Re: Thank you for signing the "Please Save the Delta Watershed and Submit Public Comments to Stop the Raising of Shasta Dam" petition
To: "mysecretfires@gmail.com" <mysecretfires@gmail.com>

Good Morning:

FOTDW1-2 I just wanted to let you know I pulled up all of the DEIR documents that are on the CD we received from BOR.
The main body of the DEIR is 2,668 pages. The appendices and attachments to the DEIR total 8,699 pages! This is a total of 11,367 pages of technical data, and some of the studies reference other information that is not included in the attachments.
c

From: Celeste Draisner <petitionshare@moveon.org>
To: Carla Thompson <carla.thompson2008@att.net>

Sent: Monday, September 30, 2013 8:59 AM
Subject: Thank you for signing the "Please Save the Delta Watershed and Submit Public Comments to Stop the Raising of Shasta Dam" petition

Thank you for signing my petition, *Please Save the Delta Watershed and Submit Public Comments to Stop the Raising of Shasta Dam.*

As of now, the petition has received 209 signatures! To really make a difference, we need a lot more people to join in. Can you share this petition with all your friends?

Click here to share it on Facebook:

Share on Facebook

Then, forward the email below to everyone you know.

Thanks!

—Celeste Draisner

FOTDW1-3

Here's a sample message to send to your friends:

Hi,

My friends and I are concerned about the Bureau of Reclamation (Mid-Pacific Region) plan to raise Shasta Dam. The raising of Shasta Dam will flood sacred native sites, destroy existing resorts and marinas, dislocate the town of Lakehead, CA and impact our local economy in a negative manner.

That's why I signed a petition to Bureau Of Reclamation, which says:

"Please extend the public comment period on the plan to raise Shasta Dam until after the holidays (January 2014). It is unfair to expect citizens to review approximately 6,000 pages of technical data in three months, as part of your SLWRI Draft Environmental Impact Statement."

Will you sign the petition too? Click here to add your name:

http://petitions.moveon.org/sign/please-save-the-delta?source=s.fwd&r_by=8916274

Thanks!

You're receiving this message because you signed the *Please Save the Delta Watershed and Submit Public*

10/23/13 DEPARTMENT OF THE INTERIOR Mail - Fwd: Thank you for signing the "Please Save the Delta Watershed and Submit Public Comments to Stop the R...

Comments to Stop the Raising of Shasta Dam petition on the MoveOn.org petition website. MoveOn Civic Action does not endorse the contents of this email or the petitions posted on MoveOn's public petition website. If you don't want to receive e-mail about this petition, click here to unsubscribe.

https://mail.google.com/mail/u/0/?ui=2&ik=20581cb21c&view=pt&search=inbox&th=141e6f07a99aef9d 4/4

Responses to Comments from Friends of the Delta Watershed

FOTDW1-1: Please refer to Master Comment Response COMMENTPERIOD-1, "Extend Comment Period."

FOTDW1-2: The SLWRI DEIS is a complex document with an extensive geographic scope and complexity of issues. However, efforts

were made to simplify the document as much as feasible while meeting the needs to disclose environmental effects to the extent required to meet current legal requirements for full disclosure, including documenting the absence of significant effects on sensitive resources. The DEIS includes a table of contents and index, and it was extensively edited by professional editors as noted in Chapter 29, "List of Preparers." All authors were given instructions to prepare the material using common language and to avoid jargon. In addition, the DEIS is available in an electronic format that allows the reader to search of the whole document. In addition, an Executive Summary was included in the DEIS which summarizes the information and impact analysis of the DEIS to make it easier for the public to review.

FOTDW1-3: Please refer to Master Comment Response COMMENTPERIOD-1, "Extend Comment Period."

33.10.14 Friends of the Delta Watershed

Fwd: Official Public Comment - SLWRI Draft EIS - Bureau of Reclamation

KATRINA CHOW <kchow@usbr.gov> Wed, Oct 23, 2013 at 1:15 PM
To: KATHLEEN DUNCAN <kduncan@usbr.gov>

Sent from my iPhone

Begin forwarded message:

From: Rose Flame <mysecretfires@gmail.com>
Date: September 30, 2013, 11:48:20 PM PDT
To: Katrina Chow <kchow@usbr.gov>
Cc: Michael Connor <mlconnor@usbr.gov>, Pete Lucero <plucero@usbr.gov>, Peter Griggs <pgriggs@shastacollege.edu>, <organizations@moveon.org>, "Ross, Bruce" <bross@redding.com>, Rosy Kalfus <rosy.kalfus@moveon.org>, Ross Bell <rebell@co.shasta.ca.us>, "hswriter@frontiernet.net" <hswriter@frontiernet.net>, Matt Davison <mbdavison@yahoo.com>, Kevin Bundy <kbundy@biologicaldiversity.org>, Lorraine Dechter <ldechter01@gmail.com>, "gomauro ." <mauro@signaloflove.org>, Charles Alexander <sushibar007@hotmail.com>, S Young <mahalo3366@yahoo.com>, "Kelly Frost, Sr" <Kelly@reddingradio.com>, Liz Warren <LizWarrenMail@earthlink.net>, David Kehoe <dkehoe@co.shasta.ca.us>
Subject: Official Public Comment - SLWRI Draft EIS - Bureau of Reclamation

Dear Katrina Chow,

I hope this attachment makes it to you, but in case it does not open, I am submitting this report in the public record, in plain

text form.

Thank you,

Celeste Draisner

Friends of the Delta Watershed Report of March 7, 2013

Expert Presentation (Ichthyology) - Redding Library

Hosted by the Sierra Club - Mother Lode Chapter

Speaker: Tricia Parker Hamelberg

Fish Biologist for the U.S. Fish & Wildlife (Red Bluff Office)

Program Manager Anadromous Fish Restoration Program - northern
Specializing in watershed plans, fish passage, and salmon
(salmonids) & steelhead habitat restoration

FOTDW2-1

Report Prepared/Written by

Celeste Drsisner, citizen activist

Friends of the Delta Watershed

530-223-0197

Fish Biologist, Tricia Parker Hamelberg, Speaks on Behalf of the Salmon

U.S. Fish and Wildlife Service representative Tricia Parker

Hamelberg, "spoke out" on behalf of salmon at the Redding Library in Northern California. She presented information to the public on "Salmon Population Monitoring & Habitat Restoration Activities" in the Northern Sacramento River.

FOTDW2-1 CONTD

As one of twenty-five people in attendance, I learned that fish populations are in trouble in California, and folks need to raise awareness.

FOTDW2-2

It is extremely important that the mainstem Sacramento River flows out of Shasta/Keswick Dams are kept as constant as possible *throughout the October to March spawning/incubation period* so that naturally spawned salmon can thrive.

FOTDW2-3

The primary reason for the noticeable lack of fish in the Sacramento River is.... Shasta Dam itself. In the 1940's when Keswick and Shasta Dams were constructed, they blocked access to 200 miles of salmon spawning habitat. When these valuable habitats were made inaccessible, there was a significant decline in the numbers of naturally spawned fish.

Coleman National Fish Hatchery on Battle Creek was constructed as a mitigation facility (to somewhat) make up for lost salmon habitat. Since our state now relies on water management provided by Shasta Dam, we also need this hatchery to protect the remaining Sacramento River salmon ecosystem.

FOTDW2-4

Tricia works with salmon habitat restoration programs that try to restore as much of the remaining habitat, as possible. She described the Clear Creek and Battle Creek Restoration Programs. Currently, willing local landowners are contributing to positive outcomes for salmon and steelhead populations.

The second major impact on fish populations in the upper Sacramento River is the Red Bluff Diversion Dam. In 1964, before the dam blocked upstream passage, 94% of the salmon population spawned above this marker. Creating this diversion ended that.

FOTDW2-5 Some salmon will not breed in the Sacramento River. Instead, many salmon migrate to the smaller streams and tributaries that feed into the Sacramento River near Redding, where conditions exist that are favorable to reproduction.

The good news is that the Red Bluff Diversion Dam has been decommissioned. The dam structure remains, but the gates are now kept permanently open, so fish returning from the ocean can swim upstream without any delay. These fish spawn in the areas that are still suitable below Shasta/Keswick Dams.

Tricia Parker Hamelberg spoke eloquently on her favorite subject – ichthyology (the study of fish). She talked from the heart, explaining how her interest in wildlife started in childhood. She grew up near Kodiak Island in Alaska, amidst all the raw, natural beauty a child could want.

FOTDW2-6

She talked about the drought of 1976-1977, where the Sacramento River level was so low that Shasta Lake looked like a small stream under the Bridge Bay (I-5) bridge. During the drought, people in California gained a heightened awareness of water levels and how these levels impacted the environment.

FOTDW2-7

There exists a Native American historical perspective to the

salmon. At one time, salmon populations were plentiful in Northern California. Representatives of the Winnemem Wintu, who appeared at the meeting, suggested that Shasta Dam could be removed (that is if anyone was asking).

FOTDW2-7 CONTD

The Winnemem Wintu are a traditional tribe. They inhabit ancestral territory from Mt. Shasta down the McCloud River watershed. When Shasta Dam was constructed during World War II, it flooded their homes and blocked the salmon runs.

The salmon are an integral part of the Winnemem Wintu spiritual tradition. Their tribe believes that when the last salmon is gone, humans will be gone, too. Their fight to return the salmon to the McCloud River is also a fight to save their tribe and all peoples everywhere.

FOTDW2-8

Tricia spoke of the economic history of salmon. In 1864, the first commercial cannery in the Pacific Northwest was located on the Sacramento River. Many people earned their living from the vibrant salmon populations in Northern California. Now, the commercial harvest of salmon on the Sacramento River is long past. (Commercial fishing in the oceans still occurs along the coast of California, Oregon and Washington).

FOTDW2-9

The building of Shasta Dam ended the plentiful salmon runs. The building of Keswick Dam and Whiskeytown Lake further disrupted healthy salmon populations.

FOTDW2-10

Tricia Parker Hamelberg advocated for money to be allocated for monitoring fish habitat and fish population levels. The more data

FOTDW2-10 CONTD

that can be made available to scientists, she argued, the more likely a positive outcome can be reached. She gave credit to many of her co-workers whose efforts were reflected in the photographs and data shown (e.g. Doug Killam, Tricia Bratcher, Sarah Giovanetti, Laurie Early, Bill Poytress, and Matt Brown).

FOTDW2-11

Fish are sensitive to adverse conditions when they are young, developing eggs. They need clean gravel, with flowing water. When baby fish first come out of the gravel, they "button up." They have a yolk sac attached to their baby bellies, which they later absorb. Apparently, this is *super cute*.

The point, from what I could gather, was that, we need to increase river flows to protect naturally produced juvenile fish populations.

FOTDW2-12

As citizens concerned about our environment, we must encourage that enough water be made available for both fish and farmers. A balanced approach is required, one that takes competing interests into account in a fair manner.

FOTDW2-13

Conservation of water can never be understated. More water would be available if we managed this resource effectively.

FOTDW2-14

Please help protect fish populations. Please help raise awareness so the pressing concerns of adequate water allocation during the *critical October to March spawning/incubation periods* can be addressed.

Tricia Parker Hamelberg spearheads the "Battle Creek Salmon and Steelhead Restoration Project" (1999 to Present) on behalf of the salmon. This project is set to restore approximately 48 miles off habitat in Battle Creek and its tributaries, to facilitate the safe passage for naturally -produced anadromous fish populations, including spring Chinook salmon, steelhead and possibly winter Chinook salmon. Methods employed include older dam decommisioning and removal, fish screen/fish ladder improvements and increased instream flows.

Tricia Parker Hamelberg's extensive education includes:

Humboldt State University

Master of Science, Natural Resources: Fisheries

1987 – 1990

University of California, Davis

Bachelor of Science, Water & Soil Resources

1984 – 1987

Other sources used in this report:

http://www.nmfs.noaa.gov/pr/species/fish/chinooksalmon.htm

http://en.wikipedia.org/wiki/Chinook_salmon

http://www.fws.gov/species/species_accounts/bio_salm.html

http://en.wikipedia.org/wiki/Ichthyology

http://www.winnememwintu.us/2013/09/27/save-salmon-and-sacred-sites-speak-out-against-the-shasta-dam-raise-by-sept-30/

http://www.linkedin.com/pub/tricia-parker-hamelberg/22/313/b2b

Report on the fish - Delta Watershed.docx
22K

Friends of the Delta Watershed Report of March 7, 2013
Expert Presentation (Ichthyology) - Redding Library
Hosted by the Sierra Club - Mother Lode Chapter
Speaker: Tricia Parker Hamelberg
Fish Biologist for the U.S. Fish & Wildlife (Red Bluff Office)
Program Manager Anadromous Fish Restoration Program - northern
Specializing in watershed plans, fish passage, and salmon (salmonids)/ steelhead habitat restoration

Report Prepared/Written by
Celeste Drsisner, citizen activist
Friends of the Delta Watershed
530-223-0197

Fish Biologist, Tricia Parker Hamelberg, Speaks on Behalf of the Salmon

U.S. Fish and Wildlife Service representative Tricia Parker Hamelberg, "spoke out" on behalf of salmon at the Redding Library in Northern California. She presented information to the public on "Salmon Population Monitoring & Habitat Restoration Activities" in the Northern Sacramento River.

As one of twenty-five people in attendance, I learned that fish populations are in trouble in California, and people need to raise their awareness.

It is extremely important that the mainstem Sacramento River flows out of Shasta/Keswick Dams are kept as constant as possible *throughout the October to March spawning/incubation period* so that naturally spawned salmon can thrive.

The primary reason for the noticeable lack of fish in the Sacramento River is.... Shasta Dam itself. In the 1940's when Keswick and Shasta Dams were constructed, they blocked access to 200 miles of salmon

spawning habitat. When these valuable habitats were made inaccessible, there was a significant decline in the numbers of naturally spawned fish.

Coleman National Fish Hatchery on Battle Creek was constructed as a mitigation facility (to somewhat) make up for lost salmon habitat. Since our state now relies on water management provided by Shasta Dam, we also need this hatchery to protect the remaining Sacramento River salmon ecosystem.

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The good news is the Red Bluff Diversion Dam has been decommissioned. The dam structure remains, but the gates are now kept permanently open, so fish returning from the ocean can swim upstream without any delay. These fish spawn in the areas that are still suitable below Shasta/Keswick Dams.

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She talked about the drought of 1976-1977, where the Sacramento River level was so low that Shasta Lake looked like a small stream under the Bridge Bay (I-5) bridge. During the drought, people in California gained a heightened awareness of water levels and how these levels impacted the environment.

There exists a Native American historical perspective to the salmon. At one time, salmon populations were plentiful in Northern California. Representatives of the Winnemem Wintu, who appeared at the meeting, suggested that Shasta Dam could be removed (that is if anyone was asking).

The Winnemem Wintu are a traditional tribe. They inhabit ancestral territory from Mt. Shasta down the McCloud River watershed. When Shasta Dam was constructed during World War II, it flooded their homes and blocked the salmon runs.

The salmon are an integral part of the Winnemem Wintu spiritual tradition. Their tribe believes that when the last salmon is gone, humans will be gone, too. Their fight to return the salmon to the McCloud River is also a fight to save their tribe and all peoples everywhere.

Tricia spoke of the economic history of salmon. In 1864, the first commercial cannery in the Pacific Northwest was located on the Sacramento River. Many people earned their living from the vibrant salmon populations in Northern California. Now, the commercial harvest of salmon on the Sacramento River is long past. (Commercial fishing in the oceans still occurs along the coast of California, Oregon and Washington).

The building of Shasta Dam ended the plentiful salmon runs. The building of Keswick Dam and Whiskeytown Lake further disrupted healthy salmon populations.

Tricia Parker Hamelberg advocated for money to be allocated for monitoring fish habitat and fish population levels. The more data that can be made available to scientists, she argued, the more likely a positive outcome can be reached. She gave credit to many of her co-workers whose efforts were reflected in the photographs and data shown (e.g. Doug Killam, Tricia Bratcher, Sarah Giovanetti, Laurie Early, Bill Poytress, and Matt Brown).

Fish are sensitive to adverse conditions when they are young, developing eggs. They need clean gravel, with flowing water. When baby fish first come out of the gravel, they "button up." They have a yolk sac attached to their baby bellies, which they later absorb. Apparently, this is *super cute.*

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As citizens concerned about our environment, we must encourage that enough water be made available for both fish and farmers. A balanced approach is required, one that takes competing interests into account in a fair manner.

Conservation of water can never be understated. More water would be available if we managed this resource effectively.

Please help protect fish populations. Please help raise awareness so the pressing concerns of adequate water allocation during the critical October to March spawning/incubation periods can be addressed.

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1987 – 1990

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Other sources used in this report:

http://www.nmfs.noaa.gov/pr/species/fish/chinooksalmon.htm

http://en.wikipedia.org/wiki/Chinook_salmon

http://www.fws.gov/species/species_accounts/bio_salm.html

http://en.wikipedia.org/wiki/Ichthyology

http://www.winnememwintu.us/2013/09/27/save-salmon-and-sacred-sites-speak-out-against-the-shasta-dam-raise-by-sept-30/

http://www.linkedin.com/pub/tricia-parker-hamelberg/22/313/b2b

Responses to Comments from Friends of the Delta Watershed

FOTDW2-1: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

FOTDW2-2: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

FOTDW2-3: Please refer to Master Comment Response DSFISH-6, "Historic Dam Effects on Fisheries."

FOTDW2-4: Comment noted.

FOTDW2-5: Comment noted.

FOTDW2-6: Comment noted.

FOTDW2-7: Please refer to Master Comment Response CR-8, "Native American Connection to Salmon."

FOTDW2-8: Comment noted.

FOTDW2-9: Please refer to Master Comment Response DSFISH-6, "Historic Dam Effects on Fisheries."

FOTDW2-10: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

FOTDW2-11: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

FOTDW2-12: Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

FOTDW2-13: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability."

FOTDW2-14: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

33.10.15 Friends of the Delta Watershed

 FOTDW3

Fwd: Official Public Comment on THP 2-12-026-SHA ~ Friends of the Delta Watershed

KATRINA CHOW <kchow@usbr.gov> Wed, Oct 23, 2013 at 1:16 PM
To: KATHLEEN DUNCAN <kduncan@usbr.gov>

Sent from my iPhone

Begin forwarded message:

From: Rose Flame <mysecretfires@gmail.com>
Date: October 2, 2013, 2:54:27 PM PDT
To: <reddingpubliccomment@fire.ca.gov>
Cc: "hswriter@frontiernet.net" <hswriter@frontiernet.net>, "gomauro ." <mauro@signaloflove.org>, Marily Woodhouse <marily-lobo@hotmail.com>, Katrina Chow <kchow@usbr.gov>, Kevin Bundy <kbundy@biologicaldiversity.org>, <Kevin@lakeshasta.com>, Rob Simpson <rob@redwoodrob.com>
Subject: Official Public Comment on THP 2-12-026-SHA ~ Friends of the Delta Watershed

Dear Mike Bacca,

Please include the following document in your review of THP 2-12-026-SHA "Reynolds Flat."

FOTDW3-1 I have already entered this report into the record for the proposed rasing of Shasta Dam; a project described in the SLWRI Draft EIS being conducted by the Bureau of Reclamation.

Please address the impacts of what you are considering here in this THP in light of the proposals in the SLWRI Draft EIS.

Thank you,

Celeste Draisner
Friends of the Delta Watershed
530-223-0197

R
Friends of the Delta Watershed Report of March 7, 2013

Expert Presentation (Ichthyology) - Redding Library

Hosted by the Sierra Club - Mother Lode Chapter

Speaker: Tricia Parker Hamelberg

Fish Biologist for the U.S. Fish & Wildlife (Red Bluff Office)

Program Manager Anadromous Fish Restoration Program - northern
Specializing in watershed plans, fish passage, and salmon (salmonids) & steelhead habitat restoration

Report Prepared/Written by

Celeste Drsisner, citizen activist

Friends of the Delta Watershed

530-223-0197

****
****

FOTDW3-2

Fish Biologist, Tricia Parker Hamelberg, Speaks on Behalf of the Salmon

U.S. Fish and Wildlife Service representative Tricia Parker Hamelberg, "spoke out" on behalf of salmon at the Redding Library in Northern California. She presented information to the public on "Salmon Population Monitoring & Habitat Restoration Activities" in the Northern

Sacramento River.

FOTDW3-2 CONTD. As one of twenty-five people in attendance, I learned that fish populations are in trouble in California, and folks need to raise awareness.

FOTDW3-3 It is extremely important that the mainstem Sacramento River flows out of Shasta/Keswick Dams are kept as constant as possible throughout the October to March spawning/incubation period so that naturally spawned salmon can thrive.

FOTDW3-4 The primary reason for the noticeable lack of fish in the Sacramento River is.... Shasta Dam itself. In the 1940's when Keswick and Shasta Dams were constructed, they blocked access to 200 miles of salmon spawning habitat. When these valuable habitats were made inaccessible, there was a significant decline in the numbers of naturally spawned fish.

Coleman National Fish Hatchery on Battle Creek was constructed as a mitigation facility (to somewhat) make up for lost salmon habitat. Since our state now relies on water management provided by Shasta Dam, we also need this hatchery to protect the remaining Sacramento River salmon ecosystem.

FOTDW3-5 Tricia works with salmon habitat restoration programs that try to restore as much of the remaining habitat, as possible. She described the Clear Creek and Battle Creek Restoration Programs. Currently, willing local landowners are contributing to positive outcomes for salmon and steelhead populations.

FOTDW3-6 The second major impact on fish populations in the upper Sacramento River is the Red Bluff Diversion Dam. In 1964, before the dam blocked upstream passage, 94% of the salmon population spawned above this marker. Creating this diversion ended that.

Some salmon will not breed in the Sacramento River. Instead, many salmon migrate to the smaller streams and tributaries that feed into the Sacramento River near Redding, where conditions exist that are favorable to reproduction.

The good news is that the Red Bluff Diversion Dam has been

FOTDW3-6 CONTD

decommissioned. The dam structure remains, but the gates are now kept permanently open, so fish returning from the ocean can swim upstream without any delay. These fish spawn in the areas that are still suitable below Shasta/Keswick Dams.

FOTDW3-7

Tricia Parker Hamelberg spoke eloquently on her favorite subject – ichthyology (the study of fish). She talked from the heart, explaining how her interest in wildlife started in childhood. She grew up near Kodiak Island in Alaska, amidst all the raw, natural beauty a child could want.

She talked about the drought of 1976-1977, where the Sacramento River level was so low that Shasta Lake looked like a small stream under the Bridge Bay (I-5) bridge. During the drought, people in California gained a heightened awareness of water levels and how these levels impacted the environment.

There exists a Native American historical perspective to the salmon. At one time, salmon populations were plentiful in Northern California. Representatives of the Winnemem Wintu, who appeared at the meeting, suggested that Shasta Dam could be removed (that is if anyone was asking).

FOTDW3-8

The Winnemem Wintu are a traditional tribe. They inhabit ancestral territory from Mt. Shasta down the McCloud River watershed. When Shasta Dam was constructed during World War II, it flooded their homes and blocked the salmon runs.

The salmon are an integral part of the Winnemem Wintu spiritual tradition. Their tribe believes that when the last salmon is gone, humans will be gone, too. Their fight to return the salmon to the McCloud River is also a fight to save their tribe and all peoples everywhere.

FOTDW3-9

Tricia spoke of the economic history of salmon. In 1864, the first commercial cannery in the Pacific Northwest was located on the Sacramento River. Many people earned their living from the vibrant salmon populations in Northern California. Now, the commercial harvest of salmon on the Sacramento River is long past. (Commercial fishing in the oceans still occurs along the coast of California, Oregon and Washington).

FOTDW3-10 The building of Shasta Dam ended the plentiful salmon runs. The building of Keswick Dam and Whiskeytown Lake further disrupted healthy salmon populations.

FOTDW3-11 Tricia Parker Hamelberg advocated for money to be allocated for monitoring fish habitat and fish population levels. The more data that can be made available to scientists, she argued, the more likely a positive outcome can be reached. She gave credit to many of her co-workers whose efforts were reflected in the photographs and data shown (e.g. Doug Killam, Tricia Bratcher, Sarah Giovanetti, Laurie Early, Bill Poytress, and Matt Brown).

FOTDW3-12 Fish are sensitive to adverse conditions when they are young, developing eggs. They need clean gravel, with flowing water. When baby fish first come out of the gravel, they "button up." They have a yolk sac attached to their baby bellies, which they later absorb. Apparently, this is super cute.

The point, from what I could gather, was that, we need to increase river flows to protect naturally produced juvenile fish populations.

FOTDW3-13 As citizens concerned about our environment, we must encourage that enough water be made available for both fish and farmers. A balanced approach is required, one that takes competing interests into account in a fair manner.

FOTDW3-14 Conservation of water can never be understated. More water would be available if we managed this resource effectively.

FOTDW3-15 Please help protect fish populations. Please help raise awareness so the pressing concerns of adequate water allocation during the critical October to March spawning/incubation periods can be addressed.

****

Tricia Parker Hamelberg spearheads the "Battle Creek Salmon and Steelhead Restoration Project" (1999 to Present) on behalf of the salmon. This project is set to restore approximately 48 miles off habitat in Battle Creek and its tributaries, to facilitate the safe passage for naturally -produced anadromous fish populations, including spring

Chinook salmon, steelhead and possibly winter Chinook salmon. Methods employed include older dam decommisioning and removal, fish screen/fish ladder improvements and increased instream flows.

Tricia Parker Hamelberg's extensive education includes:

Humboldt State University

Master of Science, Natural Resources: Fisheries

1987 – 1990

University of California, Davis

Bachelor of Science, Water & Soil Resources

1984 – 1987

Other sources used in this report:

http://www.nmfs.noaa.gov/pr/species/fish/chinooksalmon.htm

http://en.wikipedia.org/wiki/Chinook_salmon

http://www.fws.gov/species/species_accounts/bio_salm.html

http://en.wikipedia.org/wiki/Ichthyology

http://www.winnememwintu.us/2013/09/27/save-salmon-and-sacred-sites-speak-out-against-the-shasta-dam-raise-by-sept-30/

http://www.linkedin.com/pub/tricia-parker-hamelberg/22/313/b2b

Responses to Comments from Friends of the Delta Watershed

FOTDW3-1: Comment Noted.

FOTDW3-2: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

FOTDW3-3: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

FOTDW3-4: Comment noted.

FOTDW3-5: Comment noted.

FOTDW3-6: Comment noted.

FOTDW3-7: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

FOTDW3-8: Please refer to Master Comment Response CR-8, "Native American Connection to Salmon."

FOTDW3-9: Comment noted.

FOTDW3-10: Please refer to Master Comment Response DSFISH-6, "Historic Dam Effects on Fisheries."

FOTDW3-11: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

FOTDW3-12: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

FOTDW3-13: Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

FOTDW3-14: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability."

FOTDW3-15: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

33.10.16 Friends of the Delta Watershed

BISON CONNECT

Fwd: [CENTER-STAFF] Anyone working on Shasta Dam?

KATRINA CHOW <kchow@usbr.gov> Wed, Oct 23, 2013 at 1:10 PM
To: KATHLEEN DUNCAN <kduncan@usbr.gov>

Sent from my iPhone

Begin forwarded message:

From: Rose Flame <mysecretfires@gmail.com>
Date: September 30, 2013, 7:28:45 PM PDT
To: Katrina Chow <kchow@usbr.gov>
Cc: Pete Lucero <plucero@usbr.gov>, Michael Connor <mlconnor@usbr.gov>, Shanna Cannon <scannon@redding.com>, "hswriter@frontiernet.net" <hswriter@frontiernet.net>, Marily Woodhouse <marily-lobo@hotmail.com>, Charles Alexander <sushibar007@hotmail.com>
Subject: Fwd: FW: [CENTER-STAFF] Anyone working on Shasta Dam?

Dear Katrina,

FOTDW4-1 Please include this in the record, for consideration.

Thank you,
Celeste Draisner
citizen activist

---------- Forwarded message ----------
From: **Kevin Bundy** <kbundy@biologicaldiversity.org>
Date: Mon, Sep 30, 2013 at 10:33 AM
Subject: FW: [CENTER-STAFF] Anyone working on Shasta Dam?
To: Rose Flame <mysecretfires@gmail.com>

Celeste,

I forwarded your question around to some of my colleagues; one response is below. Best of luck with this!

Kevin

Hi Kevin,

The person writing comments on behalf of Winneman Wintu contributed a big section to the EWC (enviro water caucus) comments, so Celeste should ask that person (Colin Bailey) for the latest (I don't have the final draft.)

FOTDW4-2

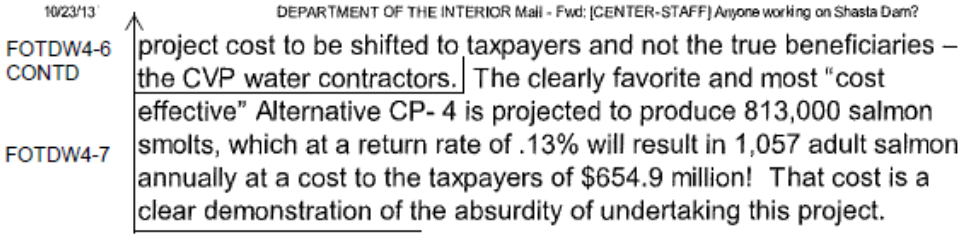
The info requested re waste of money to restore fish is in the EWC cover letter; here's the draft text, please forward:

FOTDW4-3 The stated purpose of enlarging Shasta Dam is to meet the two primary project objectives of increased survival of Sacramento River anadromous fish populations and to increase water supply reliability for CVP agricultural, M&I, and environmental purposes. However, preferred alternative CP-4 and the other alternatives are fundamentally flawed in that they will not increase survival of anadromous fish in any substantial way, especially given the cost and the plethora of other viable projects recommended by the fishery agencies but not evaluated by Reclamation. Enlargement of Shasta Dam is not mentioned as one of numerous recommendations from the National Marine Fisheries Service in the Draft Central Valley Salmon Recovery Plan. The proposed project is based on inflated and illusory benefits for natural salmon production in the Sacramento River, as described in the attached comments, and cannot be justified as proposed.

FOTDW4-4

FOTDW4-5

FOTDW4-6 The claimed benefits to salmon allow two thirds of the billion dollar


10/23/13 DEPARTMENT OF THE INTERIOR Mail - Fwd: [CENTER-STAFF] Anyone working on Shasta Dam?

FOTDW4-6 CONTD

project cost to be shifted to taxpayers and not the true beneficiaries – the CVP water contractors. The clearly favorite and most "cost effective" Alternative CP- 4 is projected to produce 813,000 salmon

FOTDW4-7

smolts, which at a return rate of .13% will result in 1,057 adult salmon annually at a cost to the taxpayers of $654.9 million! That cost is a clear demonstration of the absurdity of undertaking this project.

https://mail.google.com/mail/u/0/?ui=2&ik=20581cb21c&view=pt&search=inbox&th=141e6f08da85ec40 3/3

Responses to Comments from Friends of the Delta Watershed

FOTDW4-1: Comment Noted.

FOTDW4-2: Comment Noted.

FOTDW4-3: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

FOTDW4-4: Modeling results show that CP4 significantly improves production during those critical and dry years when the cold water pool is depleted under current conditions, which is when Chinook populations are at greatest risk. By increasing production in these years, relative to the base conditions, the risk of extirpation of listed species is greatly reduced, and therefore provides a significant benefit to the species/run.

Please refer to Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

FOTDW4-5: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

FOTDW4-6: This comment appears to be related to allocation of costs to project beneficiaries, which is outside the scope of the DEIS. As described in Master Comment Response COST/BEN-5, "Potential Project Financing," updated evaluations related to economic feasibility and cost allocation were included in the SLWRI Final Feasibility Report. A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR Part 1503.4(b)). This comment was included as part of the record and made available to decision makers before a final decision on the proposed project.

FOTDW4-7: This comment appears to be related to allocation of costs to project beneficiaries, which is outside the scope of the DEIS. Additionally, the SLWRI DEIS does not include evaluations related to economic feasibility because it is not required under NEPA. Accordingly, the DEIS does not identify a most "cost effective" alternative. As described in Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," and Master Comment Response COST/BEN-5, "Potential Project Financing," updated evaluations related to economic feasibility and cost allocation was included in the SLWRI Final Feasibility Report. A response to this comment is not required under NEPA because the comment does not raise a significant environmental issue (NEPA Regulations 40 CFR Part 1503.4(b)). This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

33.10.17 Friends of the River

FOTR1

From: **Bob Center** <bcenter7210@att.net>
Date: Wed, Jul 31, 2013 at 7:58 PM
Subject: RE: Sources of Graphs Shown at Sacramento Public Workshop, July 16
To: "CHOW, KATRINA" <kchow@usbr.gov>

Katrina,

FOTR1-2 Since I last wrote to you I discovered that your graphic of Shasta stage is seriously in error. You have the 1977 drought displaced earlier by two or three years from it; the 1990-1-2 drought is depicted about 7 years earlier than it actually occurred. In a meeting yesterday among environmentalists and the CA Department of Water Resources (DWR) regarding Bay Delta Conservation Plan (BDCP) modeling and broader subjects, I asked DWR modelers and managers for a "sanity check" regarding the your graphic. They agreed that the Bureau of Reclamation Shasta stage-storage graphic in the attached is seriously incorrect.

FOTR1-3 Once again, I request of you the source graphic, and the underlying data, which is probably in Excel or HEC-DSS form.

I do not have your immediate superior's email; could you forward this to him / her, and send a CC to me?

Sincerely,

Bob Center
Executive Director, Friends of the River
1418 20th Street, Suite A
Sacramento, CA 95811
Cell: 530 263 8800

From: CHOW, KATRINA [mailto:kchow@usbr.gov]
Sent: Tuesday, July 23, 2013 10:22 AM
To: Bob Center
Subject: Re: Sources of Graphs Shown at Sacramento Public Workshop, July 16

Bob,

We will working to post the all the graphics that were displayed on easels in the room in our website. Thanks

Katrina
--
Katrina Chow
Project Manager/Civil Engineer
Bureau of Reclamation, Sacramento
2800 Cottage Way, Sacramento, CA 95825

916-978-5067
kchow@usbr.gov

On Fri, Jul 19, 2013 at 4:11 PM, Bob Center <bcenter7210@att.net> wrote:
With attachment.

From: Bob Center [mailto:bcenter7210@att.net]
Sent: Friday, July 19, 2013 3:55 PM
To: 'kchow@usbr.gov'
Subject: Sources of Graphs Shown at Sacramento Public Workshop, July 16

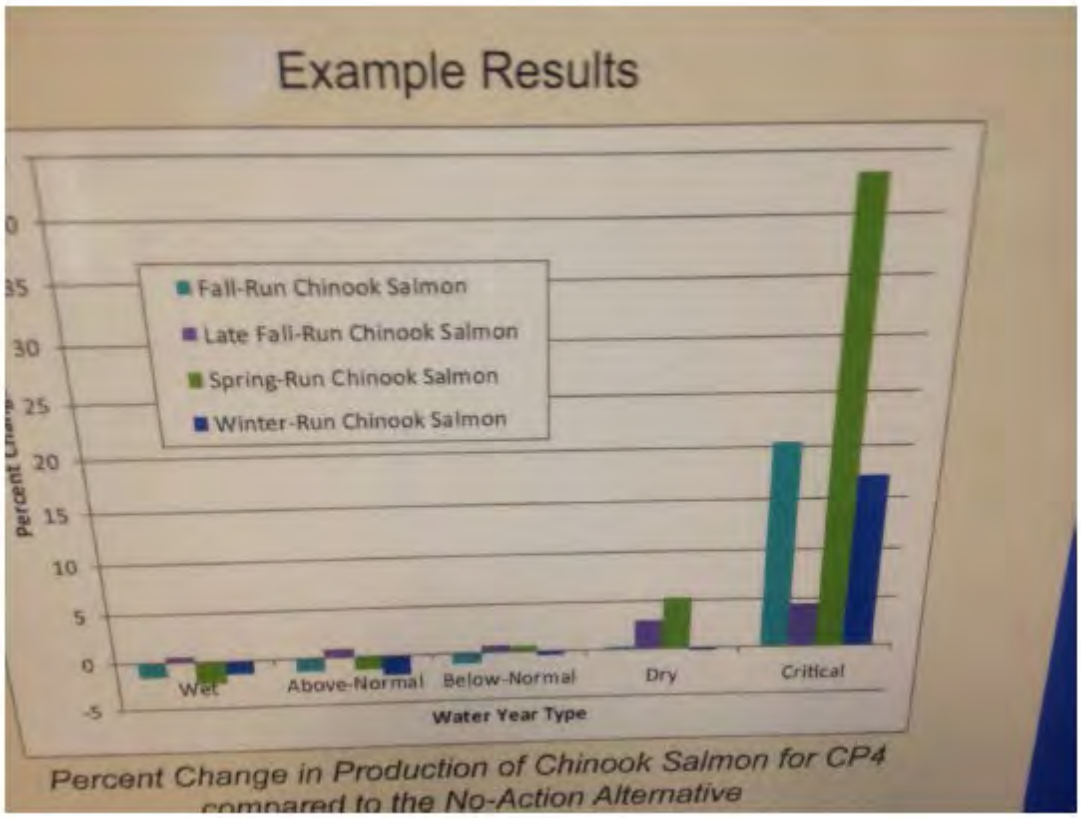
Katrina,

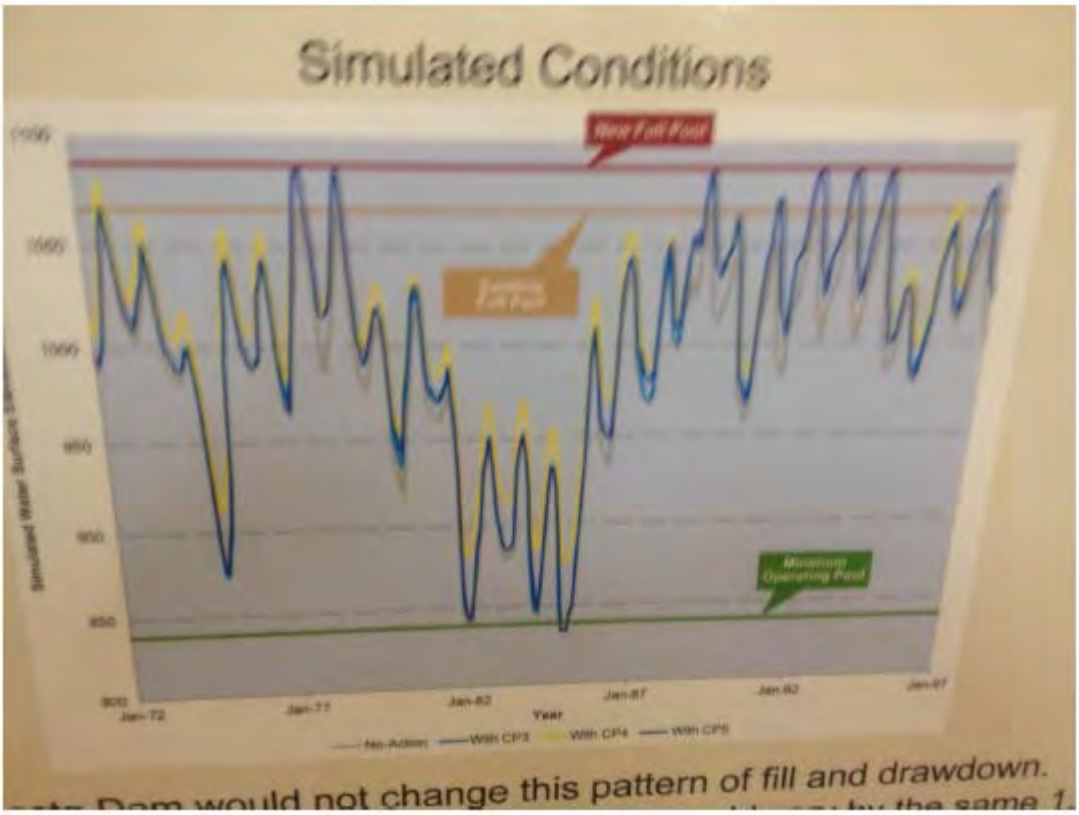
FOTR1-1

I attended your workshop in Sacramento last Wednesday. Could you tell me where I could find the Power Point presentation, and also the graphics that were displayed on easels in the room? In particular, could you tell me where I can find the two attached graphics, and the underlying data and calculations that produced the graphics?

There is a great deal of information on your website, but finding these specific graphs is akin to finding a needle in a haystack.

Thanks,
Bob Center
530 263 8800





Responses to Comments from Friends of the River

FOTR1-1: The SLWRI poster ("Shasta Reservoir Fill and Drawdown") used at the July 2013 Public Workshops was revised and displayed at the September 2013 Public Hearing. The PowerPoints and posters from the Public Workshops are available on the Reclamation website at http://www.usbr.gov/mp/slwri/documents.html.

FOTR1-2: The SLWRI poster ("Shasta Reservoir Fill and Drawdown") used at the July 2013 Public Workshops was revised and displayed at the September 2013 Public Hearing. The PowerPoints and posters from the Public Workshops are available on the Reclamation website at http://www.usbr.gov/mp/slwri/documents.html.

FOTR1-3: The SLWRI poster ("Shasta Reservoir Fill and Drawdown") used at the July 2013 Public Workshops was revised and displayed at the September 2013 Public Hearing. The PowerPoints and posters from the Public Workshops are available on the Reclamation website at http://www.usbr.gov/mp/slwri/documents.html.

33.10.18 Friends of the River

FOTR2

(Corrected--Use This One) Friends of the River SLWRI DEIS Comments vol 2

Bob Center <bcenter7210@att.net> Mon, Sep 30, 2013 at 2:42 PM
To: BOR-MPR-SLWRI@usbr.gov

Dear Ms Chow,

Attached is an additional set of comments from Friends of the River

Best Regards,

Bob Center

Executive Director, Friends of the River

530 263 8800

130930 FOR SLWRI DEIS Comments Vol 2.docx
1883K

Bob Center <bcenter7210@att.net> Mon, Sep 30, 2013 at 3:47 PM
To: BOR-MPR-SLWRI@usbr.gov
Cc: Bob Center <bcenter7210@att.net>

Ms Chow,

Did you get this email and the attached document?

I am having trouble with my email; I cannot tell if it sends emails with large

attachments, or not.

Thanks,

Bob

From: Bob Center [mailto:bcenter7210@att.net]
Sent: Monday, September 30, 2013 2:43 PM
To: 'BOR-MPR-SLWRI@usbr.gov'
Subject: (Corrected--Use This One) Friends of the River SLWRI DEIS Comments vol 2

[Quoted text hidden]

FRIENDS OF THE RIVER

September 30, 2013

Ms. Katrina Chow
SLWRI Project Manager
Bureau of Reclamation Planning Division
2800 Cottage Way
Sacramento, CA 95825-1893
Fax: (916) 978-5094
Email: BOR-MPR-SLWRI@usbr.gov

RE: Public Review and Comment on the Draft Environmental Impact Statement for Shasta Lake Water Resources Investigation

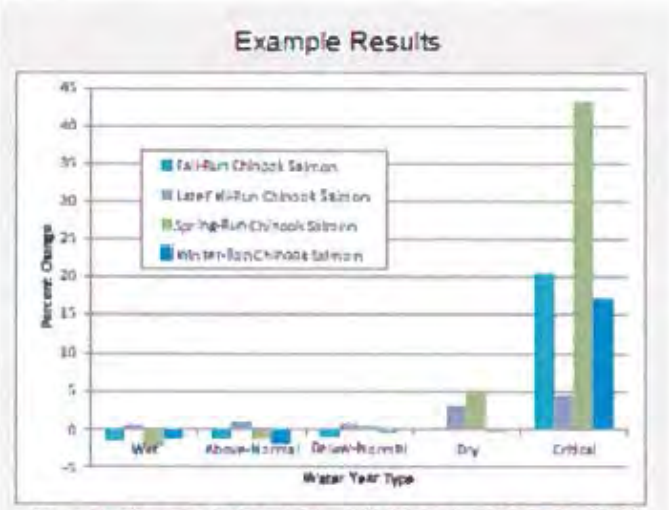
Dear Ms. Chow
Thank you for accepting our comments concerning the Shasta Lake Water Resources Investigation's Draft Environmental Impact Statement (SLWRI DEIS). Friends of the River would like to make it clear that

FOTR2-1 we are opposed to the raising of Shasta Dam.

Critique of the Fish Benefit claimed by the Shasta Lake Water Resources Invistigation (SLWRI)

FOTR2-2 The graphic in Figure 1 claims that the 18.5' dam raise will improve production of Chinook salmon in dry and critically dry years. (Presumably the direct mechanism of such improvement would be deeper water keeping cold water colder, and more cold water for release in late summera and early fall.) The only way that additional storage volume, at the top of the dam, can improve conditions for salmon in dry and critically dry years is for the additional storage to fill, or partially fill, in the year pror to the dry or critically dry year.

Figure 1

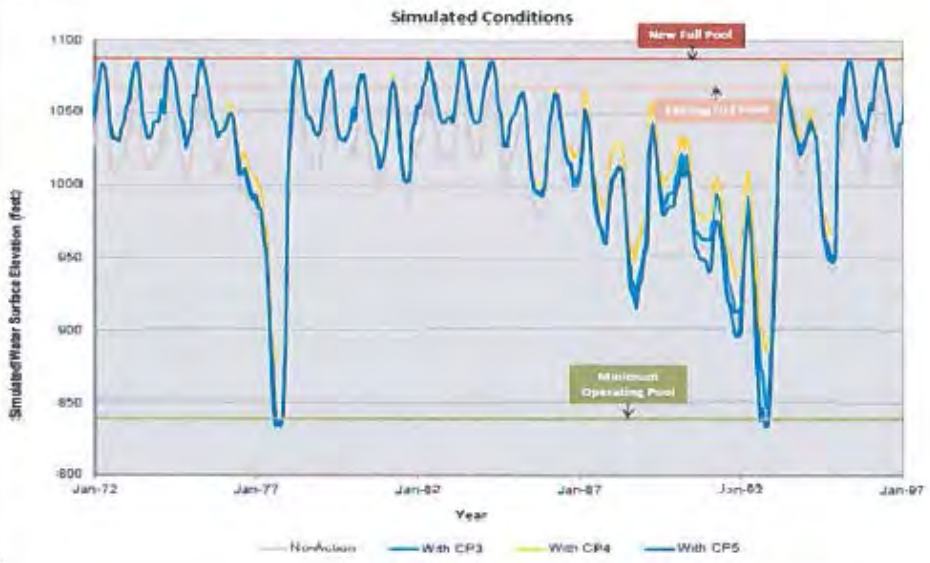


Percent Change in Production of Chinook Salmon for CP4 compared to the No-Action Alternative

FOTR2-2 CONTD

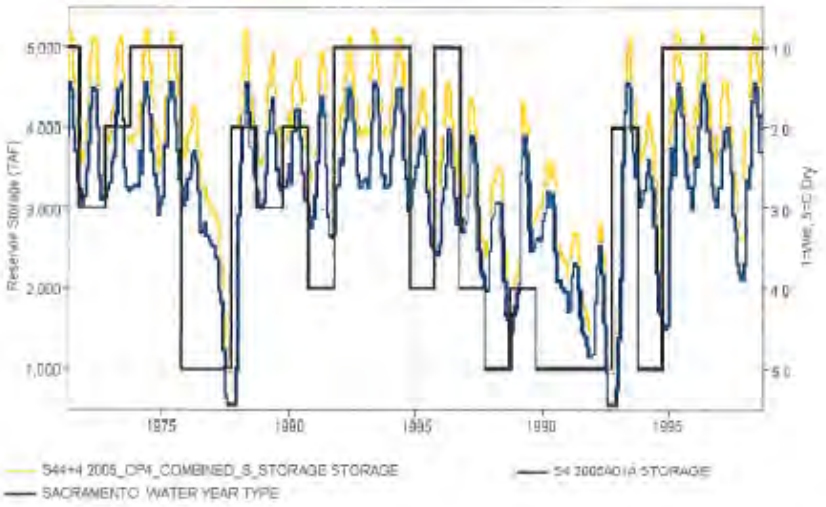
Figure 2 shows water surface elevation at Shasta for various operating scenarios, including CP4, the alternative that claims the greatest salmon benefit. Figure 3 shows the no action alternative, CP4 and water year type.

Figure 2



2

Figure 3



FOTR2-2 CONTD

The preceding two graphics show that from 1972 until 1997, there were 11 dry and critically dry years. In 1975 the additional storage could have filled, and could have provided some benefit to salmon in 1976. In 1993 the new storage could have partially filled, and could have provided some benefit to salmon in 1994. For the rest of the dry and critically dry years, 1977,1981, 1985, 1987, 1988, 1989, 1990, 1991, and 1992 the new storage would not have filled the year before, and so could have provided no benefit to Chinook Salmon in the dry or critically dry year.

So where does the significant claimed benefit to salmon come from?

In the nine out of eleven dry and critically dry years, **ALL** benefits to salmon come from operating the reservoir at a significantly higher level (some of the benefit in 1976 and 1994 would have come from re-operation, also). This re-operation of the reservoir surface elevation has nothing at all to do with raising the dam. It is spurious to attribute any salmon benefit to the raised dam for 9 out of 11 dry and critically dry years.

FOTR2-3

While the proposed re-operation would not require a higher dam, it would run up against many constraints that stem from the system being over-allocated, and subject to laws, regulations, standards, plans and contracts, including some or all of the following:

Federal

The following Federal laws, regulations, standards, and plans are discussed as part of the regulatory setting:

•NMFS 1993 and 2004 Winter-Run Chinook salmon Biological Opinion (BO) (NMFS 1993, NMFS 2004)

3

FOTR2-3 CONTD

- Central Valley Project Improvement Act (CVPIA) (Reclamation 1999)
- CVP long-term water service contracts
- Trinity River Record of Decision (ROD) (Reclamation 2000)
- Flow objective for navigation (Wilkins Slough)
- Flood management requirements

State

The following State laws, regulations, standards, and plans are discussed as part of the regulatory setting:

- SWRCB Orders 90-05 and 91-01
- 1960 DFG-Reclamation Memorandumof Agreement (DFG 1960)
- Water Quality Control Plan (WQCP) for the San Francisco Bay/San Joaquin Delta Estuary (SWRCB 1995)
- SWRCB Revised Water Right Decision 1641 (RD-1641) (SWRCB 2000)
- Coordinated Operations Agreement (COA) (Reclamation and DWR 1986)
- Groundwater regulations

USBR makes it clear that such constraints would take precedence over salmon habit improvement. The Bureau states in the DEIS on page 2-49:

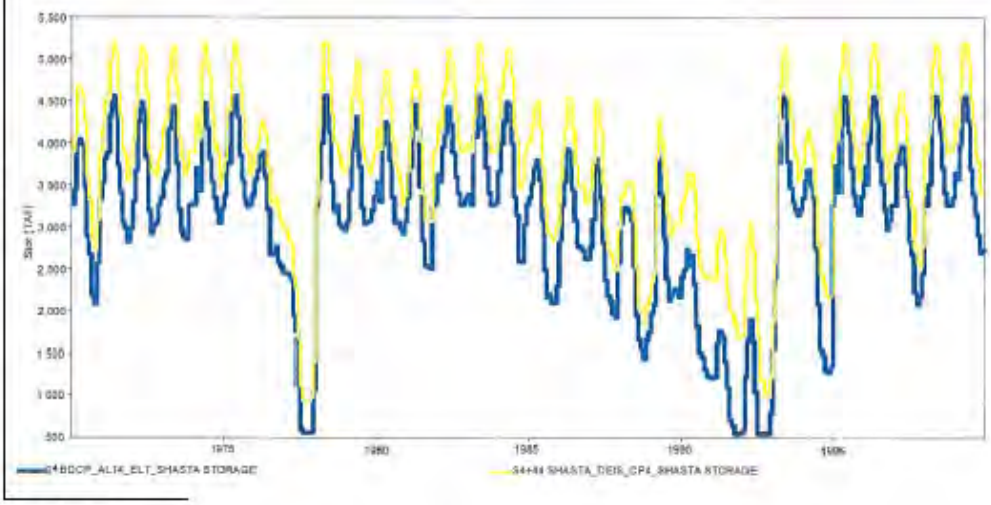
> The adaptive management plan (for the proposed cold water pool created by the raised dam/enlarged reservoir) *may* include operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, *as long as there are no conflicts with operational guidelines or adverse impacts on water supply reliability.* (*Emphasis* ours)

FOTR2-4

In addition to being probably impossible under current constraints, Figure 4 shows that operating Shasta at a higher level is contrary with the preferred BDCP alternative.

FOTR2-4 CONTD

Figure 4



Conclusion

FOTR2-5 The SLWRI claims that raising Shasta by 18.5' could have improved salmon production significantly in dry and critically dry years. USBR's own hydrological and modeling data show this claim to be questionable, if not outright bogus. In 9 of 11 dry and critically years all of the benefit would have been derived from operating the reservoir at a higher level.

FOTR2-6 But operating the reservoir at a higher level without somehow violating or altering a myriad of existing constraints, and also changing the BDCP preferred operations, cannon be done.

FOTR2-7 So the promise of salmon benefit from raising Shasta is both dodgy and hollow.

Bob Center

Robert McCenter

Executive Director, Friends of the River
1418 20th Street, Suite A
Sacramento, CA 95811

530 263 8800

5

Responses to Comments from Friends of the River

FOTR2-1: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

FOTR2-2: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the

SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. The existing Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability.

Please refer to Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir."

FOTR2-3: Please refer to Master Comment Response GEN-7, "Rules and Regulations for Water Operations under Action Alternatives."

FOTR2-4: It appears that the referenced "Figure 4," which was provided as part of the commenter's letter, shows simulated storage levels in Shasta Reservoir under the CEQA preferred BDCP alternative (blue) and under the SLWRI DEIS action alternative CP4 (yellow). It is unclear if the simulated storage levels in Shasta Reservoir under the BDCP alternative were based on outputs from modeling related to the BDCP DEIS. It is also unclear whether these storage levels are intended to represent existing or future conditions for each project.

As described in Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," operation of new conveyance facilities and/or flow patterns proposed under the BDCP would require changes in existing CVP operations. Similarly, operation of additional storage and/or flow patterns proposed under the SLWRI would also require changes in existing CVP operations. Reclamation's action in relation to both projects would be to adjust CVP operations in coordination with SWP operations and the Coordinated Operations Agreement.

FOTR2-5: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

FOTR2-6: It appears that the referenced "Figure 4," which was provided as part of the commenter's letter, shows simulated storage levels in Shasta Reservoir under the CEQA preferred BDCP alternative (blue) and under the SLWRI DEIS action alternative CP4 (yellow). It is unclear if the simulated storage levels in Shasta Reservoir under the BDCP alternative were based on outputs from modeling related to the BDCP DEIS. It is also unclear whether these storage levels are intended to represent existing or future conditions for each project. As described in Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," operation of new conveyance facilities and/or flow patterns proposed under the BDCP would require changes in existing CVP operations. Similarly, operation of additional storage and/or flow patterns proposed under the SLWRI would also

require changes in existing CVP operations. Reclamation's action in relation to both projects would be to adjust CVP operations in coordination with SWP operations and the Coordinated Operations Agreement.

FOTR2-7: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

33.10.19 International Organization for Self-Determination and Equality

Public Comment re Shasta Dam Raise

India reed bowers <india.bowers@gmail.com> Tue, Oct 1, 2013 at 12:25 AM
To: BOR-MPR-SLWRI@usbr.gov

Please see attached.

Kind regards,

India Reed Bowers
B.A. Cultural Anthropology, Brown University (USA)
LL.M. International Law of Human Rights & Criminal Justice, Utrecht University (Netherlands)

Independent freelance consultant
Founder & Director, *International Organization for Self-Determination and Equality* (IOSDE)
www.iosde.org / info@iosde.org / india.bowers@iosde.org

2 attachments

IOSDE Letter against the Shasta Dam Raise.docx
173K

IOSDE Letter against the Shasta Dam Raise.pdf
142K

International Organization for Self-Determination and Equality (IOSDE)

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September 30, 2013

Katrina Chow - Project Manager
US Bureau of Reclamation
Planning Division,
2800 Cottage Way
Sacramento, CA 95825-1893

Re: Public comment regarding the raising of the Shasta Dam

Dear Bureau of Reclamation:

IOSDE-1

The International Organization for Self-Determination and Equality (IOSDE) opposes the proposed raising of the height of the Shasta Dam by 6.5-18.5 feet. Due to such a raise in the Dam height the Winnemem Wintu tribe would see an additional 39 of their sacred sites flooded, including Puberty Rock. A major aspect of the tribe's ability to practice their culture and religion would be lost.

IOSDE-2

As IOSDE expressed to the United States Forest Service earlier this summer of 2013 in support of the protection of the Winnemem Wintu Balas Chonas puberty ceremony (performed at a Winnemem sacred site, amongst others, that would be flooded by the proposed Shasta Dam raise), IOSDE recognizes the Winnemem Wintu as a self-determining Indigenous People practicing their traditional culture, family, inheritance and religion amongst other human and Indigenous customs and values and land rights therein. Such customs and values are Rights of Indigenous Peoples under International Law, as well as being Human Rights in general. The United States and its National- and state-governing and administrative mechanisms are beholden to these International Laws that support Indigenous Peoples and Indigenous and Human Rights, including the rights of the Winnemem Wintu Tribe.

IOSDE-3

The Winnemem Wintu are an Indigenous People with Human and Indigenous Rights as per International Law, including but not limited to those rights contained within the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), adopted by the United Nations General Assembly in 2007, as well as the United Nations International Covenant on Civil and Political Rights (ICCPR) and the United Nations International Covenant on Economic, Social and Cultural Rights (ICESCR), both adopted by the United Nations General Assembly in 1966, the United Nations Convention on the Rights of the Child (CRC), adopted by the United Nations General Assembly in 1989, the United Nations International Convention on the Elimination of All Forms of Racial Discrimination (CERD), adopted by the United Nations General Assembly in 1966, and the UN Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), adopted by the United Nations General Assembly in 1979, United Nations Universal Declaration of Human Rights (UDHR), adopted by the United Nations General Assembly in 1948, and the Charter of the United Nations, of which the Unites States of American is a Member, and which came into force in 1945.

IOSDE-4

Specifically, The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), endorsed by the United States of America in 2010, supports the needs and requests of the Winnemem Wintu as an Indigenous People. The following articles of the UNDRIP, amongst others, would be violated in light of the destruction to Winnemem Wintu sacred and cultural sites were the Shasta Dam to be raised:

Article 8
1. Indigenous peoples and individuals have the right not to be subjected to forced assimilation or destruction of their culture.

Article 11
1. Indigenous peoples have the right to practise and revitalize their cultural traditions and customs. This includes the right to maintain, protect and develop the past, present and future manifestations of their cultures, such as archaeological and historical sites, artifacts, designs, ceremonies, technologies and visual and performing arts and literature.
2. States shall provide redress through effective mechanisms, which may include restitution, developed in conjunction with indigenous peoples, with respect to their cultural, intellectual, religious and spiritual property taken without their free, prior and informed consent or in violation of their laws, traditions and customs.

Article 12
1. Indigenous peoples have the right to manifest, practise, develop and teach their spiritual and religious traditions, customs and ceremonies; the right to maintain, protect, and have access in privacy to their religious and cultural sites; the right to the use and control of their ceremonial objects; and the right to the repatriation of their human remains.
[...]

IOSDE-4 CONTD

Article 19
States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them.

Article 25
Indigenous peoples have the right to maintain and strengthen their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands, territories, waters and coastal seas and other resources and to uphold their responsibilities to future generations in this regard.

Article 26
1. Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired.
2. Indigenous peoples have the right to own, use, develop and control the lands, territories and resources that they possess by reason of traditional ownership or other traditional occupation or use, as well as those which they have otherwise acquired.
3. States shall give legal recognition and protection to these lands, territories and resources. Such recognition shall be conducted with due respect to the customs, traditions and land tenure systems of the indigenous peoples concerned.

Article 27
States shall establish and implement, in conjunction with indigenous peoples concerned, a fair, independent, impartial, open and transparent process, giving due recognition to indigenous peoples' laws, traditions, customs and land tenure systems, to recognize and adjudicate the rights of indigenous peoples pertaining to their lands, territories and resources, including those which were traditionally owned or otherwise occupied or used. Indigenous peoples shall have the right to participate in this process.

Article 31
1. Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions. [...]
2. In conjunction with indigenous peoples, States shall take effective measures to recognize and protect the exercise of these rights.

Article 32

IOSDE-4 CONTD

1. Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands or territories and other resources.
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3. States shall provide effective mechanisms for just and fair redress for any such activities, and appropriate measures shall be taken to mitigate adverse environmental, economic, social, cultural or spiritual impact.

Article 34
Indigenous peoples have the right to promote, develop and maintain their institutional structures and their distinctive customs, spirituality, traditions, procedures, practices and, in the cases where they exist, juridical systems or customs, in accordance with international human rights standards.

Article 38
States, in consultation and cooperation with indigenous peoples, shall take the appropriate measures, including legislative measures, to achieve the ends of this Declaration.

IOSDE-5

As IOSDE also expressed to the United States Forest Service earlier this summer of 2013, and now expresses to the United States Bureau of Reclamation, these Human and Indigenous Rights apply to the Winnemem Wintu Tribe as an Indigenous People. That the authoritative bodies of the United States and its National and state and local mechanisms have not yet thoroughly learned of and/or applied these Indigenous and Human Rights to their methods of functioning and decision-making is a problem whose cost falls of the dignity and well-being Indigenous Peoples themselves, such as the Winnemem Wintu, resulting in ongoing undignified hardships and compounded traumatic memories of violation and experiences of trauma for the Indigenous persons and People(s) involved. In an era where violence against Indigenous Peoples, and in particular Indigenous girls and women, still exists, and after centuries of surviving genocide and colonialism, and in light of the ongoing cultural genocide faced by Indigenous Peoples in their loss of land and sacred and cultural sites, the Winnemem Wintu have the Indigenous and Human Rights by International Law to their full engagement in and protection of their traditions, religions and cultures and related traditional lands therein, as they so chose, for the continuation of their traditions, Peoples, and self-determination.

For this reason, the International Organization for Self-Determination and Equality (IOSDE) opposes raise the height of Shasta Dam.

Sincerely,

India Reed Bowers, B.A. LL.M.
(U.S. Citizen & California voter)
Founder & Director,
International Organization for Self-Determination and Equality (ISODE)

International Organization for Self-Determination and Equality (IOSDE)

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September 30, 2013

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US Bureau of Reclamation
Planning Division,
2800 Cottage Way
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Sincerely,

India Reed Bowers, B.A. LL.M.
(U.S. Citizen & California voter)
Founder & Director,
International Organization for Self-Determination and Equality (ISODE)

IOSDE an equal future starts with an equal now

Responses to Comments from International Organization for Self-Determination and Equality

IOSDE-1: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources."

IOSDE-2: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-6, "United Nations Declaration on, 'The Rights of Indigenous Peoples.'"

IOSDE-3: Please refer to Master Comment Response CR-6, "United Nations Declaration on, 'The Rights of Indigenous Peoples,'" and Master Comment Response CR-5, "Environmental Justice."

IOSDE-4: Please refer to Master Comment Response CR-6, "United Nations Declaration on, 'The Rights of Indigenous Peoples,'" and Master Comment Response CR-2, "Federal Recognition."

IOSDE-5: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-6, "United Nations Declaration on, 'The Rights of Indigenous Peoples.'"

33.10.20 Dale La Forest & Associates

 LAFO

DLA Comments - Shasta Dam Raising DEIS 9-30-13 - errata.pdf --- corrected 10/3/13

Lily Evans <lilylily@mail.com> Thu, Oct 3, 2013 at 4:20 PM
To: BOR-MPR-SLWRI@usbr.gov

Dear Ms. Katrina Chow:
10/3/13

We just discovered that the DEIS no longer is titled "Preliminary" DEIS.
The newly attached, revised comment letter has been corrected by removing "Preliminary" or the "P" before DEIS.

That is the only change in this comment letter; please substitute this errata, corrected version for the one submitted on 9/30/13.

Thank you,
Lily Evans

==========
Dear Ms. Katrina Chow, Project Manager, US Bureau of Reclamation, Planning Division, Sacramento, CA

9/30/13

Please accept the attached public comment letter that addresses the noise impacts of the proposed Shasta Dam Raising Project.
This comment letter is submitted in reference to the Shasta Lake Water Resources Investigation and preliminary draft EIS.

If you have any questions, please let me know and I will forward them to Mr. La Forest.

Thank you sincerely,

Lily Evans
Assistant to Dale La Forest

DLA Comments - Shasta Dam Raising DEIS_9-30-13 -errata.pdf
1040K

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SIGNIFICANT NOISE IMPACTS
SHASTA DAM RAISING PROJECT
Shasta Lake Water Resources Investigation
Draft Environmental Impact Statement

(Corrected 10/3/13)
September 30, 2013

Dear Ms. Chow:

LAFO-1 I submit this comment letter on behalf of the residents of Shasta Lake City. This comment letter addresses some of the potentially significant noise impacts that the Shasta Dam Raising Project's construction activities may create in its vicinity. The Shasta Lake Water Resources Investigation's Draft Environmental Impact Statement (DEIS) fails to adequately disclose those noise impacts. It fails to contain a professional and meaningful acoustical study that accurately predicts such noise impacts. An EIS is required to evaluate a project's noise impacts on homes and schools that are considered to be "noise sensitive" so that effective mitigations can be adopted.

LAFO-2 I am a professional planning consultant, architectural designer, and expert acoustical consultant. I have over 20 years of experience in evaluating the environmental noise impacts in California. Projects such as this dam raising construction project can generate significant noise impacts at homes affected by such construction noise or its related off-site transportation noise from increased vehicles and heavy trucking.

LAFO-3 All too often project proponents only focus on noise impacts caused by on-site construction activities. This comment letter focuses on how this Project's off-site traffic will create significant noise impacts that may continue for as long as five years to residents within and near Shasta Lake City and elsewhere. But with a massive, long-lasting construction project like this one, those significant off-site construction traffic impacts can linger so long that they seem nearly permanent to affected residents. This isn't a project that can be tolerated or endured for just a few days or weeks. Exposure to excessive project-related noise levels for years can cause serious health impacts to affected residents, as well as immediate sleep-disturbance impacts.

LAFO-4 There are homes located very near this Project's main haul routes along Lake Boulevard and Shasta Dam Boulevard that could be adversely impacted by this Project's substantial increase in

LAFO-4
CONTD

construction traffic and heavy trucking. Some of these homes appear to be only about 50 feet from the centerline of these roads as described below with some examples.
The DEIS fails to describe in any meaningful detail (i.e. with maps) that residents also live along Shasta Dam Boulevard and Lake Boulevard where heavy truck traffic would deliver construction materials to the Project and where large numbers of construction workers will pass for years.

PHOTOS OF EXISTING HOMES IN SHASTA LAKE CITY AS EXAMPLES OF HOW CLOSE PEOPLE LIVE TO THIS PROJECT'S ARTERIAL ACCESS ROUTES

EXISTING HOMES WITHIN 50 FEET OF CENTERLINE OF SHASTA DAM BOULEVARD

LAFO-4 CONTD

EXISTING HOMES WITHIN 50 FEET OF CENTERLINE OF LAKE BOULEVARD

LAFO-5

The point of showing these photos is to clarify a point missing in the DEIS: that some homes are so close to this Project's access roads that the noise from the large increase in construction traffic will severely impact these residents. There are other homes in Shasta Lake City that are farther from the centerline of these arterial roads that will also be exposed to excessive construction noise levels, even if not as severely as these examples at 50 feet away. The DEIS should have included existing noise level measurements at such adversely impacted homes. Only if one first knows how loud traffic noise is for such homeowners can one calculate whether or not the noise level increase during construction traffic operations will be significant. While the DEIS only purports to estimate that noise levels won't increase by more than 3 dBA, an even lesser increase could still be significant. Or using other relevant standards, if traffic noise levels along Lake Boulevard where homes are nearby are much lower than along Shasta Dam Boulevard, then this Project's heavy trucking and large numbers of employee trips could have a greater relative noise impact.

LAFO-6

As the DEIS states, "where existing traffic noise levels are greater than 65 dB Ldn, a + 1.5 dB Ldn increase will be considered significant." The problem is that the DEIS never applied this more restrictive threshold of significance to the circumstances that exist in Shasta Lake City.

The DEIS also contains no hourly equivalent noise level (L_{eq}) measurements. It defines such L_{eq} measurements on page 8-5, but never bothered to actually acquire such necessary measurements. Without such actual existing hourly equivalent noise levels, the public cannot determine whether this Project complies with the Shasta County's noise standards that include restrictions based upon such L_{eq} noise levels.

LAFO-7

Shasta County Noise Element
Policy N-f – Noise created by new transportation sources shall be mitigated to satisfy the levels specified in Table 8-5 at outdoor activity areas and/or interior spaces of existing noise-sensitive land uses. Transportation noise shall be compared with existing and projected noise levels.

Table 8-5. Noise Level Performance Standards for New Projects Affected by or Including Nontransportation Sources
55 dB Hourly L_{eq}, Daytime (7 a.m. to 10 p.m.)
50 dB Hourly L_{eq} Nighttime (10 p.m. to 7 a.m.)

But no hourly L_{eq} noise level measurements are included in the DEIS. This Project is not apparently being prohibited from operating at nighttime, so it would be required to meet the more restrictive nighttime noise standards. The DEIS fails to disclose that this Project would expose people to and would generate noise levels in excess of local standards and other applicable standards of other agencies.

LAFO-8

THIS PROJECT WOULD GENERATE SUBSTANTIAL AMOUNTS OF CONSTRUCTION TRAFFIC NOISE

As described in either the City of Shasta Lake's comment letter of September 27, 2013, or in the DEIS, Chapter 20, page 20-8, import of fill and construction materials and export of construction waste would result in 122 - 177 truck trips per day for up to 5 years; export of vegetation would result in 52-75 round trips per day for up to 3.5 years; and the construction labor force would add average of 900 daily round trips for up to five years. This increased traffic has the potential to result in significant noise impacts to the residents living near this Project's access routes.

LAFO-9

Since, according to CalTrans, the passing of a single heavy truck can generate as much noise as that of about 28 automobiles, this Project's possible increase of 177 truck trips per day hauling construction aggregates and materials would make as much noise as about 4,956 cars per day. Add to that other medium weight trucks and about 900 auto trips for construction workers, this Project may generate as much traffic noise as if nearly 6,000 extra cars passed by those nearby homes along Lake Boulevard and Shasta Dam Boulevard. Residents of Shasta Lake City should be informed of the true noise impact of such a possible five-year long Project on their lives.

LAFO-10

NIGHTTIME CONSTRUCTION AND TRAFFIC NOISE IMPACTS WILL BE SIGNIFICANT

The DEIS places no restrictions on the hours of the day during which this Project would be allowed to operate or to conduct its off-site transportation activities.[1] The DEIS, p. 8-27,

[1] To quote from the DEIS, "Typical construction would occur during daylight hours Monday through Friday, but the construction contractor may extend the hours and may schedule construction work on weekends if necessary to complete aspects of the work within a given time frame." *(emphasis added.)*

LAFO-10 CONTD

therefore acknowledges that the Project's evening, nighttime and early morning construction activities could create a significant noise impact.[2] The DEIS proposes Mitigation Measure Noise-1 that includes a restriction to limit construction noise at non-dam sites to only during daytime hours of 7 a.m. to 10 p.m., Monday through Friday. But the DEIS places no time-of-day restriction on construction noise at the dam site or along the haul routes leading to the dam. In realistic terms, that guarantees that residents along Shasta Dam Boulevard and Lake Boulevard will be exposed to loud heavy trucking noise before 7 a.m. During the hot summer months, construction activities, worker traffic and material shipments typically begin operating before 7 a.m. to avoid the heat of day. Accordingly, there is no evidence that Mitigation Measure Noise-1 is adequate to reduce this Project's non-daytime construction noise impacts. For example, since the DEIS considers evening (7 p.m. – 10 p.m.) construction noise to be potentially significant, but its mitigation measure does not restrict such evening noise levels, then this Mitigation Measure Noise-1 will not reduce the Project's evening noise impacts to less-than-significant.

MAXIMUM EXISTING TRAFFIC NOISE LEVEL ARE UNDERESTIMATED

LAFO-11

The Project's maximum existing daily traffic noise level on any major access route may also be greater than the average daily traffic noise levels that the DEIS calculates. The DEIS incorrectly estimates existing traffic noise along this Project's access routes. It does so in at least two ways:

1) It uses outdated traffic counts from 2006 and provides no traffic counts whatsoever for some roads sections of Shasta Dam Boulevard where sensitive users exist.
2) It fails to consider the worst case (i.e. loudest) noise levels that traffic generates at some hours of the day. Caltrans[3] instructs that "[a]ll Caltrans highway traffic noise analysis should be done in terms of the worst noise hour L_{eq} (h)," but the worst noise hour is not evaluated in this DEIS. Thus, the Project's maximum existing noise impacts have been underestimated in the DEIS's calculation that is based on average traffic counts, and not maximum hourly counts.

LAFO-12

The consequence of the DEIS having underestimated the current traffic noise levels is that the true severity of this Project's additional construction traffic noise is not being evaluated and mitigated.

LAFO-13

On the other hand, the data the DEIS relies upon does not accurately correlate with the most current CalTrans data. For example, the PDEIR, in Table 8-2, describes a traffic count of 5,500 ADT on SR 151 in Shasta Lake yet no current CalTrans data in the vicinity is that high. The 2012 CalTrans traffic count on Shasta Dam Boulevard to the east of Lake Boulevard is much lower and only about 1,550 AADT.[4] Father east yet along Shasta Dam Boulevard, CalTrans's 2012 traffic count increase to about 2,250 AADT, still only half as much as the DEIS reports from 2006. There are homes within about 50 feet of Shasta Dam Boulevard along this road

LAFO-10 CONTD

[2] In terms of noise impact analysis, the "daytime hours" are considered either to be from 7 a.m. to 10 p.m. (under the L_{dn} standards) or 7 a.m. to 7 p.m. (under the CNEL standards).

LAFO-11 CONTD

[3] See: *Technical Noise Supplement, A Technical Supplement to the Traffic Noise Analysis Protocol*, October 1998, page 44, by California Department of Transportation. Available online at: http://www.dot.ca.gov/hq/env/noise/pub/Technical%20Noise%20Supplement.pdf

LAFO-13 CONTD

[4] See 2012 CalTrans data here for SR-151 online: http://traffic-counts.dot.ca.gov/2012all/Route134-161.htm

LAFO-13 CONTD

section, some of which are pictured above. The DEIS calculates that an existing 5,500 ADT results in an existing traffic noise level 68 dBA L_{dn}. But if the more recent data of 2,250 AADT is used, with less than half as many vehicles, then the existing traffic noise levels along that road section might be about 65 dBA L_{dn} and not 68 dBA L_{dn} as the DEIS calculates. Those are still noise levels that exceed the City's standards, but this Project's heavy traffic and other cumulative traffic would constitute a greater percentage increase and would thus generate a greater traffic noise level increase than the DEIS reports.

NOISE IMPACTS TO MOUNTAIN LAKES HIGH SCHOOL WOULD BE SIGNIFICANT

The DEIS, p. 8-10, inaccurately describes that the nearest school to construction activities is approximately 500 feet away. It totally ignores that another school, the Mountain Lakes High School, is less than about 50 feet away from Lake Boulevard at the Shasta Dam Boulevard intersection where off-site Project-generated construction traffic will pass. Construction traffic is a construction activity, and its noise impacts must be disclosed and mitigated where feasible. The DEIS, in Table 8-7, identifies that the "maximum allowable noise exposure" from transportation noise sources at playgrounds and parks is 70 dBA L_{dn}/CNEL at the property line.

LAFO-14

This outdoor activity area, at the intersection of two roads, may be exposed to noise levels in excess of 70 dBA L_{dn}/CNEL. The DEIS calculates noise levels from just traffic along Shasta Dam Boulevard as being about 68 dBA L_{dn} at 50 feet, and that doesn't include the additional noise from traffic on Lake Boulevard nor future noise from other foreseeable projects. The City of Shasta Lake has an even stricter noise standard to limit the noise level in outdoor activity areas at schools of 60 dBA L_{dn}.[5] The photo below shows just such an outdoor activity area with a tree-shaded picnic table and students using it near the Lake Boulevard property line to the west.

Photo and aerial photo of Mountain Lakes High School:

LAFO-15

The DEIS calculates that the existing noise level along Shasta Dam Boulevard was 68 dBA L_{dn} at a distance of 50 feet from the centerline of that road. That means traffic noise is quite excessive at this school's southern property line also about 50 feet from the centerline where such noise standards apply. That noise level, especially when updated for the increased traffic now some seven years later, will be at least 8 dBA louder than the City's standards allow. This Shasta

LAFO-14 CONTD

[5] See Shasta Dam Area RP Fourth Amendment DEIR, Feb. 2008, Table 6.6-3. (Document accessed online on 9/30/13 at: http://www.ervineg.com/pdf/DEIR-SDARP4A.pdf. A copy will be made available if requested.

LAFO-15 CONTD

Dam Raising Project's construction traffic would expose this school to up to five years of increased heavy trucking noise, raising noise levels at the school even higher. The possible approval of the Moody Flats Quarry near the Shasta Dam would generate an even greater amount of additional, cumulative noise at this school.[6] Such increases in traffic noise would likely exceed 3 dBA during the Shasta Dam Raising Project's construction and would be considered significant. Since the standard however for noise sensitive land already exposed to more than 65 dBA L_{dn} is even lower, where only a 1.5 dBAL/CNEL noise level increase is considered to be significant, there should be no doubt this Shasta Dam Raising Project will create a significant noise impact to users of that school.[7]

LAFO-16

In *Los Angeles Unified School District v. City of Los Angeles* (1997) 58 Cal.App.4th 1019, the Court overturned an approval by the City of Los Angeles of a development that would have exposed an existing school to even higher unacceptable traffic levels. The court ruled that an increase under those circumstances in 1997 that might have been only 2.8 dBA was nonetheless significant. Some of that decision[8] is entirely relevant to this Shasta Dam Raising Project's noise impacts:

> "The EIR is inadequate because it fails to consider the cumulative impact of existing and projected traffic noise at the schools."
>
> "The EIR in the present case concluded there would be no significant impact on the schools from increased traffic noise. The existing ambient noise level of 72.1 dBA already exceeds the Department of Health's recommended maximum of 70 dBA and would only increase by another 2.8--3.3 dBA at build-out, an increase the EIR considered "insignificant." "
>
> "The City ignores the statutory requirement the EIR consider the cumulative effects of the project on the environment. ..."
>
> "We conclude the evidence in the record does not support the EIR's finding the plan will have no significant impact on traffic noise at Canoga Park High School and Parkman Junior High School ..."

The same conclusion now applies to this Shasta Dam Raising Project's DEIS and its construction traffic noise impacts to this Mountain Lakes High School; the cumulative noise impacts will be significant. The DEIS must be revised to correctly include such analysis and noise mitigation.

LAFO-15 CONTD

[6] The proposed Moody Flats Quarry project site is adjacent to the City's northerly city limit, southeast of the Shasta Dam complex. The proposed Quarry would also utilize SR 151 during a portion of its construction operations.

[7] See DEIS: "Where existing traffic noise levels are greater than 65 dB Ldn, a + 1.5 dB Ldn increase will be considered significant."

LAFO-16 CONTD

[8] Court decision in *Los Angeles Unified School District v. City of Los Angeles* is available online here: http://ceres.ca.gov/ceqa/cases/1997/la_unified.html

INAPPROPRIATE THRESHOLD OF SIGNIFICANCE FOR NOISE IMPACTS

LAFO-17

The DEIS, on page 8-28, is inaccurate in reference for this construction project to state that it would typically require a doubling of traffic volumes on area roads in order for the noise level along those roads to increase by 3 dBA. This Shasta Dam Raising Project would not represent not a "typical" situation. Heavy construction vehicles hauling aggregate and materials typically emit much more noise than typical automobiles. The percentage of heavy trucks during these five years of construction would be much greater than occur currently with recreational traffic along these access roads. Each heavy truck produces approximately as much noise when passing a home as 28 automobiles. Thus, a much smaller percentage increase in construction traffic could result in a 3.0 dBA CNEL/L_{dn} noise level increase. The DEIS must be revised to evaluate the actual circumstances with louder heavy trucking noise rather than some irrelevant rules of thumb that greatly understates the noise impacts to nearby homes.

LAFO-18

The DEIS uses the wrong threshold of significance for noise impacts caused by noisy construction-related traffic. It considers the severity of noise level increases of 3.0 dBA L_{dn} or less to be less-than-significant. However the courts in California have ruled that even lesser noise level increases along roads that are already excessively noisy can be significant. For example, in *Grey v. County of Madera* (2008) 167 Cal.App.4th 1099, the court found even a **2.1 dB** increase at a residence due to a project's increased heavy trucking to be significant for a road already exposed to excessive noise levels.[9] The DEIS identifies that one of the major access routes to this Project, Shasta Dam Boulevard, as based on outdated traffic information from 2007, was exposed to noise levels of 68 dBA CNEL at a distance of 50 feet from its centerline. 68 dBA CNEL is excessive noise exposure already because the BLM and Shasta County consider noise levels of 60 dBA CNEL to be limit for acceptable exposure.

LAFO-19

The DEIS, p. 8-9, Table 8-2, fails to measure, predict or describe what noise levels currently exist along Lake Boulevard where existing residences are located to the north of Shasta Dam Boulevard. Construction traffic is allowed to and will also pass along that route. The DEIS Table 8-2's calculation or modeling is also outdated because it relies upon traffic counts from 2006 that are more than 7 years old. The DEIS also fails to state what the average daily volume of traffic is along Lake Boulevard. As such, the DEIS is inadequate and must be revised.

LAFO-18 CONTD

[9] Quote from the Court's decision in *Grey v. County of Madera* (2008) 167 Cal.App.4th 1099, 1122-1123:
"Here, the Madera County General Plan Noise Element establishes that for residential uses affected by transportation noise sources (off-site traffic in this case), 60 dBA Ldn (Day-Night Average Level noise descriptor) is the maximum acceptable noise level. All of the sites tested for SR 41, however, show that existing traffic noise levels are already in excess of this amount. Thus the EIR should consider whether the cumulative noise impact would be significant when increases of up to 2.1 dBA are added to the existing noise level. For example, even though a 2.1 dBA noise in isolation will not be noticeable, when added to an already high noise level, it could cause a tipping point of noise problems for the general public. The EIR, however, does not analyze this issue and merely concludes that it would not be significant because "[I]t is generally recognized that an increase of at least 3 dB is usually required before most people will perceive a change in noise levels." This bare conclusion cannot satisfy the requirement that the EIR serve as an informational document."

LAFO-19 CONTD

The "Shasta Dam Area Redevelopment Plan Fourth Amendment DEIR" states that the 1999 Shasta Lake General Plan EIR identified that Lake Boulevard to the north of Shasta Dam Boulevard had 2,400 average daily trips.[10] That figure shows that residents along Lake Boulevard are exposed to less traffic and therefore less traffic noise than those along Shasta Dam Boulevard (5,500 ADT or more if the reader believes the DEIS). Accordingly, construction traffic noise from this Shasta Dam Raising Project would result in a more noticeable noise impact to residents along Lake Boulevard than this DEIS considers.

LAFO-20

The DEIS fails to describe the existing (2012 or 2013) traffic noise levels on those various streets where Project-related construction traffic will likely pass. Therefore it fails to support with substantial evidence its conclusion that traffic noise from temporary construction vehicles will not increase those noise levels by less than 3 dBA CNEL/L_{dn}.

LAFO-21

Other noise standards that need to be examined are found in federal regulations, in other communities' regulations, and in case law. The County of Shasta has a limited set of noise standards in its General Plan. But those are not the only measures of whether this Project will have a significant noise impact. CEQA allows and requires an agency to examine the full range of significantly harmful noise impacts, even if the agency has not adopted specific noise limits for all types of noise. Under conditions such as is found with Shasta County's limited set of noise standards, this DEIS should examine whether the Project will adversely impact people in other measureable ways.

Some communities examine whether a project will increase the ambient noise level by greater than a specified amount, and if so, then they will deem such a noise increase to be significant. In Oregon, for example, developers of commercial projects are not allowed to increase the ambient noise levels of quiet, previously undeveloped land by more than 10 dBA during any hour of the day. Those noise standards are also applied on the basis of the time of day, and on the basis of how frequently excessive noise occurs within any given hour.[11]

LAFO-22

The A-weighted sound level alone, however, is not sufficient to describe the noise environment at any given location, due to the fact that environmental sound levels tend to change frequently with time. Therefore, an environmental noise descriptor needs to address the length of time sound is present as well as the level of the sound. One environmental noise descriptor used widely throughout the United States is the "Statistical Sound Level." The statistical sound level is given as "L_{xx}," which corresponds to the level exceeded "xx" percent of the specified measurement time. For example, the L_{50} would be that level exceeded 50% of the time during a specified time period. Similarly, the L_{10} is exceeded just 10% of the time. Typically, in noise regulations and standards, the specified time period is one hour. The DEIS could fashion effective mitigations by evaluating these types of standards and restricting noise levels with specific numerical limits based upon how often the noise exceeds these levels. This is one

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[10] See: http://www.ervincg.com/pdf/DEIR-SDARP4A.pdf as available online

LAFO-21 CONTD

[11] In light of Shasta County's rural character, on the basis of which many of its residents have chosen to make Shasta County their home, the DEIS should consider Oregon's approach to regulating new commercial or industrial noise sources in its agricultural areas. See, http://arcweb.sos.state.or.us/rules/OARs_300/OAR_340/340_035.html.

LAFO-22 CONTD

measurement methodology that is used in some California communities, as well as in Oregon.

THE DEIS CONTAINS NO ANALYSIS OF PROJECT SLEEP-DISTURBANCE IMPACTS

LAFO-23

This Project's traffic noise will likely cause significant sleep-disturbances to residents living elsewhere along the main travel routes to the construction sites. Some people live close enough to Lake Boulevard and Shasta Dam Boulevard that their sleep may be significantly disturbed by this Project's added early morning or nighttime truck traffic. The DEIS is defective for failing to disclose that information. It never even mentions or examines such sleep-disturbing traffic noise impacts.

LAFO-24

The DEIS is also inadequate for failing to evaluate how loud this Project's sleep-disturbing impacts may be. Individual heavy trucks can generate brief but loud noise levels that can awaken people and harm their health and well being. Yet this DEIS never evaluates such noise impacts, as measured with the "single event level" (SEL) descriptor. The court in *Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners* (2001) 91 CA4th 1344 ruled against a project's Environmental Impact Report where the project would generate additional airplane flyovers with up to 61 dB (SEL) impacts. It ruled that a consultant's disclosure of 61 dB SEL was loud enough to disturb the sleep of about 30% of the people under the flight paths. In that case, its EIR disregarded such sleep disturbance impacts and only considered whether the Project was consistent with general plan noise standards. This is the same error that the DEIS is now making. With possible significant noise impacts in this instance for homes at about 50 feet from Shasta Dam Boulevard and Lake Boulevard that are not protected by topographic features, this Project's sleep-disturbing noise from increased passenger vehicles and its construction-related trucking will be louder than 61 dB (SEL) and potentially more disturbing yet.

LAFO-25

The purpose of mitigation measures is to reduce such noise impacts. The DEIS cannot legitimately claim to have mitigated noise impacts unless it can demonstrate the probable effectiveness of such mitigation as it proposes. With respect to noise impacts, it is quite feasible to accurately quantify both anticipated impacts and proposed mitigation. Here, the DEIS does neither.

LAFO-26

That essential error defeats some of NEPA's and CEQA's important objectives—to ensure adequate mitigation in order to limit exposure to impacts, in this case excessive construction noise. At the very least, NEPA and CEQA require even temporary construction-related noise levels to be evaluated, and mitigated if feasible. This DEIS is inadequate in that it establishes no specific maximum noise levels for construction noise, and fails to propose or analyze reasonably feasible mitigation measures.

AN ACOUSTICAL ANALYSIS IS REQUIRED

LAFO-27

The DEIS is inconsistent with the Shasta County requirement that an "acoustical analysis" is required because it fails to include any adequate acoustical analysis. The Shasta County General Plan Noise Element's Policy N-c requires such an acoustical analysis be prepared when this Project would likely produce noise levels that exceed the performance standards on existing noise-sensitive uses. The DEIS itself even acknowledges that construction noise levels will

exceed acceptable limits for some homes. The standards for an acoustical analysis are described in the DEIS, page 8-16, Table 8-6, as copied from the Noise Element. But the DEIS fails to comply with those minimal requirements because:

- It appears not to have been prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics. That is evidenced by the many flaws in the DEIS's chapter 8 regarding noise impacts and its misunderstanding of Federal and California law on this subject of this Project's noise impacts.[12]
- It fails to include any representative noise level measurements to describe the local conditions and predominant noise sources. There is no evidence anywhere in the DEIS that any noise level measurements were taken anywhere related to this Project.

LAFO-27 CONTD

- It fails to estimate the existing and projected (20 years) noise levels at homes affected by this Project and compare them with the policies of the Noise Element. The Project will obviously have short-term construction noise impacts that will be significant. It will also have long-term noise impacts due to increased traffic and altered recreational access that should have been predicted for 20 years in the future.
- It fails to recommend appropriate noise mitigation for homes exposed to excessive heavy trucking noise impacts.
- It does not estimate the noise exposure after the prescribed Mitigation Measures have been implemented.
- It contains no post-project assessment program to evaluate the effectiveness of the proposed Mitigation Measures.

Without a professional acoustical analysis upon which to base its conclusions, the DEIS has no valid support for its determination that the Project's noise impacts will be less-than-significant. Since this DEIS must also comply with the California Environmental Quality Act in evaluating noise impacts on County, and not only on Federal roads, such an acoustical analysis that meets CEQA requirements and case law must be prepared for this Project.

LAFO-28

ADDITIONAL NOISE MITIGATION SHOULD BE CONSIDERED

The DEIS, when revised for additional noise impact analysis, must analyze and could require as conditions of approval a range of common and reasonably feasible noise mitigations to be

[12] This comment that questions the professional qualifications behind the DEIS's noise chapter is not meant to be unduly harsh. There may be other unnamed professionals who contributed to the noise impact chapter of this DEIS who, if identified, might tend to support the credibility of this DEIS study. But for purposes of an EIS or an EIR, the public is entitled to the assurance that the preparer of such noise studies is qualified, accurate and truthful in his reports. The means for an EIS to provide that public assurance is to describe somewhere what personnel worked on the EIS and describe their professional qualifications. As to the qualifications of the preparer of the noise chapter of the DEIS, it only identifies one person, Jake Weirich, having a B.S., Sound Engineering; with 4 years experience, Noise and Vibration, Air Quality and Climate. But the University of Michigan's Bachelor of Science in Sound Engineering does not appear to qualify a person in California for the fields of environmental noise assessment and architectural acoustics, and no substitute qualifications are provided in the DEIS either. (See: http://www.music.umich.edu/departments/pat/bs_curr_d.htm) To comply with the Shasta County General Plan's Noise Element for a required *acoustical analysis*, more information is needed to support that an acoustical analysis has actually been prepared by a "qualified person experienced in the fields of environmental noise assessment and architectural acoustics."

LAFO-27 CONTD

implemented to reduce the Project's noise impacts on its neighbors including:

- Requiring that construction noise levels do not exceed a specific decibel level that is consistent with the current maximum noise levels permitted by the Shasta County General Plan Noise Element and the Shasta Lake City General Plan Noise Element.
- Limiting startup hour to 8 a.m. to lessen the Project's sleep-disturbance to neighbors.
- Prohibit any off-site trucking to or from the Project site except during the approved hours.
- Conditioning the Project such that its trucking would be prohibited from using certain routes where homes are located very close to those roads at times of the day that would exceed allowable noise levels.
- Require a sufficiently tall and continuous noise berm of earth or rock that wraps closely around construction areas to lower the Project's noise transmission to existing distant homes. Earth berms are commonly used to effectively reduce sounds levels. In addition, require as necessary portable on-site noise barriers. Install noise berms or noise walls where off-site trucking would significantly impact existing neighbors near those roads.

LAFO-28 CONTD

- Require better-than-average mufflers on construction equipment, mobile equipment, and haul-trucks to lower their noise emissions by at least 5 dBA lower than typical mufflers.
- Retrofit existing homes nearest to the Project's haul routes with sound-resistant windows and other structural noise-proofing, including air-conditioning for warm summer operations.
- Replace backup alarms or bells with a signaling operator, or use variable level backup alarms that measure the background sound between the beeps and vary the amplitude so as to generate an OSHA-compliant sound level. A feasible mitigation for some noise impacts might include the use of flashing lights instead of backup beepers under low-light conditions during nighttime hours.
- Relocate on-site equipment, or select inherently quieter units.
- Install sound-measuring devices at nearby homes to provide neighbors with information on whether they are being adequately protected.
- Use noise monitoring and inspections to ensure that mitigation measures are in place and operating, and that noise standards are being met.

LAFO-29

Based on these comments, it should be abundantly obvious that the DEIS's discussion and mitigation of the Project's noise impacts is inadequate and fails to comply with NEPA and CEQA. Please revise the DEIS and provide additional opportunity for public review afterward.

Thank you for considering these comments. Please notify me of any additional opportunities there may be to review this Project or its related environmental documents.

Dale La Forest
Professional Planner and Designer
Dale La Forest & Associates

DL&A Public Comments – 9/30/13 - 12 - (Corrected 10/3/13)
Shasta Dam Raising Project – DEIS Shasta Lake Water Resources Investigation

Responses to Comments from Dale La Forest & Associates

LAFO-1: In the opening paragraph of his letter, the commenter is concerned about the noise impact analysis in the DEIS and states that the DEIS "fails to contain a professional and meaningful acoustical study that accurately predicts such noise impacts." This comment alone is a general statement and does not raise any specific issues, but the comment provides introduction to the more specific comments that follow. Potential noise impacts are discussed in Chapter 8, "Noise and

Vibration." Responses to Comments LAFO-2 through LAFO-28 below address these specific comments.

LAFO-2: This comment is a general statement and does not raise any specific issues, but the comment provides introduction to the more specific comments that follow.

Please refer to Master Comment Response NOISE-1, "Traffic Noise Analysis," and Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors."

LAFO-3: The commenter states the importance of analyzing off-site traffic noise level increases during the multiple-year construction period. The analysis of noise from off-site construction traffic is included within Chapter 8, "Noise and Vibration," and begins on page 8-27 of the DEIS. A more detailed analysis is provided in Master Comment Response NOISE-1, "Traffic Noise Analysis," and Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors."

The commenter also expresses concern that increased traffic noise levels would result in sleep disturbances. Refer to Master Comment Response NOISE-2 for additional analysis regarding the potential for construction-related haul truck trips to result in sleep disturbance at off-site residences.

LAFO-4: The commenter expresses concern about the levels of noise from construction-related traffic at homes located near the main haul routes along Lake Boulevard (Road 418) and Shasta Dam Boulevard (SR 151). The commenter provides photos of homes located along these roadways. A more detailed analysis of traffic noise increases along these roadways is provided in Master Comment Response NOISE-1, "Traffic Noise Analysis." The traffic modeling performed for Master Comment Response NOISE-1 accounted for the distance between each roadway segment and the nearest residential or commercial land uses. Detailed input parameters used in the modeling are provided in Appendix, "Traffic Noise Modeling." See the table called "Average Annual Traffic Data and Receptor Distances."

LAFO-5: The commenter notes that the traffic noise analysis under Impact NOISE-1 in the DEIS focuses solely on the potential increase in traffic noise due to construction-related traffic and points out that even small increase in traffic noise levels can be considered significant. To address this point additional analysis is provided in Master Comment Response NOISE-1, "Traffic Noise Analysis," This analysis focuses on

whether traffic noise levels during project construction would exceed the transportation noise standards established by the City of Shasta Lake.

LAFO-6: The commenter states that the analysis of off-site traffic noise increases near sensitive receptors should have applied an incremental increase threshold of 1.5 dBA at locations where existing traffic noise levels exceed 65 dBA Ldn. The incremental increase standard of 1.5 dBA is part of Shasta County General Plan Policy N-g, which is provided in Chapter 8, "Noise and Vibration," on page 8-14 of the DEIS. This policy, however, only applies to roadway improvement projects that result in increased traffic volumes or increase travel speeds. Construction- traffic associated with the SLWRI is not considered a roadway improvement project. Also, construction-related traffic would not result in traffic noise increases for the long term as would most roadway improvement projects. Moreover, as stated in Master Comment Response NOISE-1, "Traffic Noise Analysis," the City of Shasta Lake has not established any standards regarding the incremental increase in traffic noise levels.

LAFO-7: Within Chapter 8, "Noise and Vibration," on page 8-14 of the DEIS, Policy N-f from the noise element of the Shasta County General Plan (2004) incorrectly refers to the noise standards in Table 8-5. Policy N-f actually refers to the noise standards in Table N-VI, which is presented as Table 8-7 on page 8-17 of the DEIS. Table 8-7 consists of exterior and interior noise standard using the Ldn and CNEL metrics, as well as some interior noise standards using the hourly Leq metric.

The commenter states that the noise analysis should include some hourly equivalent noise level (Leq) measurements to compare traffic noise levels to the Leq standards displayed in Table 8-5. The Leq standards displayed in Table 8-5, however, only apply to nontransportation noise sources.

Because the routes most heavily travelled by construction-related traffic, particularly haul trucks, would use Shasta Dam Boulevard and Lake Boulevard, which pass by noise-sensitive receptors located in the City of Shasta Lake, a more comprehensive traffic noise analysis using noise standards established by the City of Shasta Lake city is provided in Master Comment Response NOISE-1, "Traffic Noise Analysis."

LAFO-8: The commenter argues that the vehicle trips associated with material hauling and worker commutes during the construction period has the potential to result in significant noise impacts to the residents living near this project's access routes. The commenter specifically notes the number of construction-related trips stated in Chapter 20, "Transportation and Traffic," of the DEIS.

Please refer to Master Comment Response NOISE-1, "Traffic Noise Analysis," for a comprehensive analysis of traffic noise impacts during project construction. As stated in Master Response NOISE-1, this analysis used the higher trip generation values provided in Chapter 20, "Transportation and Traffic."

LAFO-9: The commenter states that "according to Caltrans, the passing of a single heavy truck can generate a substantially higher noise level than 28 automobiles." While it is true that heavy truck traffic generates more noise than an equivalent volume of automobile traffic, the commenter does not cite which source from Caltrans states that truck trucks are 28 times as loud, or whether that factor is based on noise levels expressed in hertz or A-weighted decibels.

Nonetheless, the comprehensive analysis of traffic noise impacts provided in Master Comment Response NOISE-1, "Traffic Noise Analysis," takes into account the proportion of construction-generated vehicle trips that will consist of heavy trucks. Also, additional analysis regarding the potential for construction-related haul truck trips to result in sleep disturbance at off-site residences is provided in Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors."

LAFO-10: The commenter expresses concern that the DEIS places no time-of-day restrictions on when construction-related traffic would occur, citing key text on page 20-25 in the traffic analysis in the DEIS. Mitigation Measure NOISE-1 was revised to reduce the potential impact of single event noise from truck passbys to a less-than-significant level. This analysis and the added restriction concerning nighttime truck trips are discussed in Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors." The analysis also results in a revision to the key text mentioned by the commenter.

The commenter also expresses concern that Mitigation Measure NOISE-1 places no time-of-day restrictions on noise-generating construction activities at the dam site. Please refer to the discussion of construction-generated noise at the dam site, which is included in Chapter 8, "Noise and Vibration," Section 8.3.4, "Direct and Indirect Effects," "Operation of Heavy-Duty Construction Equipment at the Dam" under Noise Impact-1. This analysis explains that noise levels generated by construction activity at the dam site would attenuate, through distance alone, to less than Shasta County's daytime standard of 55 dBA Leq at the nearest noise-sensitive receptors. It also explains that considerably more attenuation would be provided by the change in topography and intervening forest. Thus, construction noise generated at the dam site

would also not expose the nearest noise-sensitive receptors to noise levels that exceed Shasta County's nighttime standard of 50 dBA Leq.

Please refer to Master Comment Response NOISE-1, "Traffic Noise Analysis," and Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors."

LAFO-11: The commenter suggests that the existing daily traffic noise levels, presented in Table 8-2, are incorrect because they are based on traffic counts from 2006. Traffic volume data from 2006 was used to characterize existing traffic noise conditions because the Notice of Intent to prepare the DEIS was released in October 2005. However, Reclamation and its consultants acknowledge that traffic volumes have changes on some roadway segments since that time and this is why the comprehensive traffic noise analysis presented in Master Comment Response NOISE-1, "Traffic Noise Analysis," uses traffic volume data from 2012, which is the most recent year for which Caltrans provides data at the time of writing the analysis (Caltrans 2014). This approach is conservative given that the analysis focuses on whether project-generated traffic would cause traffic noise levels to exceed applicable standards and 2012 traffic volumes are generally higher than 2006 traffic volumes. The commenter also suggests that the traffic noise analysis should have followed the approach stated in Caltrans's 1998 Technical Noise Supplement, which states that "all Caltrans highway traffic noise analysis should be done in terms of worst noise hour Leq(h)" (Caltrans 1998 :44). Caltrans also makes the statement in the most recent version of this report, its 2013 Technical Noise Supplement (Caltrans 2013:2-47). It is important to note, however, that this document is literally a supplement to Caltrans's Traffic Noise Analysis Protocol (Protocol) and the purpose of the Protocol is to identify the procedures for conducting noise studies and evaluating noise abatement measures of new or reconstructed transportation projects that are funded with Federal aid (Caltrans 2011b :1). Caltrans (as well as the Federal Highway Administration) is not a lead or cooperating responsible agency for the proposed project and the project does not propose any new or modified transportation infrastructure, such as a new roadway, expansion of roadway capacity, or permanent change in traffic volume or fleet mix. Moreover, Caltrans's 2013 Technical Noise Supplement acknowledges that, "Although Caltrans exclusively uses Leq, there are times [when] comparisons need to be made with local noise standards, most of which are in terms of Ldn or CNEL" (Caltrans 2013:2-55).

Another, practical consideration is that construction-related truck trips will have a substantially influence on roadside noise levels than construction related-automobile trips, but it is not known at this time whether truck activity would be noticeably more intense during any

particular period of the day. Thus, identifying which hour of the day is considered the worst-case hour would not be feasible at this time.

For these reasons, a detailed traffic noise analysis was conducted using the Ldn standards established by the City of Shasta Lake and this analysis is provided in Master Response NOISE-1, "Traffic Noise Analysis." Also, the City of Shasta Lake has not established any hourly Leq standards for evaluating traffic noise.

Please also refer to Response LAFO-7 regarding the applicability of hourly noise standards.

LAFO-12: The commenter states, "the consequence of the DEIS having underestimated the current traffic noise levels is that the true severity of this Project's additional construction traffic noise is not being evaluated and mitigated." Please refer to Master Comment Response NOISE-1, "Traffic Noise Analysis," and Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors," for a comprehensive analysis of traffic noise.

LAFO-13: The commenter states that the traffic noise analysis under Impact Noise-1 did not use the most recent available traffic volume data from Caltrans and also points out that some homes are as close as 50 feet to the affected roadways. Please refer to response LAFO-11 and Master Comment Response Noise-1, "Traffic Noise Analysis."

The commenter also expresses concern about the existing noise level of 68 dBA Ldn/CNEL along Shasta Dam Boulevard that, according to Table 8-2 in the DEIS, has an average daily traffic volume of 5,500 vehicles per day that travel at a speed of 45 mph. The commenter is particularly concerned because Shasta Dam Boulevard passes within 50 feet of some classrooms at Mountain Lakes High School and Shasta Lake Elementary School and remarks that, at 68 dBA Ldn/CNEL, the classrooms are exposed to noise levels that exceed applicable standards. However, the noise level listed for Shasta Dam Boulevard in Table 8-2 is the portion of Shasta Dam Boulevard that is just west of Interstate 5. According to the most recent Caltrans traffic volume data (for 2012), the traffic volume on the segment of Shasta Dam Boulevard just east of Lake Boulevard, which is the segment that passes the school, carries average annual daily traffic volume of 1,550 vehicles per day (Caltrans 2014). Also, given the posted speed limit of 25 mph along this segment when children are present, the modeled traffic noise level is 46.8 dBA Ldn. During the construction period the traffic noise level along this roadway segment would increase to 54.5 dBA Ldn and therefore would not exceed the 60 dBA Ldn standard established for schools by City of Shasta Lake. This modeling is summarized in Master Comment Response Noise-1, "Traffic Noise Analysis" and detailed input

parameters, including traffic volume and travel speed, are provided in the Traffic Noise Modeling Appendix. Incidentally, for the segment of Lake Boulevard that passes by the schools, the existing traffic noise level was estimated to be 53.0 dBA Ldn under existing conditions and 59.8 dBA Ldn with the addition of construction traffic. These levels are also less than the 60 dBA Ldn standard established for schools by City of Shasta Lake.

Please refer to Master Comment Response NOISE-1, "Traffic Noise Analysis."

LAFO-14: The commenter expresses concern that the noise analysis did not specifically analyze traffic noise impacts at Mountain Lakes High School, which is located at the northeast corner of Shasta Dam Boulevard and Lake Boulevard. This analysis is provided in Master Comment Response NOISE-1, "Traffic Noise Analysis."

The commenter notes that Table 8-7 that identifies that the standard for transportation noise exposure at playgrounds and parks is 70 dBA Ldn/CNEL at the property line. The transportation noise standards in Table 8-7 were established by Shasta County. However, because these two schools are located in the jurisdiction of the City of Shasta Lake, the Ldn standards established by the city were used in the analysis provided in Master Comment Response NOISE-1. Moreover, the analysis provided in Master Comment Response NOISE-1 applied the city's 60 dBA Ldn standard to determine whether traffic noise along Shasta Dam Boulevard and/or Lake Boulevard would result in excessive noise levels at the two schools. For additional detail see Master Comment Response NOISE-1. In addition, Mitigation Measure Trans-1, which is discussed in Chapter 20, "Transportation and Traffic," of the DEIS, will require Reclamation and its primary contractors to prepare and implement a traffic control and safety assurance plan to minimize the simultaneous use of roadways by different construction contractors for worker commute trips, material hauling, and equipment delivery. This will have the added effect of limiting traffic noise on any single roadway, including the segments of roadways that pass by Mountain Lakes High School.

LAFO-15: The commenter expresses concern that Mountain Lakes High School is already exposed to excessive noise because Table 8-2 in the DEIS indicates that the existing traffic noise level along Shasta Dam Boulevard is 68 dBA Ldn. Please refer to Response LAFO-13. The commenter states, "that noise level, especially when updated for the increased traffic now some seven years later, will be at least 8 dBA louder than the City's standards allow." The commenter provides not substantiation for the magnitude of this increase.

The commenter expresses concern that the approval of the proposed Moody Flats Quarry near Shasta Dam would also expose the schools to noise, thereby contributing to a cumulative noise impact. According to the scoping announcement for the proposed quarry, the schools would be located more than 2,500 feet from the southwest corner of the quarry site with many acres of forest in between (Shasta County 2012 :4). Also, because the proposed quarry project would include an access road between the east side of the quarry site and Wonderland Boulevard near the Old Oregon Trail interchange with Interstate 5 (Shasta County 2011 :1) it is not anticipated that quarry-generated vehicle trips would travel on Shasta Dam Boulevard or Lake Boulevard.

The commenter also expresses concern about the size of the traffic noise increase at the school due to construction-related traffic.

Please refer to Master Comment Response NOISE-1, "Traffic Noise Analysis," for a detailed analysis of whether traffic noise levels would exceed the applicable noise standards established for schools by the City of Shasta Lake.

LAFO-16: The commenter questions the approach used in the DEIS to analyze traffic noise increases under Impact Noise-1. The commenter cites statements in the court decision of Los Angeles Unified School District v. City of Los Angeles (1997) 58 Cal.App.4th l 019 about why a noise impact determination should not be based solely on whether the magnitude of a traffic noise increase would exceed 3 dBA. For these reasons, a more comprehensive traffic noise analysis is provided in Master Comment Response NOISE-1, "Traffic Noise Analysis," (and additional discussion about traffic noise is added to the cumulative noise impact discussion). The analysis in Master Comment Response NOISE-1, "Traffic Noise Analysis," focuses on whether construction-generated traffic, in combination with existing traffic, would cause traffic noise levels to exceed noise standards established by the City of Shasta Lake.

Moreover, the situation reviewed in the Los Angeles Unified School District v. City of Los Angeles case involved a school that was already exposed to noise levels that exceed the applicable local noise standard under baseline conditions. This is not the case for Mountain Lakes High School because, as stated in Response LAFO-13, the modeled existing traffic noise level along the segment of Shasta Dam Boulevard that passes near the school is 46.8 dBA Ldn. Also stated in Response LAFO-13, the existing traffic noise level along the segment of Lake Boulevard that passes by the schools was estimated to be 53.0 dBA Ldn. These levels are less than the 60 dBA Ldn standard established for schools by the City of Shasta Lake.

LAFO-17: The commenter is critical of the traffic noise analysis under Impact NOISE-1 because it is based on whether traffic volumes on area roadways would double and does not account for the fact that a substantial portion of construction-related traffic would consist of trucks. The commenter also states, "Each heavy truck produces approximately as much noise when passing a home as 28 automobiles." While it is true that heavy truck traffic generates more noise than an equivalent volume of automobile traffic, the commenter does not cite which source from Caltrans states that truck trucks are 28 times as loud, or whether that factor is based on noise levels expressed in hertz or A-weighted decibels.

Nonetheless, the comprehensive analysis of traffic noise impacts provided in Master Comment Response NOISE-1, "Traffic Noise Analysis," takes into account the proportion of construction-generated vehicle trips that will consist of heavy trucks. Also, additional analysis regarding the potential for construction-related haul truck trips to result in sleep disturbance at off-site residences is provided in Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors."

LAFO-18: The commenter is critical of the traffic noise analysis under Impact NOISE-1 because the significance determination is based solely on whether the magnitude of a traffic noise increase would exceed 3 dBA. The comment claims that this approach is inappropriate if the existing level of noise already exceeds an applicable standard and highlights portions of the court decision in Grey v. County of Madera (2008) 167 Cal.App.4th 1099. As shown in Master Comment Response NOISE-1, "Traffic Noise Analysis," baseline traffic noise levels along all modeled roadway segments do not exceed any of the applicable noise standards established by the City of Shasta Lake. Moreover, the analysis provided in Master Comment Response NOISE-1 indicates that the addition of construction-related traffic would not cause traffic noise levels to exceed the city's noise standards.

LAFO-19: The commenter states that the traffic noise analysis under Impact NOISE-1 does not analysis potential traffic noise increases on Lake Boulevard north of Shasta Dam Boulevard. Analysis of traffic noise along this roadway segment is included in Master Comment Response NOISE-1, "Traffic Noise Analysis." Because it is not known at this time what proportion of construction traffic will travel on Lake Boulevard and Shasta Dam Boulevard, the analysis in Master Comment Response NOISE-1 conservatively assumes that all construction-related trips could use either road.

The commenter suggests that the existing daily traffic noise levels, presented in Table 8-2, are outdated because they are based traffic counts from 2006. Please refer to Response LAFO-11.

The commenter states that the DEIS does not show the existing traffic noise level or any analysis of the segment of Lake Boulevard north of Shasta Dam Boulevard. The commenter states that the average daily traffic volume along this segment is 2,400 vehicles per day, according to the 1999 Shasta Lake General Plan EIR. This volume was used in the traffic analysis presented under Master Comment Response NOISE-1. The web link the commenter provided for the 1999 Shasta Lake General Plan EIR is no longer valid.

Please refer to Master Comment Response NOISE-1, "Traffic Noise Analysis."

LAFO-20: Please refer to Master Comment Response NOISE-1, "Traffic Noise Analysis."

LAFO-21: The commenter states that "the County of Shasta has a limited set of noise standards in its General Plan" and suggests that additional noise standards shall be used in the noise impact analysis, including a standard applied in Oregon that disallows commercial projects from increasing ambient noise levels by more than 10 dB during any hour of the day. The commenter also suggests that the analysis should apply noise standards based on the time of day.

Shasta County noise-related policies consist of many different types of noise standards using different multiple types of noise metrics. DEIS Table 8-5 on page 8-15 of Chapter 8, "Noise and Vibration," presents hourly noise-equivalent (Leq) standards for both daytime and nighttime hours. Table 8-7 on page 8-17 shows the County's maximum allowable noise exposure standards for transportation noise. These outdoor and indoor standards are expressed in the day-night noise levels (Ldn), which is a 24-hour Leq includes a "penalty" for the noise-sensitive hours between 10 p.m. and 7 a.m. Different Ldn standards are established for different land use types. In addition, Shasta County's noise-related land use compatibility standards are presented in Table 8-8 on page 8-18. The significance determinations made in the noise impact analysis are not limited to the noise standards established by Shasta County. For instance, the analysis of construction-related traffic, which begins on page 8-27, examines whether construction-related traffic noise would exceed any of the applicable noise standards established by Shasta County and whether traffic noise levels increases would exceed 3 dBA. Applying an incremental increase standard of 3 dBA for a short-term noise source is more stringent that the 10 dBA standard suggested by the commenter based on noise practices in Oregon. Also, the following web

link about the 10 dBA standard allegedly used in Oregon is provided by the commenter but it is no longer provides any noise-related information:
http://arcweb.sos.state.or.us/rules/OARs_300/0AR_340/340_035.html.

Moreover, the traffic noise analysis in Master Comment Response NOISE-1, "Traffic Noise Analysis," provides a comprehensive examination of traffic noise levels during project construction and applicable Ldn standards established by the City of Shasta Lake. Also see Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors," for analysis about whether truck passbys would result in sleep disturbance, which employs single event noise standards.

LAFO-22: The commenter suggests that the analysis should apply statistical noise descriptors that "address the length of time sound is present as well as the level of the sound." The commenter is referring to the statistical sound level, LX, which is the noise level exceeded X percent of a specific period of time. (The definition of LX is provided in Chapter 8, "Noise and Vibration," on page 8-5 of the DEIS.) Reclamation and its consultants acknowledge that different jurisdictions use different noise metrics in their noise standards and that some local jurisdictions have standards based on statistical noise descriptors. However, Shasta County, Tehama County, and the City of Shasta Lake do not have standards based on statistical noise descriptors and the Governor's Office of Planning and Research does not recommend any noise standards based on statistical descriptors. The noise standards established by Shasta County, Tehama County, and the City of Shasta Lake include 24-hour metrics (i.e., Ldn and/or CNEL) and/or hourly equivalent noise levels (e.g., Leq standards in Table 8-5 on page 8-15). Furthermore, the commenter provides no evidence that different significance determinations would be made if noise standards based on typical statistical descriptors were applied.

Also see Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors," for analysis about whether truck passbys would result in sleep disturbance, which employs single event noise standards.

The commenter also overlooks the fact that most local jurisdictions in California, as well as other states, exempt construction noise during daytime hours from local noise standards.

LAFO-23: The commenter contends, "This Project's traffic noise will likely cause significant sleep-disturbances to residents living elsewhere along the main travel routes to the construction sites." However, the commenter does not substantiate this determination.

Please refer to Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors," for analysis about whether truck passbys would result in sleep disturbance at nearby residences.

LAFO-24: Citing the ruling in Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners (2001) 91 CA4th 1344, the comment contends that the noise analysis should examine whether truck passbys would result in sleep disturbance at nearby residences.

Please refer to Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors." The analysis under Master Comment Response NOISE-2 includes discussion about the court ruling.

LAFO-25: The commenter contends, "The DEIS cannot legitimately claim to have mitigated noise impacts unless it can demonstrate the probable effectiveness of such mitigation as it proposes." Mitigation for noise impacts is included in Mitigation Measure NOISE-1. As explained in Impact NOISE-1, noise-sensitive receptors could be adversely affected when noise is generated by nighttime operation of heavy-duty construction equipment at construction sites other than the dam site. Mitigation Measure NOISE-1 would eliminate noise exposure during the more noise-sensitive nighttime hours. Mitigation Measure NOISE-1 explicitly states, "Construction activities at non-dam sites will be limited to the less noise-sensitive daytime hours (7 a.m. to 10 p.m., Monday through Friday)." Also, some additional limitations were added to Mitigation Measure NOISE-1, as explained in Master Response NOISE-2, which limits haul trucks from traveling to and from the dam site during the less noise-sensitive daytime hours (7 a.m. to 10 p.m.). These measures are quantifiable in the sense that they are either implemented or they are not.

The other measures included in Mitigation Measure NOISE-1 consist of the standard best management practices required by Shasta County for all construction projects. There is no requirement in NEPA to only include mitigation measures that result in a quantifiable noise reduction.

Please refer to Master Comment Response NOISE-1, "Traffic Noise Analysis," and Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors."

LAFO-26: The commenter implies that the DEIS is in error for not quantifying noise impacts and noise mitigation. Please refer to Response LAFO-25.

The commenter notes that NEPA and CEQA require that "even temporary construction-related noise levels to be evaluated, and mitigated if feasible." Construction-related noise is evaluated in Chapter 8, "Noise and Vibration," of the DEIS and additional analysis of construction-related traffic noise is provided in Master Comment Response NOISE-1, "Traffic Noise Analysis," and Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors."

The commenter contends that the DEIS "is inadequate in that it establishes no specific maximum noise levels for construction noise..." Construction noise is analyzed under Impact Nosie-1 in the DEIS and additional analysis of construction-related traffic noise is provided in Master Comment Response NOISE-1 and Master Comment Response NOISE-2. These analyses apply the noise standards established by Shasta County and/or the City of Shasta Lake, depending on the location of the impact. As explained in the analysis, construction-generated noise is primarily a concern during the more noise-sensitive nighttime hours.

The commenter contends that the DEIS "fails to propose or analyze reasonably feasible mitigation measures." Noise mitigation is included in Mitigation Measure NOISE-1. Mitigation Measure NOISE-1 limits noise exposure to noise-sensitive receptors by prohibiting noise-generating construction activity during nighttime hours at locations where nearby noise-sensitive receptors could be adversely affected.

Some additional noise-control measures were added to Mitigation Measure NOISE-1, as stated in Master Comment Response NOISE-2.

Please refer to Master Comment Response NOISE-1, "Traffic Noise Analysis," and Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors."

LAFO-27: The commenter states, "The DEIS is inconsistent with the Shasta County requirement that an 'acoustical analysis' is required because it fails to include any adequate acoustical analysis" and specifically refers to the requirements listed in Table 8-6 on page 8-16, which originate from Policy N-c of the Shasta County General Plan Noise Element. The commenter also provides a bulleted summary of all the comments made in his comment letter, which is addressed in Responses LAFO-1 through LAFO-29.

Specifically, the commenter contends that the noise analysis was not prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics. In combination with Master Comment Response NOISE-1, "Traffic Noise

Analysis," and Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors," the soundness and adequacy of the noise analysis is demonstrated by Responses LAFO-1 through LAFO-29. Also, the commenter contends that a degree in Sound Engineering and multiple years of experience preparing noise analyses for CEQA and NEPA documents does not qualify someone to prepare noise analyses for CEQA and NEPA documents.

The commenter states that the noise analysis fails to include any representative noise measurements to describe the local conditions and predominant noise sources. The predominant noise sources in the project area consist of traffic noise on nearby freeways and roadways. A summary of modeled existing traffic noise levels is provided in Chapter 8, "Noise and Vibration," Table 8-2 on page 8-9 and greater detail about existing traffic noise levels are provided in Master Comment Response NOISE-1, "Traffic Noise Analysis." The commenter provides no evidence that some other non-transportation noise sources may be the predominant noise source in the project area. Also, refer to Response LAFO-7 regarding the commenter claim that the noise analysis should include some hourly equivalent noise level (Leq) measurements to compare traffic noise levels to the Leq standards displayed in Table 8-5.

The commenter states that the noise analysis "fails to estimate the existing and projected (20 years) noise levels at homes affected by this Project and compare them with the policies of the Noise Element… It will also have long-term noise impacts due to increased traffic and altered recreational access that should have been predicted for 20 years in the future." It is assumed this comment is about traffic noise levels because construction-related noise levels would cease after the 4.5—5 year construction period under all the action alternatives. However, as stated on page 20-25 in Chapter 20, "Transportation and Traffic," "the increase in long-term recreational opportunities and additional visitor days would generate an approximate average of 158 one-way trips per day to Shasta Lake and its tributaries under CP1, 238 one-way trips per day under CP2, 364 one-way trips per day under CP3, 658 one-way trips per day under CP4, and 311 one-way trips per day under CP5." As explained in Impact Trans-1, "these additional trips would be distributed throughout the primary study area to numerous recreational facilities: 6 public boat ramps, 9 commercial marinas, 15 family campgrounds, and various other public and private facilities. These recreational facilities are distributed around Shasta Lake and can be accessed via numerous roadways. Because these trips would be distributed over a large number of roadways throughout a large area, the additional trips are not expected to exceed the existing traffic loads and capacities of the street system." The additional traffic noise modeling for construction-related traffic presented in Master Comment Response NOISE-1, "Traffic Noise

Analysis," was based on traffic volume increase of 700 one-way trips per day by passenger vehicles plus 350 one-way trips per day by haul trucks. Given that these volumes are exceed the volumes projected for additional visitors and consist of much greater portion of louder, heavy-duty trucks, it is not anticipated that the long-term increase in vehicle trips by recreational users, dispersed among the many different recreation facilities around Shasta Lake, would result in an exceedance of applicable noise standards.

The commenter states that the noise analysis "fails to recommend appropriate noise mitigation for homes exposed to excessive heavy trucking noise impacts." Please refer to Master Comment Response NOISE-1, "Traffic Noise Analysis," and Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors," for discussion about the potential noise impact trucks traffic will have on residential land uses and other noise-sensitive receptors. Note that additional measures are added to Mitigation Measure Noise-2 that limit truck passbys, which could result in sleep disturbance at residential land uses, to daytime hours.

The commenter states that the noise analysis "does not estimate the noise exposure after the prescribed Mitigation Measures have been implemented." Please refer to Response LAFO-25.

The commenter states that the noise analysis "contains no post-project assessment program to evaluate the effectiveness of the proposed Mitigation Measures." Mitigation Measure Noise-1, which was revised in Master Comment Response Noise-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors," requires all the listed measures to be implemented by Reclamation and its primary construction. This includes the designation of a disturbance coordinator, with the designated person's telephone number conspicuously posted around the project sites and supplied to nearby residences. The disturbance coordinator will receive all public complaints and be responsible for determining the cause of the complaint and implementing any feasible measures to alleviate the problem. This measure provides the opportunity for potentially affected receptors to request and participate in post-assessment of potential adverse noise affects.

The commenter also contends that the proposed project must also comply with CEQA and the CEQA analysis shall include an acoustical analysis that meets CEQA requirements and case law. Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

LAFO-28: The commenter states that the DEIS must analyze and could require as conditions of approval a range of common and reasonably

feasible noise mitigations to be implemented to reduce the Project's noise impacts and provides a list of 11 different noise reduction measures. Please refer to Response LAFO-25 and LAFO-26 for discussion about why the measures required in Mitigation Measure Noise-1, as amended in Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors," are sufficient for reducing construction-generated noise to a less-than-significant level.

The commenter suggests a mitigation measure that requires that construction noise levels do not exceed a specific decibel level that is consistent with the current maximum noise levels permitted by the Shasta County General Plan Noise Element and the Shasta Lake City General Plan Noise Element. None of the noise standards established by Shasta County directly pertains to noise generated by construction activity. This is revealed by the policies in the Shasta County General Plan Noise Element, as follows:

- Policies N-a, N-e, N-h, and N-n applies to the new development of new noise-sensitive land uses;
- Policies N-b and N-m apply to noise likely to be created by a non-transportation land use;
- Policy N-c applies to noise generated by proposed non-transportation land uses;
- Policies N-d and N-f apply to transportation noise;
- Policy N-g applies to noise exposure of existing noise-sensitive land uses to future roadway improvement projects;
- Policy N-i and N-l pertain to noise mitigation measures;
- Policy N-j applies to railroad noise;
- Policy N-k applies to aircraft noise; and
- Policy N-o concerns county-wide noise contour mapping of transportation noise sources.

None of the policies from Shasta County's Noise Element, and the noise standards they refer to, pertain directly to noise-generated by construction activity. Construction is not a land use. Unlike new land uses or new transportation infrastructure construction is a temporary, intermittent source of noise.

In the same way, the Tehama County Noise Element and the City of Shasta Lake's Noise Element pertain to the development of new noise-sensitive land uses, new noise-generating land uses, transportation noise, and mitigation. Moreover, Tehama County Noise Element, like many cities and counties in California, includes an implementation measure to restrict noise-generating construction activities to daytime hours as determined by the County's Noise Control Ordinance unless an exemption is received from the County to cover special circumstances.

Given that no standards for construction noise have been established by these local jurisdictions, that noise-generating construction activity is not expected to last for an extended period at any location near potentially affected noise-sensitive receptors, and that most jurisdictions in California exempt daytime construction activity from their local noise standards, the noise analysis under Impact Noise-1 focuses on whether construction-generated noise could result in disturbances during noise-sensitive nighttime hours of the day, rather than deriving a specific maximum noise level standard to evaluate construction noise.

The commenter suggests a mitigation measure that would limit startup hour to 8 a.m. to lessen the Project's sleep-disturbance to neighbors. Mitigation Measure Noise-1 limits construction activity at non-dam sites to 7 a.m. to 10 p.m., Monday through Friday. This is consistent with the noise ordinances in most cities and counties in California that prohibit construction noise before 7 a.m. Additional analysis about whether truck passbys would result in sleep disturbance is provided in Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors."

The commenter also suggests mitigation that prohibits any off-site trucking to or from the Project site except during the approved hours and/or prohibiting trucks from using certain routes that pass close to residential land uses. Please refer to Mitigation Measure Noise-1, as amended in Master Comment Response NOISE-2, "Intermittent Single-Event Noise Levels from Trucks Passing Off-Site Sensitive Receptors." As amended, Mitigation Measure Noise-1 requires that all truck deliveries and debris removal trips that use roadways that pass within 50 feet of inhabitable rooms of residential dwellings shall be limited to the less noise-sensitive daytime hours (7 a.m. to 10 p.m.).

The commenter suggests a measure that requires the use of noise berms or walls to protect noise-sensitive receptors from construction noise. Mitigation Measure Noise-1 already requires contractors to install noise berms or noise walls where off-site trucking would significantly impact existing neighbors near those roads.

The commenter suggests a measure that requires better-than-average mufflers on construction equipment, mobile equipment, and haul-trucks to lower their noise emissions by at least 5 dBA lower than typical mufflers. Mitigation Measure Noise-1 already requires that all construction equipment to be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations and that equipment engine shrouds be closed during equipment operation. The commenter provides no definition of the meaning of "average" or indication that such noise-control technology exists without impeding the performance of the equipment or without a substantial increase in cost.

The commenter suggests a measure that requires the retrofitting of existing homes nearest to the Project's haul routes with sound-resistant windows and other structural noise-proofing, including air-conditioning for warm summer operations. Retrofits are generally not feasible for addressing temporary noise sources like construction. Also, the land use compatibility noise standard established by the City of Shasta Lake explicitly state they only apply with windows and doors in the closed position.

The commenter suggests a measure requiring that off-road equipment be installed with backup alarms or bells that include a signaling operator, or use variable level backup alarms that measure the background sound between the beeps and vary the amplitude so as to generate an OSHA-compliant sound level. The commenter also states that a feasible mitigation for some noise impacts might include the use of flashing lights instead of backup beepers under low-light conditions during nighttime hours. The commenter provides no additional detail about this measure would reduce construction-related noise impacts. This type of measure is typically implemented when construction would occur in a densely populated urban area, or when noise-generating construction activity would take place for an extended period of time near the same noise-sensitive receptors. The only location where noise-generating construction activity would take place for an extended period of time is at the dam site but, as discussed in Noise Impact-1, there are no receptors that would be adversely affected by construction noise generated at this site.

The commenter suggests a measure that requires on-site equipment to be located away from receptors. This measure is already included in Mitigation Measure Noise-1, which requires all construction equipment and staging areas to be located at the farthest distance possible from nearby noise-sensitive land uses.

The commenter suggests a measure that requires the use of inherently quieter construction equipment. Mitigation Measure Noise-1 requires that all construction equipment be properly maintained and equipped.

LAFO-29: In a concluding statement to his letter, the commenter states that “the DEIS's discussion and mitigation of the Project's noise impacts is inadequate and fails to comply with NEPA and CEQA.” This comment alone is a general statement and does not raise any specific issues. Responses to Comments LAFO-2 through LAFO-28 address specific comments regarding the adequacy of the noise analysis and mitigation.

33.10.21 Lakehead Community Development Association

LCDA

Lakehead Community Development Association
P.O. Box 322
Lakehead, CA 96051

September 27, 2013

R Duncan
2300 B
to: K Chow

Katrina Chow, Project Manager
Bureau of Reclamation
2800 Cottage Way
Sacramento CA 95825

Re: Response to SLWRI Environmental Impact Statement

LCDA-1 For many years discussions and studies have taken place regarding the possible raising of Shasta Dam to benefit California fish habitat, agriculture an increased population in California. The current EIS by the Bureau of Reclamation sets forth the needs of each of these interests and the benefits each would enjoy which justifies the raising of Shasta Dam. The study defines negative impacts to wildlife, insects, plants, and communities and provides suggested mitigation measures to lessen the impact from raising the dam.

LCDA-2 The study further indicates that many homes and businesses, both on private and US Forest Service leased land will be impacted and that Federal Law provides for financial compensation to the owners of these properties in accordance with Federal law. The majority of the homes and businesses impacted by this project are in the unincorporated community of Lakehead. In numerous meetings with BOR and the US Forest Service we have heard that while private properties on Forest Service land will be provided new Forest Service land to rebuild, no such provision is provided for private property owners, be they homes or businesses to include resorts serving the recreational needs of Shasta Lake.

LCDA-3 The community of Lakehead has a stated population of 550 permanent residents, but perhaps an additional 300-400 part time residents who have summer/ vacation homes in or around the Lakehead area and Lake Shasta. Should the dam be raised and these impacted private homes and businesses be lost, the community of Lakehead will suffer a tremendous loss of citizens, and economic benefit to the community, Shasta County and the recreational users of Lake Shasta. Many have stated that the loss of the residences and businesses due to raising the dam will be the end of Lakehead, just as the area lost the towns of Kennett, Coram, Baird, Heroult, Marley and many more small towns that are now at the bottom of Lake Shasta.

LCDA-4 The major difference here is that the vast majority of these lost properties will not be drowned by higher water, as was the case with the original construction of Shasta Dam. Many of the impacted homes and businesses on private land will just be too close to the new high water mark, thus creating a need for elimination due t

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LCDA-4 CONTD setback requirements by the County, State of Federal agency's. There seems to be no reasonable reason why with the raising of Shasta Dam, the Department of the Interior, Bureau of Reclamation, and US Forest Service should not open up new private property for both residents and business of Lakehead to mitigate the losses as described above.

LCDA-5

LCDA-6 There must have been provisions for private land along the edge of Lake Shasta when the original dam was built as much of Lakehead as seen today was developed in the 50's 60's and 70's subsequent to the dam being built. Many of the homes that will be lost have been here for 50 years or more and to just say to these property owners and the community that we will have no opportunities to rebuild our homes and businesses to serve a thriving community is irresponsible, and should be a valid mitigation consideration.

LCDA-7

LCDA-8 With the EIS stated increased population of the State of California and the need for increased recreation opportunities, it does not make sense that we will have fewer resorts and businesses serving the needs of the visitors to Shasta Lake. The US Forest Service has stated publicly that there will be fewer but bigger resorts. This seems short sighted and a desire for the US Forest Service to control all resorts as they will be on Federal Land vs private.

LCDA-9 When the Draft Environmental Impact Study was released in 2011 the Lakehead Community Development Association formed a Stakeholders Committee made up of Citizens and Business owners to cooperatively work with the Bureau of Reclamation and USFS in the process of this study. While the BOR has been cooperative holding meetings and providing information on the progress of the study, we have not received any cooperation in regard to many of the very important issue that have been raised at these meetings to include losing a significant portion of the town of Lakehead, it's citizens and businesses that have been vital to the success of our community.

LCDA-10 The US Congress, Bureau of Reclamation, and US Forest Service have a tremendous opportunity to mitigate the loss of citizens, businesses, jobs, and economy of both Lakehead and Shasta County with the opening of new private property. The raising of the dam will create a tremendous job of relocating roads, bridges, railroad crossings etc. To add to this project the opening of new private land for citizens to purchase and thus add to the opportunity of Lakehead to recover from the project for its citizens, businesses and economy. This would be both reasonable and responsible mitigation, and bring a positive result for a town that does not have to be devastated.

LCDA-11 The EIS states that there will be a need to relocate roads, bridges, railways, utilities, septic systems etc. but does not address the costs, or impact on additional homes and businesses. Not addressing these issues in the EIS leaves the report incomplete and the true impacts immeasurable. In meetings with the BOR, the need to address

LCDA-12 the major roads, utilities etc. within Lakehead have been loudly stated by the

LCDA-12 CONTD

community, but the response has only been that none of these issues will be addressed prior to the US Congress taking action to move forward with the raising of Shasta Dam. The community believes that the EIS would be in error to not address these issues and their impacts in the study without these issues being addressed.

LCDA-13

- We request that the Bureau of Reclamation and USFS address the negative impacts on the community of Lakehead, its citizens and private business owners to include the socio economic impacts. Further we request that the

LCDA-14

our government make allowances for new private property along the shoreline of Lake Shasta to mitigate the losses described herein. There is no need to lose 170 or more private homes and businesses when an opportunity is present to mitigate these losses by creating new lands, just as the USFS will create for their leased properties.

LCDA-15

- We request that the Bureau of Reclamation and USFS provide replacement lands for any and all lakeside resorts, and not just those on Forest Service leased land.

LCDA-16

- We request that the EIS address the revision of roads, access to homes, businesses, utilities, septic systems etc to show a truer impact on the community of Lakehead, and thus create opportunities for mitigation in its report to Congress.

LCDA-17

- Within the town of Lakehead there are several community water systems that serve neighborhoods. The impacts on these systems as they serve their respective communities needs to be studied, as the loss of numerous homes within a water company will impact their revenue stream for the whole community, or the elimination of wells servicing these communities due to new high water from the raising of Shasta Dam will create environmental impacts which have not been addressed.

LCDA-18

We believe that these issues and our comments for mitigation are reasonable and if responsibly considered will provide further support for the BOR to gain acceptance of raising Shasta Dam by the community of Lakehead.

Sincerely;

Joe Myers, President,
Lakehead Community Development Association

Responses to Comments from Lakehead Community Development Association

LCDA-1: Comment Noted.

LCDA-2: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

LCDA-3: Please refer to Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity."

LCDA-4: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

LCDA-5: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

LCDA-6: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

LCDA-7: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

LCDA-8: Please refer to Master Comment Response REC-1, "Effects to Recreation at Shasta Lake."

LCDA-9: Please refer to Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity."

LCDA-10: Please refer to Master Comment Response REC-5, "Relocation of Private Recreation Facilities" and Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

LCDA-11: Details regarding the modification and relocations of roads, bridges, railroads, utilities, and septic systems can be found in the DEIS Engineering Summary Appendix, Chapter 4. All costs for the modification and relocations are included in the cost estimates and can be found in the DEIS Appendices Engineering Summary Appendix Chapter 5 and in Attachments 1-4. See also Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity."

LCDA-12: Please refer to Master Comment Response REC-5, "Relocation of Private Recreation Facilities," Master Comment Response RBR-2, "Reduced Public Access Around Shasta Lake," and Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

LCDA-13: Please refer to Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity."

LCDA-14: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

LCDA-15: Please refer to Master Comment Response REC-5, "Relocation of Private Recreation Facilities."

LCDA-16: Please refer to Master Comment Response RBR-2, "Reduced Public Access Around Shasta Lake," and Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity."

LCDA-17: Please refer to Master Comment Response UR-1, "Effects to Water and Wastewater Infrastructure around Shasta Lake."

LCDA-18: Comment Noted.

33.10.22 Lakeshore Heights Municipal Water Company

LHMWC1

PUBLIC COMMENT CARD

Name: Paul Smith
Organization: LHMWC
Address: 20322 Lakeview Dr Lakehead CA 96051
Email: psLakele gmail.com

LHMWC1-1 Comment: I Represent Lakeshore Heights Mutual Water Company. We have 66 home plus Lakeshore inn & RV And the Forest Service on our water system, If this passes we will loose approximately 20% of our owners. this also means we will become insolvent. We have a 40 year USDA loan with 35 years left. this means the remaining homes will be without water. without water the Rest of the homes have No value. there are multiple water Districts in Lakehead that will also be Affected. You have Not taken this into account when doing the loss to this town. Affectively the town will be gone.

Currently this Study Has had detrimental Affect on the value of property. this community has mostly Retired people the loss of their homes will devastate their lives.

LHMWC1-2

Tear here

Responses to Comments from Lakeshore Heights Municipal Water Company

LHMWC1-1: Thank you for your comment on the DEIS for the SLWRI, we appreciate your time in commenting on the document. Reclamation acknowledges that the Lakeshore Inn & RV and Forest Service Station will be inundated and no longer require water service in this location. According to Reclamations real estate analysis, which was the basis of the DEIS Real Estate Appendix, about eight parcels west of the railroad tracks will be taken out of service. A sensitivity analysis performed in 2012 by Reclamation, which included structural surveys showed that the number of affected parcels could be less than eight.

Please refer to Master Comment Response UR-1, “Effects to Water and Wastewater Infrastructure around Shasta Lake.”

LHMWC1-2: Please refer to Master Comment Response PLAR-1, “Effects to Private Residences and Businesses.”

33.10.23 Lakeshore Heights Municipal Water Company

LHMWC2

LAKESHORE HEIGHTS MUTUAL WATER COMPANY
P.O. Box 313 • Lakehead, CA 96051

BOARD OF DIRECTORS

Dennis Flynn, President (530) 238-8616	Paul Smith 238-8833	Les Due 704-462-5132	Vic Voss 238-8821
Sandy Drake 238-8150	Doyle Martin 238-8831	Lee Cobb 238-2424	Mike Sid 916-599-9134

STAFF: Ray Smith, Jr., Plant Operator 238-9627 | Maureen Sechrengost, Secretary/Treasurer 238-8838 | Ernie Goff, Certified Water Systems Operator 238-4756

September 27, 2013

Bureau of Reclamation
Attn: Katrina Chow
2800 Cottage Way, MP-700
Sacramento, CA 95825
bor-mpr-slwri@usbr.gov

These are comments we wish to be included as part of the 90-day public review and comment period for the Shasta Lake Water Resources Investigation (SLWRI) Draft Environmental Impact Statement (EIS).

LHMWC2-1 We are a private mutual water company that serves a community in an identified potentially-affected location near the shore of Shasta Lake. (Please see the attached map showing our water service area.) Individual property owners in our subdivision have been notified of their possible condemnation due to either water level, road or railroad relocation necessity, or that their private septic system may be impacted by raising the level of the lake waters.

LHMWC2-2 In 2006, we obtained a grant and 40-year loan package from the USDA Rural Development for several system improvements, including a government-mandated filtration plant. Our annual interest and principle payments for this loan are approximately $19,800, which is divided equally by our 92 shareholders. We have 33 years remaining on the loan, with a current balance due of approximately $346,000.

We do not know how much of our system would be affected by higher lake levels, but even if just 25% of our property-owners lose their properties to this project, it will create a hardship to the remaining residents in their commitment to repay this government loan.

LHMWC2-3 Additionally, there would be new costs incurred to accommodate any required infrastructure changes to our system. If road relocations were to be necessary, it is conceivable that our entire system of water main lines would need relocation.

LHMWC2-4 We want to make sure that projects such as this are given proper consideration in review of cost estimates for the proposed project.

LHMWC2-5 Individually, many of our residents object to the project on many different points, including the right to enjoyment of private property, but as a mutual water company, we want to submit the facts included here, as we do not believe this type of financial impact has yet been considered by the Bureau.

Thank you,

Dennis Flynn

Dennis Flynn
President of the Board

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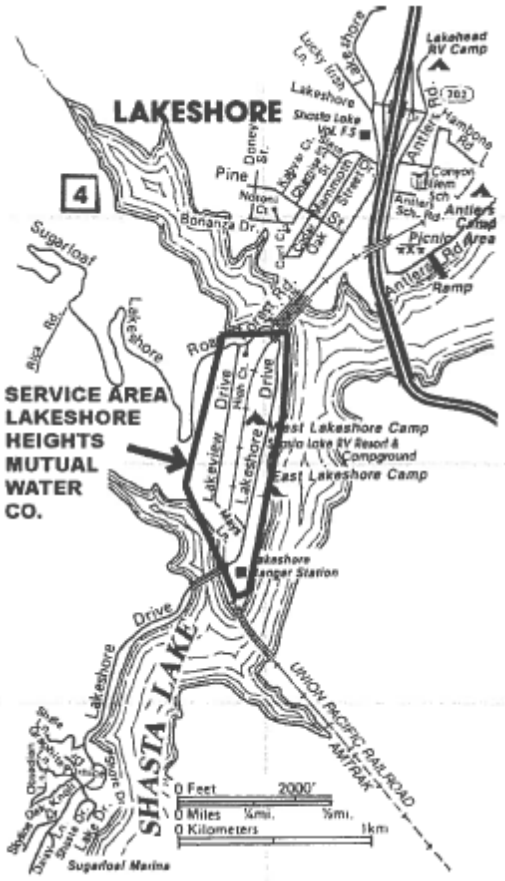


Responses to Comments from Lakeshore Heights Municipal Water Company

LHMWC2-1: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

LHMWC2-2: The number of landowners within each water service area that would be affected varies by the action alternative. Based on preliminary real estate analysis it is estimated that approximately 10% of the current property owners that comprise the customer base would be affected by inundation. It is not anticipated that facility relocations would affect the number of customers served. As discussed above Reclamation will relocate affected water services to maintain service to non-inundated structures at no cost to landowners as Reclamation will fund these relocation actions. These actions will prevent loss of customers that remain after lake enlargement, however, a net loss of water service area landowners may occur due to inundation which could affect the financial ability of water service providers to repay loans. Reclamation has not performed an evaluation to determine whether changes due to the implementation of the action alternatives would make a substantial change in local water service provider's budgets to the extent of potential insolvency. However, in addition to replacing water

distribution facilities as part of each alternative, Reclamation will also be providing new wastewater treatment facilities. As development of vacant lands can be limited in this area due to appropriate soil conditions for septic systems and required setbacks from the reservoir shoreline, new wastewater facilities could provide for potential expansion for the customer base in this area. Reclamation would consider providing additional wastewater connections in this area to maintain the customer base.

Please also refer to Master Comment Response UR-1, "Effects to Water and Wastewater Infrastructure around Shasta Lake."

LHMWC2-3: Please refer to Master Comment Response UR-1, "Effects to Water and Wastewater Infrastructure around Shasta Lake."

LHMWC2-4: Please refer to Master Comment Response COSTEST-1, "Development of Cost Estimates."

LHMWC2-5: Please refer to Master Comment Response UR-1, "Effects to Water and Wastewater Infrastructure around Shasta Lake."

33.10.24 Northern California Power Agency

NCPA

Katrina Chow
Project Manager, SLWRI
U. S Bureau of Reclamation, Planning Division
2800 Cottage Way
Sacramento, CA 95825

Reclamation issued a Draft Environmental Impact Statement (DEIS) for the Shasta Lake Water Resource Investigation on June 28, 2013 and requested written comments by September 30, 2013. The Northern California Power Agency (NCPA) offers the following comments on the power portions of the DEIS.

NCPA-1 The hydropower section on page 8 of the Executive Summary states that over the next 10 years California's peak demand is expected to increase 30 percent, from about 50,000 megawatts to about 65,000 megawatts. The 50,000 megawatt peak demand is correct for the part of California operated by the California Independent System Operator but does not include the other control area demand in California, such as Imperial Irrigation District, Los Angeles Department of Water and Power, and the Balancing Authority of Northern California. In total, California's current peak demand exceeds 60,000 megawatts. In addition, the California Energy Commission projects California's peak demand will increase by approximately 1.3 percent per year. The language in the hydropower section on page 16 of chapter 1 should also be changed to reflect these corrections.

NCPA-2 This generation data for potential benefits that is shown in Table 4-4 of the Plan Formulation Appendix conflicts with the potential generation benefits shown for the five comprehensive plans (CP) starting on page 2-38 in Chapter 2 and in the Plan Formulation Appendix.

NCPA-3 It appears data contained in Tables 23-3 though 23-7 of Chapter 23, Power and Energy, was used to develop the generation impact for the five CP's by adding the generation data in Impact Hydro – 2 - Decrease in CVP System Energy Generation with the data in Impact Hydro – 3 – Decrease in SWP System Energy Generation. That computation, however, overstates the additional generation developed by the CP alternatives. The data contained in Impact Hydro – 6 – Decrease in Pit 7 Powerplant Energy Generation needs to be subtracted from the additional generation derived from Hydro 2 and 3 to obtain the true generation impact for each CP. In addition, the report needs to clearly state how the generation data for each CP is developed.

NCPA-4 The Impact Hydro – 1- Decrease in Shasta Powerplant Energy Generation category should be eliminated in all the tables in Chapter 23 since Shasta generation is included in Impact Hydro 2. Including the same Shasta energy generation in both categories is duplicative and leads to confusion regarding the total generation increase for each CP. Impact Hydro 4 and 5 should be extracted from the current tables and placed in separate tables so generation impacts are shown in one table and pumping impacts in another.

NCPA-5 Since some of the generation benefit accrues to the State Water Project (SWP), the report should clearly state that the proportional project cost associated with SWP power benefits will be allocated to SWP for repayment. The DEIS should state that a long term contract will need to be negotiated with the SWP to ensure the repayment of the allocated cost associated with the SWP benefits.

NCPA-6 Chapter 23, Section 23.1 should be corrected to state that power is marketed by the Western Area Power Administration, not the Western Power Authority.

NCPA-7 Chapter 23, Section 23.2, omits an important proposed regulation by the State Water Resources Control Board (SWRCB) that could have a significant effect on each CP. The SWRCB has proposed implementation of unimpaired flow criteria for both the San Joaquin and Sacramento rivers. If that flow criteria is placed into effect, the calculated benefits for each CP will be greatly altered. In addition, Reclamation has recently made water releases for fishery that reduces reservoir storage (i.e. Trinity River), or bypasses generation (i.e. Folsom Dam) to meet other regulatory requirements. The affect of implementing these potential regulation requirements on Shasta Lake needs to be addressed in the DEIS.

Thank you for your consideration of these comments.

Jerry Toenyes
Consultant, NCPA

Responses to Comments from Northern California Power Agency

NCPA-1: The editorial recommendations submitted by the comment author have been incorporated into Chapter 1, "Introduction," and Section 1.2.2, "Project Need-Hydropower."

NCPA-2: Table 4-4 of the Plan Formulation Appendix was developed using operational modeling performed with regulatory assumptions appropriate for that time. During the plan formulation and DEIS development changes in the regulatory environment led to updates in the CalSim-II operational modeling and subsequent analysis, including power generation, for use in both the Plan Formulation Report and the DEIS. These changes are documented in the Plan Formulation Report, Chapter 5 Comprehensive Plans, Section "Refinement of Comprehensive Plans for the DEIS." Table 5-10 of the PFA includes the results of this updated modeling and matches the numbers reported in the DEIS.

NCPA-3: As defined and used in the DEIS in Chapter 23, "Power and Energy," Impact Hydro-2, "Decrease in CVP System Energy Generation," and Impact Hydro-3, "Decrease in SWP System Energy Generation," are each evaluated independently and are not added for any purpose. Impact Hydro-6, "Decrease in Pit 7 Powerplant Energy," is evaluated independently and is not combined with any other impact for any purpose. As described in the DEIS Chapter 23, "Power and Energy,"

Sections 23.3.2, “Methods and Assumptions,” CVP and SWP hydropower generation was simulated using the Benchmark Study Team (BST) power modeling tool LTGen, Version 1.18, and SWPPower, BST April 2010 Version, for CVP and SWP facilities, respectively, the Pit 7 Powerplant was evaluated using a custom designed power processing tool. Further details on these tools and more detailed results are included in the Modeling Appendix, Chapter 8, “Hydropower Modeling.”

NCPA-4: DEIS Chapter 23, "Power and Energy," Section 23.3.2, "Criteria for Determining Significance of Effects," defines the metrics that were developed for evaluating project impacts on hydropower generation and use. Impact Hydro-1 “Decrease in Shasta Powerplant Energy Generation," and Impact Hydro-2 “Decrease in CVP System Energy Generation," categories included in the referenced tables specifically to provide data to support corresponding impact evaluations. Text has been revised in the Final EIS to clarify why Shasta was including both individually and in the CVP system total and the appropriate use of each value. The generation and pumping were presented in the same table to group the results by the impacted power system, the CVP and the SWP. Efforts were made to simplify the document as much as feasible while disclosing environmental effects to the extent required to meet current legal requirements for full disclosure.

NCPA-5: As indicated in Chapter 23, “Power and Energy,” of the DEIS, changes in net generation within SWP facilities due to a potential Shasta Dam enlargement would be negative for all alternatives. In addition, this comment appears to be related to the preliminary cost allocation analysis completed for the Draft Feasibility Report, which was released to the public in February 2012. Please see Master Comment Response COST/BEN-5, “Potential Project Financing.”

NCPA-6: Text has been revised in Final EIS.

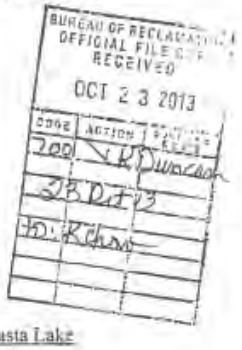
NCPA-7: Reclamation does not include all proposed regulations in NEPA document project impact analysis as they are in flux until adopted. Any reasonably foreseeable actions are included in the cumulative impact analysis. The State Water Board proposed implementation of new flow standards was not evaluated as a reasonably foreseeable action.

33.10.25 Natural Resources Defense Council

NRDC1

NRDC

NATURAL RESOURCES DEFENSE COUNCIL



September 30, 2013

Ms. Katrina Chow
United States Department of the Interior
Bureau of Reclamation, Mid-Pacific Region
2800 Cottage Way, MP-700
Sacramento, CA 95825

SENT VIA EMAIL TO KChow@usbr.gov AND VIA U.S. MAIL

Re: Comments on the Draft Environmental Impact Statement for the Shasta Lake Water Resources Investigation

Dear Ms. Chow:

NRDC1-1 On behalf of the Natural Resources Defense Council ("NRDC"), which has more than 1.3 million members and activists, 250,000 of whom are Californians, we are writing to provide comments on the inadequacy of the draft Environmental Impact Statement ("DEIS") for the Shasta Lake Water Resources Investigation ("SLWRI").[1] The DEIS evaluates the potential ← NRDC1-7

[1] The DEIS states that "[t]his document has also been prepared in accordance with the California Environmental Quality Act (CEQA)." DEIS at ES-1. However, the document is clearly not CEQA compliant. First, there is no state lead agency, and no state agency is listed as a "cooperating agency" in the DEIS. *Id.*; *see* Cal. Pub. Res. Code § 21082.1 (EIR "shall be prepared directly by, or under contract to, a public agency"); tit. 14 Cal. Code Regs. § 15379 ("'public agency'" "does not include agencies of the federal government").

NRDC1-2 Further, the DEIS fails to identify an environmentally superior alternative, *see* tit. 14 Cal. Code Regs. §15126.6(e)(2), and improperly defers mitigation measures to the future. *See id.* § 15126.4(a)(1)(B); *City of Long Beach v. Los Angeles Unified Sch. Dist.*, 176 Cal. App. 4th 889, 915-16 (2009) ("Impermissible deferral of mitigation measures occurs when an EIR puts off analysis or orders a report without either setting standards or demonstrating how the impact can be mitigated in the manner described in the EIR."); *see, e.g.*, DEIS at 25-39 (with respect to impacts to McCloud River, stating "[n]o specific mitigation measures are proposed at this point in the planning process" and referencing "Comprehensive Mitigation Strategy"); *id.* at 2-27 to 2-28 (brief discussion showing Comprehensive Mitigation Strategy devoid of details and standards).

NRDC1-3 The DEIS also fails to even determine whether impacted tribal archaeological sites qualify as historical resources, as required by tit. 14 Cal. Code Regs. § 15064.5(c), and does not address California's stringent requirements for mitigating impacts to historic resources, *see id.* § 15126.4(b). *See* DEIS at 14-12 to 14-18, 14-23. The DEIS also notes that, "formal CEQA scoping has not been initiated," despite the fact that scoping begins the CEQA process. DEIS at

NRDC1-4

NRDC1-5

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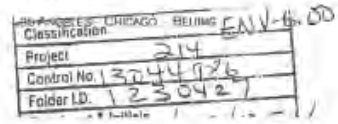

NRDC1-7 CONTD

environmental effects of five alternative plans to enlarge Shasta Dam and Reservoir, each of which purportedly has the primary purposes of (1) increasing anadromous fish survival in the Sacramento River, primarily upstream from Red Bluff Pumping Plant, and (2) increasing water supply and water supply reliability for agricultural, M&I, and environmental purposes, to help meet current and future water demands, with a focus on enlarging Shasta Dam and Reservoir. DEIS at ES-6.

NRDC1-8

Unfortunately, the DEIS is fundamentally flawed. First, the DEIS fails to analyze an adequate range of alternatives. None of the alternatives achieve the "coequal" primary purpose of increasing anadromous fish survival, and the Bureau of Reclamation ("Bureau") unlawfully rejected federal agency recommendations to consider additional alternatives that would help achieve that primary purpose.

NRDC1-9

Second, the project purposes are unlawfully narrow; the purposes fail to reference the Bureau's legal obligations to achieve anadromous fish doubling under the Central Valley Project Improvement Act ("CVPIA"), and the narrow purpose inappropriately excluded alternatives that would not involve expanding the dam but could benefit anadromous fish, provide water supply flexibility and improvements in water supply.

NRDC1-10

Third, the DEIS fails to adequately analyze the impacts of those alternatives, including impacts on anadromous fish survival, tribal resources, and cumulative impacts.

NRDC1-11

The analysis presents biased results, presents conclusions that are not supported by substantial evidence, and ignores contrary analysis provided by state and federal agencies.

NRDC1-12

The proposed project is also fatally flawed because the DEIS demonstrates that all of the alternatives would cause significant, unmitigated impacts on tribal resources

NRDC1-13

and would unlawfully impair the legally protected trout fishery

NRDC1-14

and wild and scenic values of the McCloud River (California Public Resources Code section 5093.542).

NRDC1-15

This project, and the millions of dollars spent on related studies and this environmental analysis, represents an unacceptable waste of millions of taxpayer dollars. Accordingly, we recommend that the Bureau withdraw the DEIS and terminate the SLWRI study.

NRDC1-16

Should the Bureau decide to continue consideration of the SLWRI, the Bureau must prepare and recirculate a legally adequate feasibility study and EIS/EIR, consistent with NEPA and CEQA.

On the pages that follow, we discuss these issues in greater detail.

NRDC1-5 CONTD

ES-36.

NRDC1-6

Finally, the DEIS is deficient under CEQA for the same reasons the document fails to comply with NEPA, including, *inter alia*, its failure to analyze a reasonable range of alternatives, its unlawfully narrow project objectives, its failure to accurately analyze the effects of alternatives, and its failure to adequately analyze cumulative impacts. An adequate analysis of alternatives and impacts is required, consistent with CEQA.

I. The DEIS Fails to Consider a Reasonable Range of Alternatives

NRDC1-17 Pursuant to the National Environmental Policy Act ("NEPA"), an environmental impact statement must consider a reasonable range of alternatives. 42 U.S.C. § 4332; 40 C.F.R. §§ 1502.14, 1508.25(b). "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate." *Natural Res. Def. Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005) (quotation marks and citation omitted).

NRDC1-18 The DEIS clearly fails to include a reasonable range of alternatives because although water supply and increased anadromous fish survival are of "coequal priority," DEIS at ES-6, as discussed in detail *infra*, none of the alternatives are likely to substantially increase anadromous fish survival.

NRDC1-19 One of the DEIS's most glaring deficiencies is its failure to consider an alternative that meets both primary objectives, and does not include raising Shasta Dam. In June 2008, the U.S. Fish and Wildlife Service ("FWS") prepared a report pursuant to the Fish and Wildlife Coordination Act in which it recommended that "Reclamation should include a SLWRI alternative that evaluates the capability of increasing anadromous fish survival and water supply reliability without raising Shasta Dam." U.S. Fish and Wildlife Service, *Draft Fish and Wildlife Coordination Act Report for the Shasta Lake Water Resources Investigation* vii (June 2008) (hereinafter "FWS Report").[2] The report detailed the components of such an alternative, including modifying Shasta Dam's temperature control device, increasing water use efficiency, and making operational changes to Shasta Dam to increase cold water storage and increase minimum flows. *Id.* at 16-17, 22-23.

NRDC1-20 There are dozens of similar measures that could have been considered in a no-dam-raise alternative, including conjunctive management and water recycling. Analysis of an alternative with components like these likely would have shown that it is possible to improve water supply and anadromous fish survival at a lower cost than spending billions of dollars raising Shasta Dam.

NRDC1-21 The Bureau, however, failed to include a single alternative that did not involve raising the Dam. Had it done so, it would have been able to avoid some of the most substantial impacts that plague each of the proposed action alternatives, including violating Section 5093.542 of the California Public Resources Code by impairing flows on the McCloud River and harming its trout fishery, and permanently impairing culturally significant tribal resources.

NRDC1-22 In addition to a no-dam-raise alternative, the Bureau failed to consider other alternatives that combined dam expansion with measures that could provide substantial increases in anadromous fish survival. Notably, the FWS explicitly recommended several such measures that should be analyzed as part of one or more alternatives.

NRDC1-23 For example, the FWS Report recommended analyzing an alternative that included increasing minimum flows in the upper Sacramento from

NRDC1-19 CONTD [2] The FWS Report is available online at: www.usbr.gov/mp/nepa/documentShow.cfm?Doc_ID=14138 and is hereby incorporated by reference.

the current 3,250 cfs to 4,000 cfs from October 1 through April 30, if end-of-September storage is 2.4 MAF or greater. FWS Report at vi. This could have resulted in expanded spawning habitat, reduced redd dewatering, improved migratory survival, and other benefits to anadromous fish survival. FWS Report at 16-17; *see, e.g.*, National Marine Fisheries Service, *Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project* (2009) (hereinafter "NMFS 2009 BO").[3] The DEIS failed to analyze increased minimum flows in any of the action alternatives. *See* DEIS at 2-18 (dismissing need for such analysis). FWS also recommended modifications to Shasta's storage and release operations to provide pulse flows to improve the quality of aquatic habitat. FWS Report at 22. These actions could improve migratory survival of juvenile anadromous fish, provide geomorphic flows to improve habitat, and provide other benefits. *See, e.g.*, DEIS at 11-269. The DEIS, however, failed to analyze any alternative that included modifications to Shasta's storage and release operations. While CP4 purports to include dedicated storage for the cold water pool,[4] it does not increase carryover storage requirements for Shasta reservoir; an alternative that increased carryover storage requirements would have helped to ensure adequate cold-water reserves in the reservoir to improve downstream temperatures and thus anadromous fish survival. *See, e.g.*, NMFS 2009 BO. Yet the DEIS failed to analyze any alternative that increased the carryover storage requirement.[5]

The DEIS also fails to consider a reasonable range of alternatives because all of the alternatives would violate state and federal law by unlawfully degrading the wild and scenic characteristics of the McCloud River and its protected trout fishery. As discussed *infra*, the DEIS appropriately concludes that each action alternative would violate California law (and thus violate federal law) by impairing the McCloud's trout fishery and free-flowing condition. *See* DEIS at ES-30 (listing as a significant and unavoidable impact the "Effect on McCloud River's eligibility for listing as a Federal Wild and Scenic River and conflicts with the California Public Resources Code, Section 5093.542 (all action alternatives)"); *see* DEIS at ES-122 to ES-123. Yet the DEIS failed to analyze a single alternative that would avoid these impacts and thus comply with state and

NRDC1-23 CONTD

NRDC1-24

NRDC1-25

NRDC1-28

NRDC1-29

[3] The 2009 BO is available online at: http://swr.nmfs.noaa.gov/ocap/NMFS_Biological_and_Conference_Opinion_on_the_Long-Term_Operations_of_the_CVP_and_SWP.pdf and is hereby incorporated by reference.

[4] The DEIS also fails to adequately explain whether and how the benefits of increased storage for anadromous fish would be reasonably certain to occur, without increasing existing carryover storage requirements or other regulatory standards.

[5] The eight management measures common to every alternative do not meaningfully improve conditions for anadromous fish survival; instead, at best they simply maintain status quo conditions in light of modifications to the dam. DEIS at ES-12. In addition, alternatives CP4 and CP5 include minimal spawning gravel augmentation and habitat restoration. DEIS at ES-19 to ES-21. However, these measures appear to only "partially offset" the impacts of the loss of geomorphic flows on downstream habitat. *See* DEIS at 11-270.

NRDC1-23 CONTD

NRDC1-26

NRDC1-27

NRDC1-29 CONTD federal law. Because each proposed alterative violates state and federal law and none of the alternatives lawfully may be implemented, the range of alternatives is clearly unreasonable.

NRDC1-30 In order to analyze a reasonable range of alternatives, the DEIS must include one or more alternatives that do not expand the reservoir but still improve water supply and anadromous fish survival, one or more alternatives that meaningfully improve anadromous fish survival, and one or more alternatives that do not violate state and federal law.

II. The DEIS Utilizes an Unlawfully Narrow Project Purpose and Objectives

NRDC1-31 The DEIS also fails to comply with NEPA because it defined the project's objectives in unreasonably narrow terms. *See Nat'l Parks & Conservation Ass'n v. Bureau of Land Mgmt.*, 606 F.3d 1058, 1070 (9th Cir. 2010) ("An agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action, and the EIS would become a foreordained formality." (quotation marks and citation omitted)).

NRDC1-32 First, the Bureau's water-supply focused objective is narrowly defined to require the raising of Shasta Dam. DEIS at ES-6 (water supply goal includes "a focus on enlarging Shasta Dam and Reservoir"). This definition is inappropriate because it unreasonably forecloses the possibility that both the water supply and anadromous fish survival objectives could feasibly be achieved without increasing the Reservoir's capacity.

NRDC1-33 Second, the fish-focused primary objective is narrowly drawn to ignore the CVPIA's salmon-doubling requirement. *See* P.L.102-575, § 3406(b)(1) (CVPIA § 3406(b)(1)). Because the Bureau's operation of Shasta Dam must comply with the CVPIA, the statute's command that the Secretary of Interior make "all reasonable efforts" to ensure that "natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less than twice the average levels attained during the period of 1967–1991" must have been explicitly incorporated into the DEIS's fish-focused objective and progress towards that objective evaluated in the DEIS. *Id*.[6]

NRDC1-36 By narrowly defining project objectives that fail to reference the Bureau's mandatory obligations under the CVPIA and which apparently preclude alternatives that would not expand the Dam but

[6] The DEIS acknowledges the CVPIA's salmon-doubling goal, but states that it will only be included in a qualitative cumulative impacts assessment. DEIS at 3-23 to 3-24. This is inadequate in light of the Bureau's legal obligations under the CVPIA, the terms and conditions of the Bureau's water rights, and state law. It is also inaccurate, as nowhere in Chapter 11 does the DEIS analyze the cumulative effects of the project in meeting the Bureau's obligations under section 3406(b)(1) of the CVPIA.

NRDC1-34 In addition, as discussed *infra*, modeling tools exist to

NRDC1-35 quantitatively analyze the impacts on anadromous fish abundance and achievement of the salmon-doubling goal under CVPIA.

NRDC1-36 CONTD

would otherwise achieve improved water supply and anadromous fish survival, the DEIS's project purpose and objectives violate NEPA.

III. None of the Alternatives is Likely to Achieve the DEIS's Coequal Primary Objective of Increasing Anadromous Fish Survival

The alternatives analyzed in the DEIS were clearly unreasonable because none meets the primary project objective of increasing anadromous fish survival in the upper Sacramento River. Commenting on the SLWRI Plan Formulation Report, the FWS highlighted the minimal benefits provided to anadromous fish:

> Only one alternative (CP4) provides *any* measurable benefit to anadromous fish survival, and even under that alternative, in the vast majority of years the enlarged cold water pool results in either negligible or slightly negative impacts to Chinook salmon survival. In about 90 percent of the years, there would be no benefit to anadromous fish survival. Even in CP4, the benefits of an enlarged cold water pool for each of the four runs of Chinook salmon are limited to a few critical and dry water years representing 6 – 16 percent of the water years, based on the 1922 – 2002 period of simulation.

NRDC1-37

FWS Report at v (emphasis in original). Similarly, commenting on the SLWRI Feasibility Report, the California Department of Fish and Wildlife ("CDFW") stated that "[o]nly in one alternative (CP4) does enlarging the cold water pool provide benefits to anadromous fish survival. However, it appears that the benefits to anadromous fish are limited to a few critical and dry water years representing 5% to 10% of the 1922-2003 period of simulation." Cal. Dept. of Fish and Wildlife, *SLWRI Comments on the Public Draft of the Feasibility Report, and Selected Attachments, January 2013* (February 8, 2013) at 5 ("CDFW, Attachment 1").

NRDC1-38

In spite of these agencies criticisms, the alternatives analyzed in the DEIS are similar to those presented in the Plan Formulation and Feasibility Reports, and analysis of the DEIS's alternatives continues to show insubstantial benefits to anadromous fish survival. The DEIS's flawed analysis makes clear that even alternative CP4, which is the most "fish friendly" alternative analyzed in the DEIS, will fail to increase anadromous fish survival in the vast majority of years.[7]

NRDC1-38 CONTD

[7] Our comments focus on alternative CP4 because it purports to provide the greatest benefits to anadromous fish, and the DEIS's flawed methodology demonstrates that other alternatives provide even worse outcomes for anadromous fish survival. *See, e.g.*, DEIS at 11-93 to 11-110 (showing decreased winter run and late fall run production under CP1, and no significant increase in production of other runs); DEIS at 11-98 (showing that alternatives CP1, CP2, and CP5 result in increased mortality of winter run); DEIS at 11-209 to 11-217 (showing that on

NRDC1-39

For example, in most years, CP4 will actually result in *decreased* production for winter-run Chinook salmon. In particular, the DEIS's modeling shows that, compared to existing conditions and the no action alternative, winter-run production will decrease in dry, below normal, above normal, and wet years. DEIS at 11-255. Only in critical years, which represent just 16% of modeled years, will there be any increase in production. *Id.* Thus, in 84% of modeled years, the most fish friendly alternative will have a negative impact on winter-run Chinook salmon, and even the DEIS concludes that, "[w]inter-run Chinook salmon would have an *overall insignificant* increase in production" under CP4. DEIS at 11-256 (emphasis added).

NRDC1-40

The DEIS shows that CP4 will have a similar impact on fall-run Chinook salmon. Compared to existing conditions and the no action alternative, the DEIS concludes that CP4 will cause production to *decrease* in below normal, above normal, and wet years. DEIS at 11-261. Only in critical and dry years, which represent just 30% of modeled years, is fall-run production predicted to improve. *Id.* As a result, in the vast majority of modeled years, the most fish-friendly alternative will result in negative impacts to survival of fall-run Chinook salmon, and the DEIS concludes that overall, CP4 will have an "*insignificant increase in overall production*" of fall-run Chinook salmon. DEIS at 11-262 (emphasis added).

NRDC1-41

Further, as discussed *infra*, the substantial flaws in the DEIS's modeling results cast doubt on even the modest benefits to anadromous fish survival that the DEIS claims. Because the DEIS's flawed analysis shows that no alternative will provide substantial benefits to anadromous fish, the range of alternatives that the DEIS analyzes is clearly inadequate.

IV. The DEIS Fails to Adequately Assess the Impacts of Proposed Alternatives on the Environment, and Fails to Adequately Analyze Cumulative Impacts

NRDC1-42

One of NEPA's primary purposes is "to guarantee relevant information is available to the public." *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1072 (9th Cir. 2011). The DEIS is deficient because it fails to provide the public with adequate, accurate information that it can use to make an informed comparison of the alternatives that the Bureau did evaluate. *See Natural Res. Def. Council*, 421 F.3d at 811 ("Where the information in the initial EIS was so incomplete or misleading that the decisionmaker and the public could not make an informed comparison of the alternatives, revision of an EIS may be necessary to provide a reasonable, good faith, and objective presentation of the subjects required by NEPA." (quotation marks and citation omitted)).

NRDC1-38 CONTD

average, alternative CP3 results in negative production of endangered winter-run Chinook salmon, threatened spring-run Chinook salmon, and late-fall run Chinook salmon). We also note that the flaws with the analysis of impacts pertain to all of the alternatives in the DEIS.

A. The DEIS Fails to Adequately Analyze Impacts on Anadromous Fish Survival

NRDC1-43 The DEIS relies exclusively on the SALMOD model to quantitatively analyze potential impacts of alternatives on anadromous fish survival. However, given the extensive flaws and limitations of the SALMOD model (*see infra*), and the fact that other modeling tools are available to the Bureau to quantitatively analyze potential impacts, the DEIS fails to adequately analyze the alternatives' impacts on anadromous fish survival.

NRDC1-44 For instance, several other life cycle models are available to the Bureau to quantitatively analyze the impacts of alternatives on survival of winter-run Chinook salmon. The OBAN model[8] is one such model which the Bureau and other federal agencies have utilized as a tool to assess impacts on winter-run Chinook salmon. One of the key advantages of using the OBAN model to analyze impacts is that OBAN can analyze impacts to population abundance over time, whereas SALMOD is limited to analyzing impacts in a single year; in other words, the SALMOD model does not account for the effects of alternatives to previous generations of fish, assuming a constant number of spawning salmon, thus inaccurately describing (and likely understating) the negative impacts of the alternatives to the survival of anadromous fish over multiple generations.

NRDC1-45 The CDFW has likewise identified additional modeling tools that should have been utilized in the DEIS to analyze impacts on anadromous fish survival. *See* CDFW, Attachment 1 at 5-6.

NRDC1-46 The Bureau's failure to analyze impacts with other existing models, including the OBAN model, is inexplicable and violates the agency's obligations to adequately analyze impacts under NEPA.

NRDC1-47 Even the modest benefits to salmon that the DEIS suggests will occur in some years may be offset by negative impacts that each action alternative will cause, and the DEIS fails to adequately analyze these negative impacts.

NRDC1-48 For instance, the DEIS concludes that CP4 and the other action alternatives will reduce the frequency and magnitude of intermediate to high flows, causing a reduction in ecologically important geomorphic processes in the upper Sacramento River. *See* DEIS at 11-269. "[I]ntermediate to large flows [are] necessary for channel forming and maintenance, meander migration, and creation of seasonally inundated floodplains." *Id.*

[8] A description of the OBAN model is available online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=69587 and is hereby incorporated by reference. It concludes that reduced water temperatures in spawning reaches, increased flows during outmigration, and reduced water exports are the factors most likely to increase abundance of winter-run Chinook salmon. *Id.* The OBAN model is one of several modeling tools utilized by the Bureau and other federal agencies in the administrative draft of the environmental impact report for the Bay-Delta Conservation Plan. *See* http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/BDCP_Effects_Analysis_-_Appendix_5_G_-_Fish_Life_Cycle_Models_3-27-13.sflb.ashx, hereby incorporated by reference. However, we note that there are also scientific concerns with the adequacy and accuracy of the OBAN model, and nothing herein constitutes a waiver of claims regarding the adequacy and accuracy of that model or of the environmental analysis in BDCP.

NRDC1-44 CONTD

NRDC1-48 CONTD

These processes, in turn, are ecologically important for maintaining essential habitat functions and values for anadromous fish. *Id.* Thus, while salmon and other anadromous fish may benefit from slightly decreased water temperatures, each action alternative would reduce the quality of their spawning habitat.[9]

NRDC1-49

Because the impact of this habitat impairment was not included in the Bureau's quantitative modeling under SALMOD, and because the qualitative conclusions regarding impacts do not account for these flow-related impacts, the analysis is inadequate.

NRDC1-50

At a minimum, the DEIS must adequately explain how these impacts can reduce or eliminate the temperature-related benefits.[10] *See N. Alaska Envtl. Ctr. v. Kempthorne*, 457 F.3d 969, 975 (9th Cir. 2006) (NEPA's "'hard look' should involve a discussion of adverse impacts that does not improperly minimize negative side effects.").

NRDC1-51

The DEIS's reliance on CalSim II is also problematic. As the FWS Report pointed out, because CalSim II provides hydrological data in monthly time steps, and flooding and temperature conditions operate on a finer time scale—from hours to weeks—the model is unable to adequately simulate the impacts of each alternative on flooding and temperature conditions. FWS Report at 105. The model's failure to incorporate a finer time scale casts doubt on the accuracy of many of the DEIS's conclusions regarding the hydrologic impacts of the proposed alternatives.

i. The DEIS's reliance on the flawed SALMOD created a misleading overstatement of project benefits to salmon

NRDC1-52

The DEIS's analysis of impacts to salmon relies on the flawed SALMOD model, even though more accurate models are available. The Bureau's failure to utilize the best available science to evaluate and describe the proposed alternatives' impacts on anadromous fish leaves the public with a distorted perception of the project's impacts and benefits, and makes it difficult to meaningfully understand and comment on the alternatives.

NRDC1-53

In its 2008 Fish and Wildlife Coordination Act Report for the SLWRI, FWS described many of the problems with the Bureau's reliance on the SALMOD model. FWS explained that SALMOD is not able to simulate the effects of resource competition and predation among different size classes of the four runs of Chinook salmon and steelhead, and noted that such competition and predation "are thought to be an important source of mortality for salmonids in

NRDC1-48 CONTD

[9] While the DEIS contends that CP4 will provide the greatest benefits for anadromous fish because of the increased cold-water pool, it also concludes that CP3, CP4, and CP5 would cause a more substantial impact to important geomorphic processes than CP1 or CP2 because the larger reservoir size would cause a greater reduction in the frequency and magnitude of intermediate and high flow events. *See* DEIS at 11-224.

NRDC1-50 CONTD

[10] The impact from reductions in the frequency and magnitude of intermediate and high flow events would only be partially offset by the habitat restoration efforts that are included in CP4 and CP5. DEIS at 11-270.

NRDC1-53 CONTD

the Sacramento River." FWS Report at 9. FWS also emphasized that SALMOD is not able to simulate juvenile mortality in the Sacramento River downstream from Red Bluff Diversion Dam.

NRDC1-54

Id. FWS concluded that these flaws cause SALMOD to underestimate mortality to all four salmon runs. *Id.* at 83, 88. It also pointed out that the SALMOD "modeling results in the SLWRI overstate the benefits that the SLWRI would provide for spring-run Chinook salmon"

NRDC1-55

because SALMOD overestimates the number of spring-run spawners returning to the mainstem Sacramento River. *Id.* at 178.

NRDC1-56

The CDFW has raised similarly serious concerns regarding the Bureau's use of SALMOD to analyze the SLWRI. *See* CDFW, Attachment 1; Cal. Dept. of Fish and Wildlife, Shasta Lake Water Resources Investigation, Comments on the Administrative Draft of the Environmental Impact Statement and Environmental Impact Report, Feasibility Report, and Appendices (November 7, 2008) ("CDFW, Attachment 2"). In these comments, CDFW raises significant concerns regarding "overdependence on the SALMOD model in the ADEIS/DEIR and unsubstantiated assumptions driving the model," asserts that "SALMOD has not been accepted by the Department for use in the Central Valley," and identifies other modeling tools and approaches that should be utilized to analyze impacts. *Id.*

NRDC1-57

Even the Bureau has acknowledged the shortcomings of the SALMOD model: The 2008 Biological Assessment for the CVP/SWP Operations Criteria and Plan ("2008 OCAP BA"), for which the Bureau was the lead federal agency, stated that SALMOD has never been peer reviewed, that it cannot account for the impacts of changes in geomorphology, and that the model may be inappropriate where the number of spawners is small (i.e. fewer than 500).[11]

NRDC1-59

In addition to the criticisms raised by the agencies, the SALMOD model fails to account for daily fluctuations in temperature, which can have a profound impact on salmon mortality. SALMOD derived its flow data from CalSim-II, and that data had to be disaggregated from monthly to weekly data. DEIS at 11-59. The DEIS acknowledges that this disaggregation was a potential source of error, *id.*, but does not further acknowledge that using weekly data may mask lethal daily temperature spikes. SALMOD's failure to account for daily temperatures likely causes it to underestimate salmonid mortality. The National Marine Fisheries Service has

[11] *See* Bureau of Reclamation, *Biological Assessment on the Continued Long-Term Operations of the CVP and SWP* (August 2008), App. P at 7-8, available online at: http://www.usbr.gov/mp/cvo/OCAP/sep08_docs/Appendix_P.pdf and hereby incorporated by reference.

NRDC1-57 CONTD

The DEIS acknowledges that the number of spring-run spawners used in their SALMOD modeling (132) was too low to obtain an accurate result. DEIS at 11-55. Yet the DEIS also claims, based on the modeling results, that "[s]pring-run Chinook salmon would have significantly reduced flow- and water temperature-related mortality under CP4" and that "they would experience a significant increase in production during almost all critical water years." *Id.* at 11-259.

NRDC1-58

The Bureau's reliance on the inaccurate modeling results to show benefits to spring-run Chinook salmon is misleading.

NRDC1-59 CONTD

previously expressed concern with the adequacy of the Sacramento River temperature modeling in SALMOD, warning that there is "a great deal of uncertainty in the temperature model results" and that the model fails to accurately account for adaptive management operations. *See* NMFS 2009 BO at 257.

NRDC1-60

SALMOD also inaccurately assesses project versus non-project mortality, asserting that mortality from such factors as disease and predation are completely unrelated to project operations, *see* DEIS at 11-265 (analyzing CP4 and concluding that for winter-, spring-, fall-, and late fall-run Chinook salmon, non-operations factors will cause 89%, 89%, 66%, and 79% of total mortality, respectively), while substantial scientific evidence shows that project operations cause and contribute to these and other stressors. *See, e.g.*, NMFS 2009 BO. SALMOD's assessment of the causes of mortality and drivers of production is inconsistent with more recent modeling and scientific studies, including the OBAN model referenced *supra*.

NRDC1-61

In spite of these numerous criticisms and flaws, and in spite of their knowledge of the existence of other, superior models, the Bureau proceeded to use SALMOD as their only model for assessing impacts to anadromous fish.

NRDC1-62

The sole reliance on the SALMOD model is inadequate to assess the impacts of alternatives on anadromous fish survival, and the lack of adequate analysis of these impacts constitutes a violation of NEPA.

B. The DEIS Fails to Adequately Analyze Impacts on Tribal Resources

NRDC1-63

The DEIS's analysis of impacts to tribal resources is also inadequate. While the DEIS acknowledges that each action alternative will result in significant impacts to tribal resources that cannot be mitigated, it fails to provide an accurate picture of the extent of these impacts. For example, with respect to archeological and historic-era structural resources, the DEIS states that "the frequency and distribution of recorded sites within the project study area only give a limited and incomplete picture of the actual number of resources. This is because only a very small percentage of the project area has been systematically inventoried for cultural resources." DEIS at 14-16. In fact, systematic surveys have only occurred in five percent of the Shasta study area, and in fifteen percent of the upper Sacramento River. *Id.* The DEIS therefore acknowledges that "there are undoubtedly many more cultural resources that have not been identified or formally recorded." *Id.* In light of the lack of available survey data, the DEIS conducted a sensitivity analysis to estimate the number of resources that would be impacted by each alternative. Considering the sensitive, irreplaceable nature of the tribal resources that would be affected, this cursory analysis is inadequate to fully inform the public about each alternative's impacts.[12]

NRDC1-64

[12] As discussed in footnote 1, *supra*, the DEIS's failure to determine whether tribal archeological sites qualify as historical resources, and its failure to address stringent state-law mitigation requirements for impacts to historical resources makes clear that the DEIS does not comply with CEQA. *See* tit. 14 Cal. Code Regs. §§ 15064.5(c), 15126.4(b).

C. In Several Additional Ways, the DEIS Failed to Provide Accurate, Adequate Information for the Public to Assess the Proposed Alternatives

NRDC1-65 There are several other ways in which the DEIS failed to provide the public with sufficient information to assess the impacts of the proposed alternatives. Most generally, the DEIS substantially misleads the public by claiming that certain alternatives benefit anadromous fish when they do not. For example, the DEIS concludes that CP4 will be beneficial for winter-, spring-, and fall-run Chinook salmon. As discussed above, however, these benefits are largely illusory.

NRDC1-66 The inaccurate information that the DEIS provides makes it difficult for members of the public to assess the potential costs and benefits of the proposed projects.

NRDC1-67 The Bureau also failed to explain how the DEIS integrated the RPA actions from the 2008 and 2009 BOs, and it inaccurately modeled implementation of the RPA actions, rendering the modeling inaccurate and misleading. The DEIS states that "the No-Action/No-Project Alternative is based on CVP and SWP operational conditions described in the 2008 *Biological Assessment on the Continued Long-Term Operations of the CVP and SWP* (2008 OCAP BA), and the BOs issued by USFWS and NMFS in 2008 and 2009, respectively." DEIS at 2-20. But the DEIS fails to provide details regarding how the 2008 and 2009 BOs' requirements were included in the DEIS's baseline conditions.

NRDC1-68 For example, the DEIS's modeling appendix fails to clarify how the complicated, sometimes flexible requirements of the RPAs were included in the models. Instead, it merely states, in a conclusory fashion, that particular RPA actions were included in the modeling for existing and future conditions. *See, e.g.*, DEIS Modeling Appx. at 2-5 (Shasta Lake end-of-September storage based on NMFS BO Action 1.2.2); *id.* at 2-6 (Delta flow and salinity based on 2008 BO Action 4); *id.* at 2-6 (combined flow in OMR based on 2008 BO Action 1, 2, 3 and 2009 BO Action IV.2.3). The modeling appendix elaborates that, "[i]n cooperation with NMFS, USFWS, and CDFW, the Reclamation and DWR have developed assumptions for implementation of the USFWS BO (December 15, 2008) and NMFS BO (June 4, 2009) in CalSim-II." *Id.* at 2-9 n.10. But the DEIS does not describe the agencies' assumptions. For RPA actions that include adaptive management provisions, such as OMR flow requirements, this lack of clarity makes it impossible to assess whether the requirements were properly integrated into the Bureau's modeling.

NRDC1-69 In addition, the modeling shows noncompliance with the RPA actions in certain months and years, and presents other results that appear highly anomalous and inaccurate. For instance, the modeling shows that Delta outflow in the month of September in wet and above normal years would substantially exceed the Fall X2 RPA action requirements (the CVP and SWP would release water from the reservoirs and/or reduce Delta exports in excess of the Fall X2

NRDC1-69 CONTD

requirement), which is inconsistent with operational practices; in contrast, Delta outflow in the month of October in wet and above normal years would not achieve the minimum outflow requirements under the Fall X2 RPA action. *See* DEIS, Fisheries and Aquatic Ecosystems Technical Report, Attachment 1, Assessment of Fisheries Impacts within the Sacramento – San Joaquin Delta, at 2-9 to 2-10, 2-43 to 2-44, 2-47 to 2-48. The 2008 delta smelt biological opinion requires that the Fall X2 requirement be separately achieved in the months of September and October, and as such, the modeling is inconsistent with implementation of the biological opinion.

NRDC1-70

The modeling also appears to fail to account for the "first flush" action of the Delta smelt RPA actions, as Old and Middle River flows are highly negative in wet years during the month of December. *See id.* at 2-61. These modeling flaws cast significant uncertainty on the reliability of all of the modeling results that are used to assess impacts.

NRDC1-71

Several alternatives in the DEIS also result in impacts on delta hydrology, including reductions in delta outflow. *See, e.g.*, DEIS at 11-126 11-129 (CP1). The DEIS claims that the effect would be less than significant, but it does not provide any analysis to support this conclusion. In contrast, there is substantial scientific information that reductions in Delta outflow in the winter and spring months has significant effects on the abundance and survival of listed species in the Delta, including green sturgeon, longfin smelt, and Chinook salmon. *See, e.g.*, SWRCB 2010, Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem (August 3, 2010).[13] The DEIS fails to analyze the effects on abundance and survival of these species as a result of reductions in outflow, and the DEIS's conclusion that these effects are less than significant are not supported by substantial evidence.

NRDC1-72

The DEIS also fails to provide certain information by water-year type, making it difficult for the public to accurately compare the impacts of various alternatives. For example, the DEIS presents figures showing changes in mean monthly water temperature at modeled locations in the Sacramento River. *See, e.g.*, DEIS Figures 11-34 and 11-35 at 11-267 to 11-268. These averages fail to show the dangerously high temperatures that can occur in dry and critical water years, making it difficult to assess the true impacts of each alternative.

NRDC1-73

Moreover, the monthly averages mask daily temperature changes, which can result in substantial mortality or sublethal effects that reduce survival.

NRDC1-74

Further, the no-action alternative is misleading because it improperly includes the Vernalis Adaptive Management Plan ("VAMP") as part of its 2030 baseline. *See* DEIS at 3-16, 3-18 to 3-19. As the DEIS acknowledges, VAMP expired in 2011. *Id.* at 3-19. Yet the DEIS justifies its inclusion of VAMP in the no-action alternative by stating that the Bureau "intends to continue implementing actions similar to the VAMP for the foreseeable future, or until the SWRCB

NRDC1-71 CONTD

[13] This report is available online at: http://www.swrcb.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf and is hereby incorporated by reference.

adopts new, permanent objectives for San Joaquin River flows that replace the current program." *Id.* As the State Water Resources Control Board has explained, with the expiration of VAMP the Bureau is obliged to meet the pulse flows required under the Bay-Delta Water Quality Control Plan and Decision 1641. This requires additional flows in certain water year types, and the exclusion of these flows from the modeling creates inaccurate results that may understate impacts.

NRDC1-74 CONTD

The DEIS also inaccurately assesses impacts on other special status species. For instance, the DEIS asserts that the project will increase entrainment of Delta smelt, but the methodology used estimates that on average, 41,937 Delta smelt are entrained, whereas the take limit for salvage of Delta smelt under the current biological opinion is in the hundreds of fish at current abundance levels. *See* DEIS, Fisheries and Aquatic Ecosystems Technical Report, Attachment 1, Assessment of Fisheries Impacts within the Sacramento – San Joaquin Delta, at 2-88 (Table 2-170). The entrainment methodology utilized in the DEIS is unreliable, and fails to accurately assess entrainment impacts to Delta smelt. With respect to other special status species, the DEIS concludes that the project will result in significant and unavoidable impacts to numerous botanical and biological resources, including species listed under the California Endangered Species Act. DEIS at ES-66 to ES-67, ES-77 to ES-86; CDFW, Attachment 1.

NRDC1-75

However, the DEIS improperly defers analysis of impacts to California Red-Legged Frog to a future date and fails to analyze the impacts to this species in this document. DEIS at ES-86.

NRDC1-76

And as noted in footnote 1, the DEIS improperly defers mitigation measures for these impacts under CEQA.

NRDC1-77

Finally, the DEIS utilizes multiple baselines for comparison (e.g., existing condition and no action), which leads to substantial confusion for the reader and undermines NEPA and CEQA's goal of informed decision-making.

NRDC1-78

D. The Draft SLWRI Feasibility Report Must be Revised to Provide the Public and Decision Makers With Adequate Information on the Costs and Benefits of the Alternatives

Prior to releasing the DEIS, the Bureau released a draft SLWRI feasibility report, which is incorporated into the DEIS. *See* DEIS at ES-1, ES-35 to ES-36, 1-26. As noted in NRDC's comments on the draft feasibility report, the Bureau's initial analysis failed to account for changes to CVP and SWP operations caused by the 2008 and 2009 BOs. *See* NRDC comments on SLWRI feasibility report, attached hereto as Attachment 3. Based on these and other comments, the modeling assumptions used in the DEIS have changed substantially from those analyzed in the feasibility report, and the feasibility report no longer presents an accurate picture of the alternatives' costs and benefits (FWS's report indicates that the feasibility report dramatically overstated project benefits to anadromous species). *See also* DEIS at 1-1 to 1-2 (noting that water operations modeling was significantly revised as compared to that utilized in

NRDC1-79

the feasibility report). However, the DEIS also makes clear that the DEIS and feasibility report both play an important role in providing the public and decisionmakers with information on the costs, benefits, and impacts of the alternatives, in order to make an informed decision. DEIS at ES-1, ES-35, 1-26. As a result, the DEIS's reliance on the November 2011 draft SLWRI feasibility report to inform the public about the costs and benefits of the proposed alternatives is misleading, and the Bureau must revise the project's feasibility report in order to comply with NEPA and the Bureau's other legal obligations.

NRDC1-79 CONTD

NRDC1-80

E. The DEIS Fails to Adequately Account for Climate Change Impacts and Analyze the Effects of the Alternatives and Climate Change

The DEIS's climate change modeling appendix reviews global climate change forecasts and discusses some of the implications of climate change for California's water resources.[14] It also presents a quantitative analysis of climate change's impacts on various resources, using models to compare climate-change influenced CP4 and CP5 to a climate-change influenced no-action alternative. Thus, the Bureau has acknowledged the important role that climate change will play in California's water future, and showed that it is capable of modeling future scenarios in a way that accounts for climate change impacts. Yet in its analysis of alternatives in the DEIS, the Bureau failed to include climate change impacts in its modeling for any of the alternatives. Instead, it merely briefly discussed climate change in its cumulative impacts analysis for each analyzed resource area. *See* DEIS at 3-10; *see also, e.g., id.* at 11-335 to 11-341. The Bureau's brief, qualitative analysis of climate change in the cumulative impacts sections of the DEIS fails to provide sufficient detail for the public to meaningfully analyze the proposed alternatives, and NRDC recommends that the Bureau include climate change in the modeling of all future scenarios.

NRDC1-81

NRDC1-83

NRDC1-84

Moreover, even when the DEIS did account for climate change impacts in the climate change modeling appendix, it assumed that the CVP and SWP would operate as they do today. *See* DEIS Climate Change Modeling Appx. at 4-4 (indicating system operations were modeled using the SLWRI 2012 Benchmark Version CalSim-II model). This is unacceptable because a failure to adapt project operations to account for climate change impacts likely will result in jeopardy to several threatened and endangered species, *see* NMFS 2009 BO, and the Bureau must acknowledge that simply maintaining the status quo in a warmer future is unacceptable. *See also National Wildlife Federation v. NMFS*, 524 F.3d 917, 929-931 (9th Cir. 2008) (jeopardy analysis under the ESA must consider the effects of the action in light of "present and future human and

NRDC1-85

[14] The Bureau's analysis should be updated to include a discussion of the climate change impacts described in the California Environmental Protection Agency's recent publication, *Indicators of Climate Change in California*, August 2013. The document is available at: http://oehha.ca.gov/multimedia/epic/pdf/ClimateChangeIndicatorsReport2013.pdf and is hereby incorporated by reference.

NRDC1-82

NRDC1-85 CONTD

natural contexts." (quotation and citation omitted)). NRDC recommends that the Bureau's modeling of all future scenarios account for modifications to CVP and SWP operations that will have to occur to avoid jeopardy to threatened and endangered species.

NRDC1-86

F. The DEIS Fails to Adequately Analyze Cumulative Impacts of the Alternatives

NRDC1-87

"The cumulative impact analysis must be more than perfunctory; it must provide a 'useful analysis of the cumulative impacts of past, present, and future projects.'" *Kern v. U.S. Bureau of Land Mgmt.*, 284 F.3d 1062, 1075 (9th Cir. 2002) (quoting *Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 810 (9th Cir. 1999)). Moreover, "[t]o be useful to decision makers and the public, the cumulative impact analysis must include some quantified or detailed information; . . . general statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." *N. Plains Res. Council*, 668 F.3d at 1076 (quotation marks and citations omitted). Nonetheless, for several projects that are in advanced planning stages and that will have substantial impacts on resources in the DEIS's study area, the DEIS fails to provide anything more than vague, general statements regarding cumulative impacts of the projects and the action alternatives.

NRDC1-88

For example, the DEIS improperly fails to provide any detailed analysis of the cumulative impacts that BDCP will have on resources within the study area, even though BDCP will have a profound effect on many of the same resources that would be impacted by each of the proposed action alternatives. Among other impacts, both BDCP and the proposed alternatives would affect OMR flows, Delta salinity and outflow, and fish entrainment. Moreover, BDCP will have a substantial impact on the SLWRI's primary objectives—water supply reliability and anadromous fish survival. The DEIS, however, concludes that "[i]t would be speculative to consider [BDCP] at any more than a conceptual level because [its] effects are not defined in sufficient detail to allow meaningful analysis." DEIS at 3-22 to 3-23. This makes little sense because the administrative draft of the EIR/EIS for BDCP was released *before* the SLWRI DEIS was issued. In fact, the DEIS discussed details regarding BDCP, including the draft plan's twenty conservation measures. DEIS at 11-32; *see also id.* at 3-27 to 3-28. Because the SLWRI and BDCP will impact the same resources, and because details regarding BDCP were available during the DEIS's development and are currently available (including quantitative analysis of the effects of BDCP on upstream reservoir storage, Sacramento River inflows, Delta outflows, and Old & Middle River flows), the Bureau should have provided a quantitative analysis of the cumulative effects of BDCP and expansion of Shasta Dam.

NRDC1-89

NRDC1-90

The same problems exist for the DEIS's assessment of cumulative impacts from other surface storage projects being contemplated by the Bureau, including Sites Reservoir and Temperance Flats Reservoir projects. As it did for BDCP, the DEIS concludes that it would be speculative to

consider these projects at anything more than a conceptual level. DEIS at 3-22 to 3-23. Yet it notes that the notice of intent/notice of preparation for the Sites Reservoir project was issued in November 2001, that a complete plan formulation report was published in September 2008, and that the final EIS/EIR/Feasibility Report is scheduled to be complete in 2013. *Id.* at 3-32. The DEIS also acknowledges that the plan formulation report for the Temperance Flats Reservoir project was released in October 2008. *Id.* at 3-38. Though sufficient information was available, the DEIS fails to analyze the cumulative impact of implementation of these reservoir projects and the SLWRI on water quality (including outflow, X2 location, turbidity, and water temperatures), flows, anadromous fisheries, and other environmental resources. Even assuming that the impacts of a single reservoir project are less than significant, the reduced flows resulting from additional storage in 3 new upstream reservoirs could result in impacts that are cumulatively significant.[15]

NRDC1-90 CONTD

The DEIS also fails to analyze the effects of the SLWRI on implementation of existing RPA actions to allow winter-run Chinook salmon to spawn upstream of Shasta Dam. *See* NMFS 2009 at 659-671. The alternatives in the DEIS could impede implementation of this action, for instance by inundating additional upstream spawning habitat, reducing survival while salmon migrate through the reservoir, or increasing abundance of non-native and warm-water species that could predate on salmon. Although the DEIS mentions impacts on adfluvial salmonids (salmon that do not migrate to the ocean), the DEIS wholly fails to analyze the potential impacts of the alternatives on implementation of the RPA action to allow winter-run Chinook salmon to spawn upstream of Shasta Dam.

NRDC1-93

V. The Bureau Should Withdraw the DEIS and Terminate the SLWRI Because All of the Alternatives would Violate State Law and Irreparably Harm Tribal Resources

[15] In the executive summary, the DEIS admits that all action alternatives could result in significant and unavoidable cumulative impacts on Delta outflow and X2. *See* DEIS at ES-30 to ES-31. However, Chapter 11 of the DEIS fails to quantify or even qualitatively describe the magnitude of these cumulative impacts on Sacramento River flows, Delta outflow, or X2, and it does not find that it would result in these significant and unavoidable cumulative impacts. None of the surface storage projects being evaluated by the Bureau are referenced or included in the cumulative impacts analysis. Reductions in Delta outflow in the winter and spring months could cause significant impacts on state and federally listed endangered species that live in or migrate through the Delta, including longfin smelt, green sturgeon, winter run Chinook salmon, and Delta smelt. The DEIS wholly fails to analyze these cumulative impacts on listed species in the Delta. Because the DEIS admits that there are significant impacts, the failure to identify mitigation measures violates CEQA. *See* Footnote 1, *supra*. Feasible mitigation measures could include restrictions on when water can be stored in upstream reservoirs, in order to prevent downstream impacts on river flows, X2, and delta outflow, and thereby on biological resources, including listed fish species.

NRDC1-91

NRDC1-92

A. All of the Alternatives Unreasonably Harm Tribal Resources

NRDC1-94 In addition to failing to analyze any alternatives that would substantially benefit anadromous fish, the Bureau failed to analyze a single action alternative that would avoid causing irreparable harm to important tribal resources. As discussed above, the Bureau could have, but chose not to, analyze an alternative that would meet its water supply and anadromous fish survival objectives without raising Shasta Dam. As a result, each action alternative will inundate additional land surrounding Shasta Reservoir, further harming tribal resources that surround the lake.

NRDC1-95 Several culturally important tribal resources exist in the areas immediately surrounding Shasta Lake. The Pit River Madesi Band has indicated that twenty-two ethnographic villages and associated burial grounds are located within existing reservoir and proposed reservoir areas, DEIS at 14-10, and the Winnemem Wintu identified important localities within the study area where ceremonies are regularly conducted, such as Puberty Rock and the doctoring pools near Nawtawaket Creek. With respect to the Winnemem Wintu's identified locations, the DEIS concluded that "ongoing use of many archeological and religious sites is fundamental to the well-being of their culture, particularly the education of their youth." *Id.* at 14-10 to 14-11. Because the Winnemem Wintu believe that the location of these important sites is preordained, they cannot be relocated. *Id.* at 14-23.

NRDC1-96 The Winnemem Wintu Tribe has prepared detailed comments regarding these impacts to cultural and tribal resources, which we support.

NRDC1-97 The DEIS concludes that even CP1, which would inundate less land than CP2, CP3, CP4, or CP5, would have a direct, significant adverse impact on these and other tribal resources. *Id.* at 14-22. For example, CP1 would impact Puberty Rock and the doctoring pools near Nawtawaket Creek, and would place approximately 212 prehistoric sites and 355 historic-era archival localities in the inundation zone, and many more sites in the fluctuation zone and quarter-mile buffer zone. *Id.* at14-22 to 14-23. The other action alternatives would place many more cultural resources in the inundation zone. Accordingly, the DEIS concluded that "it is clear that raising Shasta Dam would result in cumulative effect on historic properties." *Id.* at 14-33. Yet the Bureau chose not to analyze any alternative that would avoid these impacts by meeting the project's objectives without raising Shasta Dam and flooding the lands surrounding the reservoir.

B. All of the Alternatives Violate State and Federal Law by Negatively Impacting the McCloud River's Free-Flowing Conditions and its Trout Fishery

NRDC1-98 In 1989, the Legislature passed an amendment to the California Wild and Scenic Rivers Act to protect the McCloud River's free-flowing conditions and the fishery below McCloud Dam, adding Section 5093.542 to the California Public Resources Code. The Legislature found and declared "that the McCloud River possesses extraordinary resources in that it supports one of the

finest wild trout fisheries in the state." Cal. Pub. Res. Code § 5093.542. The statute states that "[t]he continued management of river resources in their existing natural condition represent the best way to protect the unique fishery of the McCloud River" and that "maintaining the McCloud River in its free-flowing condition to protect its fishery is the highest and most beneficial use of the waters of the McCloud River." *Id*

NRDC1-98 CONTD

The DEIS, however, concluded that each action alternative will cause impacts to the McCloud's free-flowing conditions and to its trout fishery, and would therefore conflict with Section 5093.542. DEIS at 25-30 to 25-31, 25-34, 25-38 to 25-39. In particular, by raising Shasta Dam, each proposal would increase the size of Shasta Reservoir so that it inundates portions of the McCloud River in violation of state law. The DEIS concludes that CP1 would impair the free-flowing conditions in 1,470 feet of the McCloud River, *id.* at 25-26, that CP2 would impair 2,740 feet, *id.* at 25-31, and that CP3, CP4, and CP5 would impair 3,550 feet, *id.* at 25-35. Each alternative would also adversely affect spawning habitat for trout in the lower McCloud River. *See, e.g., id.* at 25-28 to 25-29. The DEIS concludes that no mitigation is currently available for these impacts. *Id.* at 25-39.

NRDC1-99

Because each action alternative conflicts with Section 5093.542, each alternative also violates the CVPIA. *See* P.L. 102-575, § 3406(b) (CVPIA § 3406(b)) (Secretary of the Interior "shall operate the Central Valley Project to meet all obligations under State and Federal law"). Accordingly, all five of the action alternatives would violate both state and federal law if implemented.

NRDC1-100

The DEIS also notes that some segments of the McCloud river are eligible for listing under the federal Wild and Scenic Rivers Act. DEIS at 25-6. Because free-flowing conditions are a fundamental requirement for Wild and Scenic River Act eligibility, the impaired reaches of the McCloud River would become ineligible for federal listing. *Id.* at 25-26. Water-level fluctuations would also reduce water quality in impaired sections of the McCloud, rendering them further ineligible for listing under the federal Wild and Scenic Rivers Act. *Id.* at 25-27.

NRDC1-101

Because none of the alternatives can be implemented consistent with state and federal law, the Bureau should withdraw the DEIS and terminate the SLWRI.

NRDC1-102

VI. Conclusion

As demonstrated above, the DEIS fails to comply with NEPA and CEQA, and all of the alternatives would violate state law, would significantly harm the tribal resources of the Winnemem Wintu Tribe, and would cause negative impacts (or provide insignificant benefits) to anadromous fish and other biological resources. As a result, the Bureau should withdraw the DEIS and draft feasibility study, and terminate the SLWRI. Should the Bureau decide to

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NRDC1-104

NRDC1-104 CONTD

continue with the SLWRI, it must prepare and recirculate a revised DEIS/EIR and draft feasibility study that address the substantial flaws identified in these and other agencies' comments.

Thank you for consideration of our views. Please feel free to contact us at your convenience if you have any questions or concerns.

Sincerely,

Rachel Zwillinger
Altshuler Berzon

Doug Obegi
Natural Resources Defense Council

Attachments:

1. Cal. Dept. of Fish and Wildlife, SLWRI Comments on the Public Draft of the Feasibility Report, and Selected Attachments, January 2013 (February 8, 2013)
2. Cal. Dept. of Fish and Wildlife, Shasta Lake Water Resources Investigation, Comments on the Administrative Draft of the Environmental Impact Statement and Environmental Impact Report, Feasibility Report, and Appendices (November 7, 2008)
3. NRDC comments on SLWRI feasibility report

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February 8, 2013

Ms. Katrina Chow, Project Manager/Civil Engineer
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Subject: Shasta Lake Water Resources Investigation, Comments on the Public Draft of the Feasibility Report, and Selected Attachments, January 2013

Dear Ms. Chow:

The California Department of Fish and Wildlife (Department) appreciates the opportunity to provide comments on the Shasta Lake Water Resources Investigation (SLWRI) Public Draft of the Feasibility Report and selected Technical Reports/Attachments for the Shasta Dam enlargement project (Project).

The scope of these comments reflects the Department's statutory authority as trustee agency for the conservation of California's fish, wildlife, and botanical resources, and the habitats on which they depend. The following issues and comments are not in order of priority.

The Department's review was focused to SLWRI alternative CP4 because it was identified previously as the preferred alternative, but other alternatives were also assessed. In addition to this narrative, we have offered comments on the Excel spreadsheet template (Attachments) provided by the Bureau of Reclamation (Reclamation).

The Department reviewed and provides comments on the following documents:

- The SLWRI Feasibility Report
- Hydrology, Hydraulics, and Water Management Technical Report
- Hydrology, Hydraulics, and Water Management Technical Report Attachment A: CalSim-II Output
- Hydrology, Hydraulics, and Water Management Technical Report Attachment B: DSM2 Output – Water Levels
- Modeling Appendix
- Water Quality Technical Report
- Geologic Technical Report

- Geologic Technical Report Attachment 1: Shoreline Erosion Technical memorandum
- Fisheries and Aquatic Ecosystems Technical Report
- Wildlife Resources Technical Report
- Wildlife Resources Technical Report Attachment 1: Special-Status Wildlife Species Potentially Occurring in the Shasta Reservoir and Vicinity Portion of the Primary Study Area
- Botanical Resources and Wetlands Technical Report
- Botanical Resources and Wetlands Technical Report Attachment: Lists of All Special-Status Plant Species Known from or Potentially Present in the Primary and Extended Study Area

The Potential for Species Listing and Compliance with the Multi-Species Conservation Strategy

The U.S. Fish and Wildlife Service (Service), as per the July 2008 draft Coordination Act Report (Service 2008a), believes that the Project will result in adverse affects to special-status species within the vicinity of Shasta Reservoir, riparian habitat along the Sacramento River, and aquatic habitat in the Sacramento-San Joaquin Delta. The Department concurs with this conclusion. The raising of Shasta Reservoir would inundate the limited habitat of three rare species: Shasta snow-wreath (*Neviusia cliftonii*), Shasta chaparral snail (*Trilobopsis roperi*), and Shasta hesperian snail (*Vespericola shasta*) of which all are endemic to restricted limestone substrate in the vicinity of Shasta Reservoir.

Four of the terrestrial mollusks that could be impacted by enlarging Shasta Reservoir are currently petitioned for federal listing under the Endangered Species Act (ESA): Shasta sideband snail (*Monadenia troglodytes troglodytes)*, Wintu sideband snail (*Monadenia troglodytes wintu)*, Shasta chaparral snail, and Shasta hesperian snail. All four of these terrestrial mollusks are also species endemic to the vicinity of Shasta Reservoir. Reclamation should analyze the range and population of these species and estimate what percentage of each species' habitat would be impacted by the Project.

The Botanical and Wetlands Technical Report should be updated to reflect the status of a potentially new rare plant species, commonly referred to as Shasta huckleberry (*Vaccinium* sp.), that would be affected by enlarging Shasta Reservoir. If confirmed as a distinct species, Shasta huckleberry would likely meet the criteria for listing under the California Endangered Species Act due to its rarity and identified threats to the species. Shasta huckleberry is known from only three locations, all of which are in the vicinity of Shasta Reservoir. At least nine individual Shasta huckleberry shrubs in the Little Backbone Creek drainage would be lost within the inundation zone. The occurrence of Shasta huckleberry near Bully Hill Mine is currently threatened by non-project related activities associated with soil remediation. Additional genetic analyses are needed to clarify the taxonomic issues for these plants. Given current known information about their rarity, occurrences of these rare plant species could be treated as a rare species.

Secondly, the CALFED Final Programmatic EIS/EIR requires CALFED to avoid all actions that could result in the mortality of any species identified within Table 4-5 of the Multi-Species Conservation Strategy (CALFED 2000a). This includes Shasta snow-wreath which is found among a list of "...evaluated species for which direct mortality as a result of implementing CALFED actions is prohibited as a condition of the Multi-Species Conservation Strategy (MSCS)..." This conservation measure was developed because these species are extremely rare. For many of the plants identified, fewer than a dozen known populations exist. The Feasibility Report and Technical Reports/Attachments do not adequately identify how this requirement is being addressed given the SLWRI is a CALFED project.

Incomplete Information

The Habitat Evaluation and Procedure analysis, which was being prepared by the Service, and the reservoir tributary study are two examples of information that was not provided in the Feasibility Report or the Technical Reports/Attachments. Also, details regarding management of the dedicated pool within the alternatives, and the impacts of that element of the alternative were not provided or assessed. The Department believes this information is essential and needs to be included in the Feasibility Report and Draft Environmental Impact Statement/Environmental Impact Report preparation.

Use of the 2004 and 2005 OCAP BOs

The Feasibility Report uses the National Marine Fisheries Service (NMFS) 2004 Biological Opinion (BO) for the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan, and the Service's 2005 BO for the Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP) (2004 and 2005 OCAP BOs). Use of the more current OCAP BOs (the 2008 Service OCAP BO and the 2009 NMFS OCAP BO) (Service 2008b) (NMFS 2009a) would provide a more relevant analysis.

Clarification on the Dedicated Pool, Alternative CP4

Cold water is essential for listed anadromous fish needs. The analysis within the Feasibility Report or Technical Reports/Attachments that specifically identified the quantifiable increase in volume of the cold water pool as a result of a dam raise was incomplete. Understanding the amount of additional cold water available as a result of this Project will help the Department better evaluate the (potential) positive benefits to anadromous fish.

The older requirement of 1.9 million acre-feet (MAF) of total storage in September was necessary in critically dry years to preserve enough cold water (1.3 MAF) for the following season (NMFS 2004). The 2009 NMFS OCAP BO requires a higher end of September storage (2.2 MAF) in order to avoid temperature impacts. The Department

assumes that all action alternatives will provide additional volume to the cold water pool above the 2.2 MAF requirement (NMFS 2009a). That volume should also be quantitatively disclosed.

In 2008, the Service provided a Planning Aid Memorandum (PAM) on Adaptive Management of the Dedicated Environmental Water in the Shasta Reservoir Water Resources Investigation Project (2008 PAM) (Service 2008c). The 2008 PAM identified an earlier recommendation from the Service, the Department, and NMFS for "dedicated environmental water" to be included in a SLWRI alternative (378,000 acre-feet is identified in Alternative CP4). This water was to be adaptively managed and used at the discretion of the federal and State fisheries resource agencies and would also be allocated in addition to and beyond any actions identified and/or required as mitigation for this Project or in the Central Valley Project Improvement Act (CVPIA), CALFED, and any existing biological opinions. The Department's interpretation of the 378,000 acre-feet of water continues to be consistent with what was included in the 2008 PAM. However, the Feasibility Report implies that this water could be added to the existing cold water pool and not treated as a separate source of water to be used for natural resource purposes. The Feasibility Report states this water be managed in coordination with the Sacramento River Temperature Task Force, which has never been discussed with the Department, the Service, and NMFS. The Department requests resurrecting the 2008 PAM and continuing these discussions on the dedicated pool found in Alternative CP4 with the affected resource agencies.

Habitat Conditions within the Sacramento River below Keswick Dam

The Feasibility Report and/or Technical Reports/Attachments do not provide a clear picture or analysis of fish habitat conditions within the Sacramento River below Keswick Dam. We encourage Reclamation to evaluate those parameters which are deemed important to anadromous fish, which includes both instream conditions and adjacent terrestrial habitats. One source for this assessment is to look at the federal definition of Critical Habitat for listed anadromous fish, such as winter-run Chinook salmon *(Oncorhynchus tshawytscha*). We also encourage assessing those conditions within the range of the species affected, and not just in the area immediately downstream of Shasta dam. For example, Critical Habitat designation for winter-run Chinook, as identified in the 2009 NMFS OCAP BO (NMFS 2009a) identifies those physical and biological features of the habitat that are essential to the conservation of the species and that may require special management consideration and protection. Within the Sacramento River, this includes the river water, river bottom (including those areas and associated gravel used by winter-run Chinook salmon as spawning substrate), and adjacent riparian zones used by fry and juveniles for rearing. In the areas west of Chipps Island, including San Francisco Bay to the Golden Gate Bridge, this designation includes the estuarine water column and essential foraging habitat and food resources utilized by winter-run Chinook salmon as part of their juvenile outmigration or adult spawning migrations. An analysis of the effect on every primary constituent element of Critical Habitat, as per ESA, should be completed.

Impacts to the Fishery in Shasta Reservoir

The Feasibility Report analysis of the loss of perennial and intermittent stream habitat, its associated riparian habitat, and the effect on reservoir fisheries values as a result of the Project is incomplete. The Department believes the loss of tributary habitat would have significant effects on riverine aquatic species and requests a more complete analysis. More specific information on the affected stream miles, habitat types they contain, and current barriers to upstream fish passage from the reservoir that will be inundated is needed.

Impacts on the Fishery and Habitat below Shasta Dam

The primary resource management measures within the Feasibility Report which address the objective of Anadromous Fish Survival are enlarging the cold water pool and modifying the Temperature Control Device in Shasta Reservoir. These elements would be used to maintain cooler temperatures for anadromous fish spawning and rearing habitat in the Sacramento River between Keswick Dam and the Red Bluff Diversion Dam (RBDD). Only in one alternative (CP4) does enlarging the cold water pool provide benefits to anadromous fish survival. However, it appears that the benefits to anadromous fish are limited to a few critical and dry water years representing 5% to 10% of the 1922-2003 period of simulation.

The 2008 SLWRI Administrative Draft documents identified a significant (negative) effect on Sacramento-San Joaquin Delta smelt (*Hypomesus transpacificus*), Sacramento splittail (*Pogonichthys macrolepidotus*), and striped bass (*Morone saxatilis*) (Reclamation 2008). This is due to increased reverse flows in Old and Middle Rivers, and also due to increased risk of entrainment or salvage of species at CVP and SWP facilities caused by changes in CVP and SWP exports. We recommend this be addressed in the Feasibility Report or the Technical Reports/Attachments.

Alternative CP4, as per the Feasibility Report, currently includes a limited amount of gravel augmentation, while other enhancement elements that could improve anadromous fish habitat, such as riparian restoration and removal of bank armoring, were placed into another alternative (CP5). The Department encourages Reclamation to revisit the CP4 Alternative and include restoration elements beyond what is currently identified (i.e. gravel augmentation, the details of which are not provided).

Use of SALMOD and Concerns about Correct Representation of Data

The Department's previous comments on modifying SALMOD, as well as our concerns about using it as an analysis tool, have not been addressed fully (Department correspondence to Reclamation in February 2006, Attachment 8). The analysis on impacts to salmonids in the Sacramento River below Keswick Dam is largely restricted to the SALMOD model results and does not include any other analysis efforts, such as habitat typing data, or The Nature Conservancy (Nature Conservancy) State of the Sacramento River Report (Nature Conservancy 2008). Analysis of the effects of flow

management on potential redd dewatering, or assessing how to balance the annual management of flow on the species and/or runs of salmonids, is also not included. SALMOD has not been accepted by the Department for use in the Central Valley, and the documents should clearly reflect this fact (See Attachment 8). Model assumptions and parameters applied should be clearly stated in the document. In addition, there should be a statement that this is a preliminary analysis used by Reclamation and should not be interpreted as the final tool to analyze fish impacts from the various alternatives under consideration.

The CVPIA Anadromous Fish Restoration Program (AFRP) goal needs to be clearly defined within the context of the SALMOD analysis. If the document is referring to the doubling goals, that needs to be identified, as opposed to a goal which may have to do with an AFRP target in the Final Restoration Plan on the Sacramento River. The AFRP definition of production needs to be clarified because it may not differ with the SALMOD definition of production. In one location, a population figure is given, which further confuses the entire fisheries analysis. There may also be a discrepancy in discussing AFRP goals with any other goal for production because other agencies may not be using the same databases as the Department or AFRP. Some agencies use Chinook Prod, and others use Grandtab, which are different databases. When referring to production, the document also needs to specify if it includes all fish, or wild versus hatchery fish. AFRP fish production targets are focused on the natural production of fish from each watershed. In summary, due to potential discrepancies between the premises that SALMOD, AFRP, and other restoration programs are based upon, the Feasibility Report's predictions, particularly in the AFRP context, may be inaccurate and/or misrepresented.

Spring-run Chinook Salmon (*Oncorhynchus tshawytscha*)

The 1998 spring-run Chinook Status Review (Department 1998) says, "A small population of spring-run salmon may persist in the upper Sacramento River above RBDD, although there is question as to the genetic integrity of these fish." Essentially, the extent of spring-run Chinook salmon spawning in the mainstem of the upper Sacramento River is unclear. Due to geographic overlap of Evolutionary Significant Units and resultant hybridization since the construction of Shasta Dam, Chinook salmon that spawn in the mainstem Sacramento River during September are more likely to be identified as early fall-run Chinook (*Oncorhynchus tshawytscha*) rather than spring-run Chinook salmon. The 2009 Public Draft Recovery Plan for the Evolutionary Significant Units of Sacramento River winter-run Chinook and the Central Valley spring-run Chinook, and the Distinct Population segment of Central Valley Steelhead (NMFS 2009b), states that upper Sacramento River may support a small spring-run Chinook salmon population, but the degree of hybridization with fall-run Chinook salmon is likely high. It also states that construction of Shasta and Keswick Dams on the Sacramento River has eliminated the spatial separation between spawning fall-run and spring-run

Chinook salmon. Additionally, no more than 10% and likely less than 5% of the Sacramento River spring-run Chinook population occurs upstream of RBDD.

The plan for spring-run Chinook recovery (NMFS 2009b) may or may not affect the inclusion of that species in the SLWRI analysis. That may subsequently require a change in the cost-benefit projections in the SLWRI and affect flow management in the mainstem Sacramento River, should the Project occur.

Condition of Gravel below Dam and Requirements for Management

The Feasibility Report identifies inriver gravel augmentation in some of the alternatives (e.g. alternatives CP4 and CP5), but detail is lacking on the degree to which this augmentation would benefit anadromous fish, i.e. quantity and location of augmentation is not provided. Based upon previous and ongoing studies of the need for gravel in the Sacramento River below Keswick Reservoir (Buer et al. 1989, Nature Conservancy 2008, Stillwater Sciences 2007, Service 2001), the amount proposed for augmentation (5,000 to 10,000 tons per year for 10 years) is substantially low. This amount does not appear to address the need for gravel and mitigating the potential impacts of the new flow regime proposed within the SLWRI Feasibility Report.

The diversion and storage of natural flows by dams and diversion structures on Central Valley waterways have depleted stream flows and altered the natural cycles by which juvenile and adult salmonids base their migrations. Depleted flows have contributed to higher temperatures, lower dissolved oxygen levels, and decreased recruitment of gravel and large woody debris. Furthermore, more uniform flows year-round have resulted in diminished natural channel formation, altered foodweb processes, and slower regeneration of riparian vegetation. These stable flow patterns have reduced bedload movement (Stillwater Sciences 2007), caused spawning gravels to become embedded and reduced channel widths, which has decreased the available spawning and rearing habitat below dams.

The Sacramento River has received gravel augmentation in most years, although the identified CVPIA targets have not been met in any one year. In the Sacramento River upstream of Highway 44, the percentage of total redds has increased from 6.9% pre-CVPIA to 15.6% post-CVPIA. The agencies' progress, measured by the quantity of gravel placed each year, is meeting, on average, 28% (13,885 cubic yards, or approximately 22,216 tons) of the Sacramento River target.

The Department encourages Reclamation to clearly identify these obligations within the Feasibility Report, Technical Reports/Attachments, and future environmental documents and identify steps to implement them, if they have not been completed and/or initiated. The Department also encourages Reclamation to clearly articulate the difference between its legal obligations, per CVPIA, to provide gravel as compared to its gravel augmentation proposal in the SWLRI, which is being presented as a restoration

measure. Reclamation also needs to identify the need to provide gravel to address mitigation, as opposed to a restoration measure.

Analysis of Botanical Resources

The documents do not appear to consider the impacts of the permanent loss of an undetermined number of acres of vegetation and general wildlife habitat within the Shasta Reservoir area under the various dam-raising scenarios (Alternatives CP1-CP5). These impacts and their level of significance should be described and include the impacts of this permanent loss of vegetation/habitat, what mitigation measures are necessary to offset this permanent loss, and the location of mitigation sites.

The general mitigation strategy proposed for the direct loss of sensitive plant[1] occurrences is relocation. The Department generally does not support the relocation of sensitive plants as an effective mitigation measure. It is rarely effective to re-establish the population somewhere else and does little to offset the permanent loss of suitable habitat. No provisions are provided for off-site mitigation (preservation of suitable/occupied habitat which is currently not protected, enhancement of existing populations, etc.). It is unclear how the proposed measures would mitigate impacts to a "less than significant" level. The following detail is needed within subsequent drafts of the SLWRI environmental documents:

- Where, specifically, will these plants be relocated;
- The amount of available "growing space" within areas of suitable habitat to which these plants can be moved (habitat not already occupied by other individuals of the species in question);
- Evidence that relocation will be effective;
- Monitoring of these relocated populations to verify that relocation efforts have been successful; and
- A definition of what would constitute success (identify performance standards), who would conduct the monitoring, and alternatives if the relocation failed or was found to be failing.

Analysis of Effects on Fish, Wildlife, and Botanical Resources, and Biologist Qualifications

The following wildlife species, in particular, were not adequately analyzed within the Feasibility Report and Wildlife Technical Report. Please see the comment spreadsheet (Attachments 1 and 4) for more specific comments:

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[1] Multi-Species Conservation Strategy, U.S. Forest Service Sensitive, California Rare Plant Rank

- Shasta Salamander (*Hydromantes shastae*)
- Peregrine falcon (*Falco peregrinus*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Purple Martin (*Progne subis)*
- Special-Status Raptors, Bats, and Ringtails (*Bassariscus astutus*)
- Bank Swallow (*Riparia riparia*)

"Out of kind" mitigation, such as enhancement of nearby non-limestone habitat for Shasta salamander, is listed as a potential option to address impacts to certain species. However, it is unclear if such mitigation will actually occur, what specifically would habitat "enhancement" consist of, and will enhancement activities convert unsuitable habitat to suitable habitat. The ratio of acres of suitable habitat inundated to acres of unsuitable habitat "enhanced" should be clearly stated. Similarly, mitigation measures and the significance level of potential impacts have not yet been developed for several species: Northern spotted owl (*Strix occidentalis caurina*), fisher (*Martes pennanti*), etc. The Department may submit additional comments on later drafts which include a complete analysis of the Project's impacts.

For several species addressed, the Feasibility Report and Technical Reports/Attachments indicate "qualified biologists" will decide on appropriate construction buffers if nest sites are discovered within or adjacent to the Project's construction boundary during pre-construction surveys. The minimum qualifications of these biologists should be identified.

The Feasibility Report clearly does not reflect the results of a comprehensive analysis of effects to species and habitats over the entire project footprint, which includes the primary and extended Project area. The documents, for example, assess impacts to adfluvial salmonids in Shasta Reservoir but not adfluvial salmonids that are in the Sacramento River. It assesses impacts to warmwater species in Shasta Reservoir but not in the Sacramento River, and should include an analysis of changes in warmwater species' response to flow changes. This is an important element due to the predation pressure warmwater species places upon anadromous salmonids and other special status species, such as northwestern pond turtle (*Actinemys marmorata marmorata*). Other species, such as bald eagle, are found both on the Shasta Reservoir and along the Sacramento River, yet the document does not address this species comprehensively. An analysis of the direct, indirect, and cumulative effects to this species, both at the individual and population scale, is needed. Similarly, analysis of anadromous salmonids is fragmented into sections (Sacramento River below Keswick, middle/lower Sacramento River, and Bay/Sacramento-San Joaquin Delta) so that the overall impact to various runs and/or species is not provided, which leads to an inability to assess the overall effects of the Project.

Analysis areas which are suitably "sized" for species with large home ranges were also lacking. For example, restricting the analysis area to the inundation zone for assessing impacts to northern spotted owls is not adequate due to the large home ranges of this species and does not capture the potential for both direct and indirect effects. Since 2000

the Department requested sufficient analysis areas which could extend, depending on the species, beyond the inundation zone.

There are many wildlife resources that are not evaluated at all. For example, impacts to deer *(Odocoileus hemionus columbianus)* habitat and populations are not assessed. In 1984 the Trinity River Basin Fish and Wildlife Management Act (PL 98-541) was signed, authorizing the Secretary of the Interior to develop and implement a management program to restore the fish and wildlife populations in the Trinity River Basin to levels which existed prior to construction of the Trinity and Lewiston dams. The initial phase of the Trinity River Restoration Program included development of a series of action plans. These action plans included five main program goals, one of which addressed the need to compensate for impacts to deer and other wildlife from flooding of habitat and reduced streamflow resulting from diversions to the CVP.

Role and Importance of Tributaries to Sacramento River Health and Dynamic Ecological Processes

The Department has previously requested an adequate assessment of the interrelationship of the Sacramento River to its tributaries, given the potential for flow changes to affect this relationship. The health of the Sacramento River is directly tied to its relationship with its tributaries. Tributaries below Shasta Dam provide water, spawning gravel, sediment, and large woody debris to the Sacramento River in order for it to continue to provide habitat to anadromous fish and other aquatic and riparian-obligate species. Tributaries also can provide a location where anadromous juveniles can rear (Maslin et al. 1999, Snider 2001). Likewise, the Sacramento River provides a conduit through which fish travel in order to reach their natal streams. During high flow conditions, the Sacramento River inundates the lower portions of its tributaries, which affects tributaries' riparian habitats, geomorphological condition, and substrate condition. Because of this relationship, it is crucial to evaluate the role of the tributaries and to more completely explore the condition of tributary watersheds and restoration opportunities in order to maintain these relationships, particularly if management of the Sacramento River changes due to the Project.

It should be more effectively acknowledged in the Feasibility Report and Technical Reports/Attachments that the tributaries supply materials, such as large woody debris and gravel, to the Sacramento River and have, at some level, offset the effects of Shasta Dam on instream habitat quality and quantity. This contribution should be quantified. An evaluation of the dam raise on instream habitat quality and quantity should take into account not only the potential effects of flow changes but also the potential changes in tributary contributions, given their dynamic nature. Watershed ecological processes are not static; if tributaries are deteriorating and/or their contributions to the Sacramento River lessen at some level, it could affect instream habitat of the river itself, which could be exacerbated by the dam raise and subsequent flow changes. Some watersheds are in a degraded condition due to historical and present management, such as Thomes, Cottonwood, Cow, and Battle Creeks.

Because of this, the Department strongly encourages inclusion of restoration efforts to improve tributary contributions and condition.

Control of non-native species such as arundo (*Arundo donax*) and tamarix (*Tamarix chinensis*) along the Sacramento River is another issue in which tributary assessment is important. These species' negative impacts on native plant displacement, effects on bank stability, and channel configuration are well documented in the literature. In order to most effectively manage non-native plant and animal species that use water flow as a means of dispersal, effective management includes finding uppermost areas of infestation and working in a downstream fashion. These two plant species are found on many of the watersheds in the upper Sacramento River. The Feasibility Report should address impacts of the Project on these non-native species.

Analysis of Geologic and Geomorphic Impacts

The Geologic Technical Report needs to be modified to show it meets the standards of practice for geologic reports. This includes identifying a licensed geologist as the preparer of the Geologic Technical Report. This report relies on model results and provides opinions regarding slope stability, future erosion, and potential impacts associated with the proposed Project. Similarly, the Feasibility Report itself does not appear to provide a complete recognition and characterization of the existing geologic conditions and issues, and any costs associated with the issues and needs revolving around geology and geomorphology. Such interpretations and opinions fall under the professional responsibilities of a State-licensed geologist or geotechnical engineer. Such errors render the conclusions and recommendations within the Geologic Technical Report and Feasibility Report suspect.

The Geologic Technical Report does not appear to include an analysis of the volume of sediment that has accumulated behind Shasta Dam since its original construction. Because any dam's effective design life is affected by the rate of sediment accumulation in the reservoir, knowledge of how fast the reservoir is filling is an important parameter with which to evaluate the overall Project. Without an analysis of the volume of accumulated sediment, an important aspect of the proposed Project's long-term effectiveness and environmental impact cannot be fully evaluated. Similarly, the Geologic Technical Report does not appear to include an analysis of the existing environmental impacts that have occurred on the Sacramento River and its primary tributaries since the original construction of the dam. Such impacts appear to include scouring of tributary channels down to bedrock thereby limiting spawning habitat in those tributaries. Additional impacts are described more fully by Buer and others (Buer et. al. 1989). This analysis and description provide a baseline from which to assess impacts of a dam raise on the Sacramento River and its tributaries, particularly those above RBDD. Without an analysis/understanding of the existing and ongoing downstream effects of Shasta Dam on the Sacramento River and its Sacramento-San Joaquin Delta, it is not possible to fully evaluate the potential impacts associated with the proposed Project.

The Geologic Technical Report does not appear to include an analysis of sediment aggradation in the primary tributaries that drain into Shasta Reservoir. In general, the primary reference to sedimentation is with regard to that created by construction activities. Channel aggradation is an important in-stream limiting factor for fish and without such an analysis, the existing and future environmental impacts of the proposed Project cannot be fully evaluated.

Analysis of Impacts to Water Quality and Addressing Abandoned Mines

The Feasibility Report does not adequately address impacts to water quality from abandoned mines, lake shore erosion, and recent wildfires. There is only a minimal discussion of these issues, and mitigation measures are not explored. There are several abandoned mines in and around the Shasta Reservoir area which discharge highly dissolved metals and/or have acid-mine drainage issues. These sites may be in various stages of reclamation. Consequently, it appears that the Feasibility Report is remiss in analyzing the costs of addressing the impacts associated with the abandoned mines and future reclamation efforts.

The Water Quality Technical Report should also discuss and analyze the Total Maximum Daily Load (TMDL) for metals in the Sacramento River below Keswick and should include an analysis of the effects of the Project and any flow management changes on management of the TMDL.

Obligations to the CVPIA and AFRP

The Feasibility Report does not fully acknowledge obligations for restoration as identified within the CVPIA, which was signed into law in October 1992, and AFRP (Service 2001), a program under CVPIA. For example, Page 17 of CVPIA Section 3406(b)(13) states (in part):

> "...Develop and implement a continuing program for the purpose of restoring and replenishing, as needed, spawning gravel lost due to the construction and operation of Central Valley Project dams, bank protection projects, and other actions that have reduced the availability of spawning gravel and rearing habitat in the Upper Sacramento River from Keswick Dam to Red Bluff Diversion Dam in the American and Stanislaus Rivers downstream from the Nimbus and Goodwin Dams, respectively. The program shall include preventive measures, such as re-establishment of meander belts and limitations on future bank protection activities, in order to avoid further losses of instream and riparian habitat..."

The CVPIA redefined the purposes of the CVP to include the protection, restoration, and enhancement of fish and wildlife and associated habitats. The CVPIA identified numerous specific measures and programs to meet the new project purpose and also directed the Secretary of the Interior to operate the CVP consistent with these purposes. There are several AFRP goals and evaluations for the Sacramento River itself which address limiting factors, but this was not articulated within the Feasibility Report or

Technical Reports/Attachments. As a component of the CVPIA, the Feasibility Report should address these actions and evaluations.

We encourage Reclamation to move back to the step of identifying limiting factors for anadromous fish on the Sacramento River (Keswick Dam to the Delta). This has been done in several contexts: CVPIA AFRP Final Restoration Plan; CALFED Record of Decision and associated documents (CALFED 2000b); Sacramento River ecological flows tools effort, developed by the Nature Conservancy (Nature Conservancy et.al. 2008); and the new effort by Reclamation, the Service, its partners, and CVPIA stakeholders to develop a coordinated plan for CVPIA programs. These analyses/tools should be used to better develop a list of actions required to address anadromous fish survival, particularly the elements needed by fish other than flow and spawning gravel.

Relationship to Other CALFED and Water Management Programs

The purpose of the CALFED Program is to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Sacramento-San Joaquin Delta system (CALFED 2000b). To practicably achieve this program purpose, CALFED will concurrently and comprehensively address problems of the Bay-Sacramento-San Joaquin Delta system within each of four resource categories: ecosystem quality, water quality, water supply reliability, and levee system integrity. Important physical, ecological, and socioeconomic linkages exist between the problems and possible solutions in each of these categories. Accordingly, a solution to problems in one resource category cannot be pursued without addressing problems in the other resource categories.

The CALFED Bay-Sacramento-San Joaquin Delta Program recognized early on that its plan must include the means for fully integrating California's water supply system to provide more reliable water supplies and to meet competing needs. As per the Memorandum of Understanding (MOU) on Sites Reservoir (CALFED 2000a), Section 1.6, Integrated Water Development and Management, the parties to this MOU, in addition to proceeding with the planning and environmental review of Sites Reservoir, jointly or separately sought to pursue a broader integrated water supply management and water development program. However, the SLWRI barely mentions Sites Reservoir.

All aspects of the CALFED Program are interrelated and interdependent. More specifically, many of the elements are complementary or directly related to storage. The California Department of Water Resources and Reclamation, in coordination with the Bay-Sacramento-San Joaquin Delta Authority, initiated the Common Assumptions process to develop consistency and improve efficiency among the surface storage investigations. While each of these investigations addresses a unique purpose to meet different combinations of water supply reliability, water quality, and environmental needs, all of the investigations share some common requirements that include completing planning reports and feasibility studies and associated alternatives analyses to comply with CEQA, NEPA, and Clean Water Act Section 404 requirements.

There are also other major existing water resources projects that influence Sites Reservoir and SLWRI planning and its potential capabilities. These projects include Reclamation's CVP, SWP, and the United States Army Corps of Engineers' Sacramento River Flood Control Project. In addition, two ongoing programs in the Central Valley significantly influence the Sites Reservoir Investigation: the CVPIA and the Bay-Sacramento-San Joaquin Delta Program, which is responsible for implementing the CALFED Bay-Sacramento-San Joaquin Delta PEIS/EIR and Record of Decision. Both of these programs also substantially affect the SLWRI and its environmental document preparation and analyses.

Other Plans

The principles and goals of plans pertain to the conservation of natural resources in the Sacramento River valley, including anadromous fish and associated stream and riparian habitats that could be affected by the Project, should be discussed in the Feasibility Report. These plans are directed at restoring, enhancing, and recovering these resources, which have been adversely affected by water supply development and other human activities, and include:

- Central Valley Salmon and Steelhead Restoration and Enhancement Plan (Reynolds et al., 1990);
- 2009 Public Draft Recovery Plan for the Evolutionary Significant Units of Sacramento River winter-run Chinook and the Central Valley spring-run Chinook, and the Distinct Population segment of Central Valley Steelhead (NMFS, 2009b);
- Restoring Central Valley Streams: A Plan for Action (Reynolds et al., 1993);
- Status of Actions to Restore Central Valley Spring-Run Chinook Salmon (Mills and Ward, 1996); and
- Steelhead Restoration and Management Plan for California (McEwan and Jackson, 1996)

We appreciate the opportunity to review the Feasibility Report and the Attachments. If you have further questions regarding our comments, please contact Staff Environmental Scientist Patricia Bratcher at Patricia.Bratcher@wildlife.ca.gov or (530) 225-3845.

Sincerely,

NEIL MANJI
Regional Manager

Attachments

ec: Page 15

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Attachment 1: Shasta Lake Water Resources Investigation Feasibility Report Comment Form, Version December 2013

Reviewer Name: CA Dept. of Fish and Wildlife, Region 1 and Water Branch

Reviewer Email: See Reviewer cells below

Reviewer Agency: CA Dept. of Fish and Wildlife

Reviewer Mailing Address: 601 Locust St., Redding, CA 96001

Date: 1/11/13

Comments on Draft Feasibility Report

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
1	Vorpagel: Jane.Vorpagel@wildlife.ca.gov	Executive Summary	ES	ES-3	4th paragraph	The RBDD facilities are directly adjacent to the Red Bluff Pumping Plant (RBPP), which is currently under construction.	The Red Bluff Diversion Dam Project is nearly completed, and the gates are in a permanent "gates up" position. Please update the document where this is mentioned.
2	Vorpagel	Executive Summary	ES	ES-6	2nd paragraph	One of the most significant factors contributing to the declines is unsuitable water temperature in the upper Sacramento River, especially in dry and critically dry years.	One of the most significant factors contributing to the declines of fisheries is the building of the Shasta Dam which blocked passage up stream to sources of cooler water. This needs to be included as well.
3	Vorpagel	Executive Summary	ES	ES-7	last paragraph	California Department of Fish and Game (DFG)	Global Name change to California Department of Fish and Wildlife (CDFW)
4	Bratcher: Patricia.Bratcher @wildlife.ca.gov	Planning Objectives, Constraints, and Considerations	N/A	ES-10	N/A	Re. use of 2004 and 2005 OCAP BO	The 2008 and 2009 OCAP BO should be used on the SLWRI EIS and FR. It has come to our attention that BOR is using the 2009 OCAP flow requirements in a new round of modeling on the SLWRI EIS. This section should be updated to reflect use of the new BO's.
5	Bratcher	Formulation of Alternative Plans	N/A	ES-15	N/A	Reference to the 2007 Plan Formulation Report	CDFW made comments on the first version of the PFR; we were not allowed to see the third and final version, despite a request to do so. BOR should identify the comments and concerns with the first PFR which were not addressed in the Final (third) PFR.
6	Vorpagel	Executive Summary	ES	ES-18	last paragraph	Of the increased reservoir storage space, about 378,000 acre-feet would be dedicated...for anadromous fish.	Elaborate on how the cold water pool would be used.
7	Bratcher	Formulation of Alternative Plans	N/A	ES-19	N/A	Figure ES-5 and use of SALMOD Model	SALMOD appears to be heavily, if not solely, relied upon to reflect benefits or drawbacks to the various alternatives with respect to anadromous fish response. DFW has made repeated comments about use of SALMOD, which do not appear to have been addressed. DFW requests BOR to proactively address our comments on SALMOD.
8	Bratcher	Formulation of Alternative Plans	N/A	ES-20	N/A	Table ES-2, spawning gravel augmentation	10,000 tons is a paltry amount of spawning gravel. The document should note that BOR is already obligated to inject spawning gravel into upper Sacramento River, as per CVPIA 3406(b)(13), and the gravel augmentation target is never met. The additional 10,000 tons of gravel will do little to address the long-term need for spawning gravel; the amount should be independent of and addition to the CVPIA gravel injection requirement. BOR should consider doing an analysis of the change in flow operations due to additional water, how that may affect gravel routing processes and availability, and then develop a gravel quantity accordingly for a longer period of time.
9	Chad.Dibble@wildlife.ca.gov	Executive Summary	Executive Summary	ES21	Table ES-2 line 8	see comment	The listed increase in outmigrating Chinook salmon should be quanified by a date that the project expects to see the increases by.
10	Vorpagel	Executive Summary	ES	ES-21	ES table 2	Sidr Channel Rearing Habitat Restoration (miles) - - - 0.8 0.8	This does not appear to be much habitat...please elaborate on how it will support all numbers of fish/juveniles that will be outmigrating.

Page 2		Shasta Lake Water Resources Investigation Feasibility Report Document Form--Draft Feasibility Report						
11	Vorpagel	Executive Summary	ES	ES-21	ES table 2 line 19	Riparian, Floodplain, and Side Channel Habitat Restoration (acres)	Almost 3 acres... This is not much, especially considering the acres of tributary riparian habitat which will be lost during the "Shoreline Enhancement, 130 acres."	
						- - - 2.9 2.9		
12	Vorpagel	Executive Summary	ES	ES-21	ES Table-2 Line 13	Increased Firm Water Supplies SOD (TAF/year)3 66.8 85.3 103.8 66.8 103.8	Please identify how this compares to the increased storage amount.	
13	Bratcher	Formulation of Alternative Plans	N/A	ES-23	5	CP4 would generate 563.3 million in net benefits.	General comment; the amount of net benefit is all based upon CALSIM runs using the 2004 OCAP BO flow requirements, so the new cost benefit info may be totally different. This essentially makes the entire Feasibility Study inaccurate and should be completely redone.	
14	Vorpagel	Executive Summary	ES	ES-27	ES Table 4	% of Total Construction Cost 12.4% 18.6% 61.2% 7.9% 100.0%	Please identify if this is what will be charged to fish/natural resource funding.	
15	Bratcher	Implementation Considerations	N/A	ES-29	N/A	Special Status Species	There are other critical special status species that could be affected (e.g. Delta Smelt). Document and analysis needs to fully evaluate the effects to these species and/or special habitats, as well as identify ways in which adverse effects could be minimized as well. In addition, the benefit to one species may result in a negative effect on another species (e.g. winter-run Chinook and bank swallow). This also needs to be evaluated.	
16	Bratcher	Implementation Considerations	N/A	ES-30	N/A	McCloud River	Please see our cover letter for the Department's position on the McCloud River. In addition, details about what Westlands Water District and/or other agricultural interests may obtain as a result of a dam raise needs to be fully disclosed within the FR and EIS, especially if they are subject to CEQA and CESA.	
17	Vorpagel	Executive Summary	ES	ES-31	Forth Paragraph	Water rights for the expanded Shasta Reservoir, which are appropriated by the SWRCB...	This almost sounds like a claim would be filed for the "extra" storage before the project can be operated. However, the water is already over allocated. This water should be considered for use as reserve water for instream beneficial uses, including a 1707 dedication.	
18	Vorpagel	Executive Summary	ES	ES-32	2nd to last bullet	Potential effects on Central Valley hydrology below CVP and SWP facilities...	Please identify if there will there be impacts below other dams when more flow is used from Shasta to meet instream flows downstream and in the Delta. These should be evaluated.	
19	Vorpagel	Executive Summary	ES	ES-33	last paragraph	If recommended for implementation, Reclamation and/or future project partners or beneficiaries would perform...	These will be required based on new BO. Please identify how BOR is transferring those studies and costs to future partners.	
20	Vorpagel	Executive Summary	ES	ES-34	Table ES-6	SWRCB Amended Water Right • Application • Draft (possibly final) environmental compliance documents	It appears that BOR would need to apply for the additional storage...CDFW recommends consideration of using 1707, instream beneficial use, not irrigation. This may create a situation where the State Board would be lead for CEQA.	
21	Bratcher	Federal Responsibilities	N/A	ES-34	N/A	Table ES-6	CDFW has previously provided additional Fish and Game Code sections which may apply. Please see earlier comment letters and/or correspondence.	
22	Dibble	Executive Summary		ES37		See bullet 2	See JDR comment on 3-6 & 3-7 below	
23	Vorpagel	Executive Summary	ES	ES-37	3rd paragraph	To date, one comprehensive plan (CP4) has been analyzed for financial feasibility-...	This will need to be re-evaluated with requirements found in the new BO's.	

Row #	Central Valley Water Resources Investigation Feasibility Report Comment Form--Draft Feasibility Report						
24	Vorpagel	Chapter 1, Introduction	1	1-4	3rd paragraph	Anadromous Fish Survival. The population of Chinook salmon in the Sacramento River has significantly declined over the last 40 years (DFG 2010).	Please start the sentence with, "...Since the building of the Shasta Dam, the population..."
25	Vorpagel	Chapter 1, Introduction	1	1-4	3rd paragraph	As with other Sacramento-San Joaquin Delta (Delta) tributaries, water temperature...especially in dry and critically dry years1.	Please make the following change (in bold): "As with other Sacramento-San Joaquin Delta (Delta) tributaries with dams, water temperature..."
26	Vorpagel	Chapter 1, Introduction	1	1-4	2nd to last paragraph	...the need for additional flood protection along the upper Sacramento River.	This appears to be overstated. More information is needed on the current concern regarding floods and their affect downstream. Please identify how often Shasta Dam spills.
27	Vorpagel	Chapter 1, Introduction	1	1-6	3rd paragraph	Keswick Reservoir also receives inflows from Whiskeytown Reservoir on Clear Creek.	Add language: "...Which receives water from Trinity Reservoir..."
28	Vorpagel	Chapter 1, Introduction	1	1-6	3rd bullet from bottom	Lower reaches of three primary tributaries flowing into Shasta Lake (Sacramento, McCloud, and Pit rivers) and all smaller tributaries flowing into the lake...	The document must fully address impacts from metals in the smaller tributaries. These seem to be overlooked throughout the document.
29	Vorpagel	Chapter 1, Introduction	1	1-6	2nd bullet from bottom	Trinity and Lewiston reservoirs	Please identify potential changes in operation to the Trinity River, as a result of a Shasta Dam raise.
30	Vorpagel	Chapter 1, Introduction	1	1-7	1st paragraph	The RBDD is directly adjacent to the Red Bluff Pumping Plant (RBPP), which is currently under construction.	Please update the RBDD sections.
31	Vorpagel	Chapter 1, Introduction	1	1-11	3rd paragraph	Most of the outflow from Shasta Dam travels south...to the Pacific Ocean through San Francisco Bay. The CVPIA also addresses the operational flexibility of the CVP...and improved water conservation.	This may have been a correct statement historically. Exportation from the Delta or the irrigation uses should also be mentioned and discussed.
32	Vorpagel	Chapter 1, Introduction	1	1-12	3rd paragraph		The amount of transfers needs to be identified, relative to how much comparable conservation is occurring.
33	Vorpagel	Chapter 1, Introduction	1	1-14	1st bullet	Construction on the RBDD began in April 2010.	Please update the RBDD sections.

Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Draft Feasibility Report								
2nd ¶								
34	Vorpagel	Chapter 1, Introduction	1	1-19	1st paragraph	Analysis and conclusions presented in the 2009 California Water Plan Update...	The 2009 California Water Plan is currently being updated (2013). Please identify if there are new locations of use.	
35	Vorpagel	Chapter 1, Introduction	1	1-19	2nd paragraph	...the Delta Stewardship Council is developing a Delta Plan. In November 2011, the council published... to serve as a basis for future findings of consistency by State and local agencies with regard to "covered actions."	Please identify if this is the same document as the recent Bay Delta Plan, which was being evaluated in fall, 2012. If so, please update this section to reflect more recent changes to the BDP.	
36	Vorpagel	Chapter 1, Introduction		1-21	1st paragraph	The Program Plan also addressed the California Public Resources Code's protection of the McCloud River... but also provides for investigations for potential enlargement of Shasta Dam.	The CALFED document identified a dam raise of 6 to 8 feet. Please see other comments on the McCloud River in this spreadsheet and the comment letter.	
37	Vorpagel	Chapter 1, Introduction	1	1-21	5th paragraph	The CALFED Storage Program Preferred Program Alternative includes a proposed 6.5-foot raise of Shasta Dam which would expand the reservoir by approximately 256,000 acre-feet.	If the CALFED document is being used to identify and/or quantify the level of impacts, it can only be used for the 6.5 dam raise alternative.	
38	Bratcher	Federal/State	Introduction	1-24	N/A	Bay-Delta Conservation Plan	The BDCP has gone through several iterations since this version of the Feasibility Report was prepared. Please review and update the BDCP section as needed. Please also consider adding the Bay Delta Plan as another item/project that needs to be addressed and/or considered.	
39	Vorpagel	Chapter 1, Introduction	1	1-26	1st paragraph	Modifications of Shasta Dam and Reservoir could allow for increased system flexibility ...increases in water supply reliability.	There are no mention of impacts of reduced flows through the Delta, please elaborate.	
40	Vorpagel	Chapter 1, Introduction	1	1-27	1st paragraph	To the east are the Fall River and Pit River RCDs, and to the west and north are the Trinity County and Shasta Valley RCDs.	The Shasta Valley RCD is not a part of the Sacramento River system. The Shasta River flows to the Klamath.	
41	Vorpagel	Chapter 1, Introduction	1	1-27	2nd paragraph	Other Programs and Private Organizations	Also include the Churn Stillwater Creek Alliance.	

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Page #							
42	Bratcher	"Water and Related Resources Problems, Needs, and Opportunities	2	2-3 to 2-4	N/A	Although some fluctuations occur from year to year, the overall trend for the past 10 years...	DFW does not believe this is true. While populations showed increases in the mid 2000's to as large as 15 to 17 thousand fish, the populations since then have not rebounded as hoped and remain less than 5 thousand for the past six years. Go to http://www.fws.gov/stockton/afrp/ to review Grandtab and ChinookProd tables, which currently contains data through the 2011 spawning season.
43	Vorpagel	Chapter 2	2	2-4	3rd paragraph	Although some fluctuations occur from year to year, the overall trend ...This increasing trend in salmon populations is likely due primarily to minimum release requirements at Shasta Dam, and to the TCD.	See other comments. The winter-run population is not in an increasing trend. There should possibly be mention of the Livingston Stone Hatchery at the base of the dam.
44	Vorpagel	Chapter 2		2-10	2nd paragraph from bottom	Additionally, development of additional water sources and increased storage... to maintain adequate supplies for agricultural and environmental purposes.	The impact of filling in of the system reservoirs with sediment is not mentioned, and/or how that changes the storage capacity.
45	Vorpagel	Chapter 2		2-11	2nd paragraph	For example, Shasta Lake is home to the largest concentration of nesting bald eagles in California, with 18 pairs nesting within 0.5 miles of the shoreline in any given year.	The impacts of inundating all those nesting trees needs to be adequately and completely assess. Impacts to trails like Clickapuit should also be addressed.
46	Vorpagel	Chapter 2		2-14	1st paragraph	Accordingly, there is a need to review flood control operations at Shasta Dam.	Comment for your consideration: While floods may have negative impacts upon man-made structures, flooding is a natural occurrence in rivers and acts to maintain ecosystem functions for a diverse number of species.
47	Vorpagel	Chapter 2	2	2-14	last paragraph	The Sacramento River downstream from Keswick Dam is critical habitat...and the Delta is one of the largest ecosystems for fish and wildlife habitat and production in the United States	Please identify the geographic extent of critical habitat and whether or not it includes the Delta.
48	Vorpagel	Chapter 2	2	2-15	2nd paragraph	Planning efforts, such as the BDCP, are intended allow implementation of projects...in the Delta to proceed within a stable regulatory framework.	Typo, need to add the word "intended to protect..."

Page 6		Shasta Lake Water Resources Investigation Feasibility Report				Comment Form - Draft Feasibility Report	
49	Vorpagel		2	2-15	last paragraph	The information used to assess existing and future resources conditions for water operations was developed in 2006... described in the 2004 OCAP BA (Reclamation 2004c) and the Coordinated Operations Agreement...	See comments about use of these older documents.
50	Vorpagel	Chapter 2	2	2-22	1st paragraph	The shoreline below full pool elevation is generally steep and devoid of vegetation that might otherwise help stabilize soils.	This could be a major impact with the raising of the dam. Shoreline processes, including wave action and changing reservoir levels, along with stormwater runoff will provide a constant mechanism by which soil in the new area of inundation can be constantly eroded and sediment transported into the lake resulting in elevated levels of suspended sediment and turbidity. These impacts seem to be downplayed throughout the document.
51	Vorpagel	Chapter 2	2	2-22	2nd paragraph	Shasta and Keswick dams have a significant influence on sediment transport...	See earlier comment about the filling of the reservoir with these sediments. This should be addressed.
52	Vorpagel	Chapter 2	2	2-22	2nd paragraph, last sentence	The river channel in the reach from Keswick Dam to RBDD is constrained by erosion-resistant formations and therefore is more stable.	This portion of the river is the major location for salmon spawning and therefore needs major spawning gravel injection to mitigate for the loss of sediment transport.
53	Vorpagel	Chapter 2	2	General comment			It took 6-9 years for the lake to fill. The act of reservoir filling may haveimpacts on fish, such as limiting options for augmenting flows for fall-run Chinook, steelhead, and late fall-run Chinook to avoid redd dewatering and/or provide habitat.
54	Vorpagel	Chapter 2	2	2-27	Table 2-7	1945-1952	Earlier section discussed large meandering belt along the Sacramento River, but that is not really accurate. This section is probably the more accurate statement. Perhaps the meandering belt is historic? Please elaborate.
55	Vorpagel	Chapter 2	2	2-28	2nd paragraph	Levees associated with the Sacramento River Flood Control Project begin intermittently downstream from the RBDD...	Check most current 303 d list 2008-2010. It is also listed for unknown toxicity and further down for pesticides. Pesticides are addressed in next paragraph.
56	Vorpagel			2-28	3rd paragraph	The Central Valley Regional Water Quality Control Board (RWQCB) determined that the 25-mile-long reach....is impaired because levels of dissolved metals periodically exceed levels identified to protect aquatic organisms (CVRWQCB 2002a).	This section needs to be significantly elaborated upon. The impacts of raising the dam will include the inundation of other abandoned mines.

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57	Vorpagel	Chapter 2	2	2-30	2nd paragraph	Of these, Bully Hill is the closest abandoned mine to the current shoreline...	A complete species list for all the impacted areas is needed, as well as a more recent search of the California Natural Diversity Data Base. It may be covered in appendixes, but it should be mentioned here also.
58	Carlson; Jennifer.Carlson@wildlife.ca.gov	FR - Water Resources and Related Conditions	2	2-32		Wildlife	The list of species presented should include which type of species instead of using generic terms like quail, falcon, hawk (these are not really species names). Then the second sentence refers to specific species like Hutton's vireo, warbling vireo, etc. When listing species, there should be some consistency in how they are listed. The list is not complete either - what about fishers, ringtail cat, coyotes, etc?
59	Bratcher	Existing Conditions Summary	2	2-33	N/A	Elk	Elk are currently present in the upper watershed and surrounding area. The two species in the region is Roosevelt and Rocky Mountain Elk. There are roosevelt elk west of the lake in the Douglas City area - they were transplanted there in 1999. North and east of the lake there are Rocky Mountain elk, and their populations are doing well also. These elk do not frequent the immediate Shasta Lake area, however.
60	Bratcher	Existing Conditions Summary	2	2-34	N/A	The CALFED Program Plan (CALFED 2000b) concluded that although Section 5093.542...	See Departmental comments about analysis of effects on the McCloud River in the comment letter.
61	Vorpagel	Chapter 2	2	2-34	1st paragraph	DFG has taken the position that it must participate in preparing the EIS to comply with Section 5093.542(d).	See Departmental comments about analysis of effects on the McCloud River in the comment letter.
62	Vorpagel	Chapter 2	2	2-37		USFS maintains...	Ramps would have to be removed and relocated. As per CDFW requirements, you cannot leave asphalt where it can enter the waters of the State. There are also walking and horse trails which could be impacted by the dam raising.
63	Vorpagel	Chapter 2	2	2-39	1st paragraph	The UPRR main line follows the I-5 alignment and crosses Shasta Reservoir at the Pit River Bridge.	It may cross at other locations further north; please verify.
64	Vorpagel	Chapter 2	2	2-39	2nd paragraph	Many areas scattered throughout Shasta and Tehama counties are served by individual septic systems.	Would the raising impact any gas lines? Please elaborate.
65	Vorpagel	Chapter 2	2	2-40	3rd paragraph	Prominent examples include the State of California's Delta Plan and the BDCP	Sites Reservoir (North of Delta Offstream Storage) should also be discussed/mentioned. That could be a major impact on water available to fill the larger Shasta.
66	Bratcher	Existing Conditions Summary	2	2-41	N/A	Accordingly, populations of anadromous fish are expected...	Identify rationale behind this statement, esp. in the context of BDCP, ocean conditions, the decline of the Bay Delta, or other elements that has resulted in recent declines in populations.

Page 8		Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Draft Feasibility Report					
67	Bratcher	Rationale for Use of 2004 Biological Assessment for Water Operation Models	2	2-42	N/A	Use of the 2004 OCAP BO	This page also mentions the 2004 OCAP BO. See CDFW's comments about its use in the summary letter.
68	Bratcher	SLWRI-Specific Planning Objectives	3	3-4	N/A	Reference to the 2000 CALFED ROD	CDFW has made repeated requests to address compliance with CALFED ROD. Discussion regarding compliance with the CALFED ROD, ASIP, and MCSC still needs to occur.
69	Bratcher	SLWRI-Specific Planning Objectives	3	3-5	N/A	Reference to the 2000 CALFED ROD	Same comment as row 22.
70	Roberts: Jason.Roberts@wildlife.ca.gov	Plan Formulation	3	3-6 & 3-7	unknown	see comment	"Modeling studies will be updated...incorporated into future SLWRI documents" The modeling used for this document is outdated and needs to be updated. Sections of the document (as a whole) use updated information, while other sections such as modeling use outdated assumptions. The 2004 BiOp is outdated. The 2008 and 2009 BiOps should be the baseline for this document. Additionally, many modeling scenarios and evaluations have been developed through BDCP, which would most likely provide some useful information for this project.
71	Vorpagel	Chapter 3	3	3-8	3rd bullet	Alternatives that require future and ongoing action specific for success have a higher uncertainty than other plans.	Please identify how long will it take to fill the new reservoir space.
72	Vorpagel	Chapter 3 Management Measures	3	3-10	Table 3.1 8th	Although existing TCD at Shasta effectively meets objectives, potential may exist to further modify the device...	The temperature objectives are not always met. There is work which could be done to the TCD which would improve it, but those tasks are not necessarily tied to the raising of the Dam (as implied here).
73	Bratcher	Chapter 3 Management Measures	3	3-11		Table 3-1	While some of these management measures have been deleted from further consideration, they may prove useful when considering mitigation requirements/needs.
74	Bratcher	Management Measures	3	3-11		Table 3-1: Deleted: Construct a migration corridor from the Sacramento River to the Pit River	Any discussion of restoring fish above Shasta Dam should be updated to reflect the current status of that option, within the context of the 2009 OCAP BO, the Draft NMFS Recovery Plan, and BOR-generated analyses of that issue. To the extent that design has been completed, installation of structures to manage juveniles associated with the above rim dam relocation project needs to be mentioned and addressed within the SLWRI EIS.
75	Vorpagel	Chapter 3		3-12	Table 3.2 8th box	Extremely high cost for a very small potential benefit and severe environmental impacts.	Identify how much sediment is behind Shasta Dam.
76	Vorpagel	Chapter 3	3	3-18	Table 3.4	Reoperate reservoir for recreation	Please identify how this and reservoir reoperations will impact fish below the dam and the need for natural flood processes, including filling the reservoir.
77	Vorpagel	Chapter 3	3	3-19	3rd paragraph	(4) coordinated operation and precipitation enhancement.	Please identify how precipitation enhancement and reoperations will address surface water quality.

Page 9		Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Draft Feasibility Report						
78	Vorpagel	Chapter 3	3	3-20	2nd paragraph	These included (1) updating Shasta Dam and Reservoir flood management operations... the second measure...was subsequently eliminated from further consideration;	Whenever water is withdrawn, metals in the reservoir pool must be considered. They are at various levels at various times of the year. Phil Woodward at the Regional Board in Redding has studied this extensively.	
79	Vorpagel	Chapter 3		3-21	5th paragraph	Side channels and other features could be created to encourage spawning and rearing.	State Lands has some major issues with restoration projects... discuss this with Andrew Jensen for more current update of problems caused by trying to work with the State Lands Commission, which owns the lands under rivers. This is a major glitch or obstacle in this measure which may need to be resolved at upper management levels.	
80	Vorpagel	Chapter 3		3-22	1st	This measure would not be expected to conflict with other known programs or projects on the upper Sacramento River.	Discuss with State Lands Commission. They seem to have serious conflicts with these types of projects	
81	Vorpagel		3	3-22	2nd paragraph	Suitable spawning gravel has been identified as a potential limiting factor in the recovery of anadromous fish populations on the Sacramento River.	The document should mention existing amounts of gravel already required, timing of injections, current success and what would be the additional amount of gravel required because of this project. Also discus the costs associated with gravel augmentation.	
82	Vorpagel		3	3-22	2nd paragraph	Structural treatments may be required below Keswick Dam to prevent the gravel from being washed downstream.	See State Lands concern above.	
83	Vorpagel		3	3-22	2nd paragraph	Hydraulic and geomorphic evaluations are needed to determine the most effective gravel size distribution and the most appropriate locations for gravel placement.	To some extent these studies have already been done for the existing gravel projects and/or in other studies, but it was either a while ago or was uncomplete. We already know what size most appropriate for salmonids and have picked out injection sites.	
84	Vorpagel		3	3-23	last paragraph	Further, the measure could help provide additional control and dilution of acid mine drainage from Spring Creek.	The acid mine drainage from Iron Mountain Mine should not be used as a rationale for this project. That issue has been remedied. More metals are coming from the other abandoned mines around Shasta Lake and the raising of the dam will exacerbate those discharges. The so called "dilution" water from Shasta Lake is at times more contaminated than the current discharges from Iron Mt Mine or Spring Creek Reservoir. Raising the dam would create additional sources of metals.	
85	Vorpagel		3	3-24	3rd paragraph	The goal of the operation changes would be to minimize required evacuation of the reservoir...	Caution, may impact fish in downstream river.	

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86	Vorpagel		3	3-24	4th paragraph	The 2009 California Water Plan Update identified a host of urban and agricultural water use efficiency measures (DWR 2009).	While these measures were identified, they were generally described and did not go into enough detail as to how much water would be saved and/or specifically where it would be implemented.
87	Vorpagel		3	3	3-25	last paragraph	The lower reaches of intermittent and perennial streams tributary to Shasta Lake that support aquatic organisms native to the upper Sacramento River would be targeted...	There is no mention of the major tributaries with acid mine drainage. This issue is not properly addressed in this document.
88	Vorpagel		3	3	3-26	1st full paragraph	A limited amount of land contouring and imported fill material would be required...	Contact Andrew Jensen (CDFW Redding) about State Lands Commission issues with rehabilitation projects.
89	Vorpagel		3	3	3-26	4th paragraph	Potential methods to improve flood management would include improved long-range weather forecasting...and modifying target peak flows at Bend Bridge.	Ramping rates to reduce stranding of fish should also be confirmed and/or developed.
90	Vorpagel		3	3	3-26	1st paragraph	On occasion, however, outflows during flood operations are made through the flood control outlets and over the spillway.	Please identify how often a spill has occurred in the last 50 years.
91	Vorpagel		3	3	3-28	3rd paragraph	Shasta Dam has the ability to provide increased releases and high flow releases to reestablish Delta water quality.	The document must disclose what impacts the use of Shasta water would cause to other rivers which are used to meet Delta Water Quality objectives. An example: if we are meeting Delta flow requirements with Sacramento River water, what happens to the flows below Folsom Dam or Oroville Dam?
92	Vorpagel		3	3	3-28	3rd paragraph	Improved Delta water quality conditions could provide benefits...by potentially increasing Delta outflow during drought years, and reducing salinity during critical periods.	Lowered water quality may exist due to inundation of abandoned mines and additional turbidity caused by waves eroding new higher water line, which would not have vegetation to protect it from erosion due to the fluctuation of water levels. This entire subject is not addressed in the document.
93	Bratcher	Refinement of Anadromous Fish Survival Focus Alternative	3	3	3-37		Table 3-7; reference to 378,000 additional acre feet of water	Document should clearly reflect that this is an additional amount of water ABOVE what is already maintained to provide cold water for anadromous fish in the Sacramento River below Keswick Dam.
94	Vorpagel		3	3	3-39	last sentence	All comprehensive plans also provide for modernization of recreation facilities.	Asphalt boat ramps should be removed and replaced using concrete. Impacts to trails around the lake, such as Clickapudi, should also be evaluated.

Page 11		Shasta Lake Water Resources Investigation Feasibility Report Continued Joint Draft Feasibility Report						
95	Vorpagel		3	3-40	1st sentence	All alternatives could contribute to improved Delta water quality conditions and Delta emergency response	Please define Delta emergency response? This statement does not account for increase of metals from flooding old mines nor the increase in turbidity from wave action on exposed reservoir sides.
96	Vorpagel		3	3-44	1st sentence	The following is a description of the No-Action alternative, representing a scenario in which...	Sentence does not appear to make sense.
97	Vorpagel		3	3-50	Table 3-11	All CPs replace reservoir area septic systems with centralized wastewater treatment plants	That appears to be a large cost item. Please elaborate.
98	Vorpagel		3	3-54	1st paragraph	This action would contribute to replacement of supplies redirected to other purposes in the CVPIA...	Please define annual yield.
99	Vorpagel		3	3-57	Table 3-14	Impact WQ-4: Long-Term Sediment Effects That Would Cause Violations of Water Quality Standards...	The storm water pollution plan would not be able to address the entire new "ring" around the reservoir which would erode for years and years. There is therefore the potential for violating basin plan standards for turbidity and suspended sediments.
100	Vorpagel		3	3-57	Table 3-14	Impact WQ-6: Long-Term Metals Effects ... Mitigation Measure WQ-6: Prepare and Implement a Site-Specific Remediation Plan...	The impacts from those mines appear to be downplayed. The mine owners have tried for years to clean up these sources of contamination. Make sure the costs of this are represented in this documents. There is also no mention of the fact that Shasta Lake is listed for mercury on the SWRCB 303d list.
101	Vorpagel		3	3-66	2nd paragraph	The primary difference in the reservoir area would be that during extended drought periods...	Please elaborate on why this is the primary difference.
102	Vorpagel		3	3-66	2nd paragraph	Figure 3-5 shows the changes from existing and future conditions for a dam raise of 6.5 feet for a representative period of 1972 through 2002.	Please provide a comparable figure for the 18.5 foot raise.

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103	Bratcher	Adaptive Management of Cold Water Pool	3	3-86		Reclamation would manage the cold-water pool each year in cooperation with the SRTTG.	The SRTTG does not conduct monitoring. When last discussed at any level of detail (in 2008), the process under which this water was to be managed had not been clarified in a group setting. For more information on the role of the SRTTG, refer to the 2008 NMFS OCAP BO. The dedicated pool may be used beyond its role as a cold water source (e.g. fallflows for fall-run spawning, cottonwood recruitment). Please look at the draft of the CAR last worked on by Joseph Terry (USFWS) and other documents to support the original intent and plans for management. During PCT meetings in the last two+ years, CDFW has repeatedly requested that this be discussed, but this has not been acted upon by BOR.
104	Bratcher	Augment Spawning Gravel in the Sacramento River	3	3-84		Gravel augmentation would occur at one to three locations every year...On average, 5,000 to 10,000 tons of gravel would be placed each year...	This is vague and inconsistent with other mentions of this topic in the FR. The FR stated earlier that hydraulic and geomorphic investigations need to occur to determine the best approach to gravel augmentation. In addition, BOR needs to commit to an amount each year and clarify the conditions under which the injection may not occur.
105	Roberts	Plan Formulation	3	3-84	unknown	see comment	*"This alternative may also include development...impacts to water supply reliability."* The second sentence of the 'Adaptive Management of Cold-Water Pool' section does not accurately reflect the goal of CP4. The 378k acre feet of water is specifically for anadromous fish survival and very well could have conflicts with water supply reliability for that specific quantity of increased storage. Suggested Edit: Remove discussion of 'no conflicts with water supply reliability'.
106	Bratcher	Increase Anadromous Fish Survival	3	3-86		Reclamation would manage the cold-water pool each year based on recommendations from SRTTG... the computer model SALMOD was upgraded to evaluate changes in Chinook salmon population	See earlier comments about use of the SRTTG and how the dedicated pool amount should be correctly interpreted.
107	Bratcher	Increase Anadromous Fish Survival	3	3-86		Modeling with SALMOD showed increases in production of Chinook salmon populations, especially winter-run and spring-run Chinook	Please see other comments CDFW has made on this and other SLWRI documents with regards to spring-run Chinook on the mainstem Sacramento River.
108	Bratcher	Increase Anadromous Fish Survival	3	3-87		Gravel augmentation would occur on average at one or more locations...and, on average, 5,000 to 10,000 tons of gravel would be placed each year...	See earlier comments about gravel augmentation needs and requirements.
109	Roberts	Plan formulation	3	3-87	unknown	see comment	*"The majority of increased flow yield...would be for south-of-Delta agricultural and M&I deliveries"* The sentence needs to be reworded to include CVPIA Refuge Water Supply (Section 3406(d)). Suggested Edit: '...would be for south-of-Delta agricultural, M&I and CVPIA refuge water supply deliveries.'

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110	Bratcher	Increase Anadromous Fish Survival	4	4-2		Anadromous fish benefits were computed though multiplying the per habitat unit benefit estimate ...	CDFW has made numerous comments regarding the use of SALMOD. In addition to the summary letter associated with this review, please note earlier comments in the 2008 letter about quantifying benefit and the challenges placed therein when using SALMOD.
111	Vorpagel		4	4-2	4th paragraph	The underlying premise for the valuation approach is that increasing salmon populations...	Consider placing a value on the commercial fish, and the financial benefit of recreation days for fishing.
112	Vorpagel	Water Quality	4	4-12	Table 4-8 WQ	Long-term beneficial effects to reservoir water quality due to replacement of reservoir area septic systems with centralized wastewater treatment plants. Short-term adverse effects...	We disagree; the water quality in Shasta Lake will be significantly degraded due to suspended sediments from the "new" ring of exposed soils and wave action. Additionally the inundation of abandoned mines within Shasta Lake will create additional metals problems. The septic tanks being replaced by treatment facilities will be a very large expense, for a minimal benefit. Shasta Lake is also listed on the 303d list for mercury. This project will not change that fact.
113	Bratcher	Environmental Quality	4	4-15		Table 4-8 McCloud River	See earlier comments and summary letter regarding CDFW input on effects to the McCloud River.
114	Roberts	Preliminary Proposed Plan and Implementation Requirements	5	5-19	unknown	see comment	Water System Operations Analysis needs to be updated with current modeling, constraints, and BiOps (see JDR comment on 3-6 &3-7 above)
115	Roberts	Preliminary Proposed Plan and Implementation Requirements	5	5-20	unknown	see comment	Paragraph 4 describes how the document will be updated, these updates need to be incorporated
116	Roberts	Preliminary Proposed Plan and Implementation Requirements	5	5-20 & 5-21	unknown	see comment	Analysis of 2008 USFWS and 2009 BO RPA section of Chapter 5 needs to be updated. Judge Wanger issued his rulings on these BiOps. Update the text to reflect his ruling. Furthermore, both BiOps were not fully remanded, the text is not accurate and misleading.
117	Carlson	Off-Site Mitigation for Impacts on Biological Resources	5	5-26	Carlson	Details about off-site opportunities to mitigate impacts on biological resources in the primary study area are not yet available.	Details about the cost of mitigation and the potential effects of a project would seem essential to be included in a Feasibility Report. It is impossible to assess this document and the project's feasibility without complete information.
118	Roberts	Preliminary Proposed Plan and Implementation Requirements	5	5-27	unknown	see comment	The last paragraph of page 5-27 needs to be updated. The 2004 BiOp is outdated. The 2008 and 2009 BiOps should be the baseline for this document.
119	Carlson	Off-site Mitigation Development	5	5-28	Carlson	Preliminary cost allowances have been prepared based on these initial investigations. As the SLWRI progresses,	See comment above. These costs should have been included within this document to allow agencies review of their validity.

Shasta Lake Water Resources Investigation Feasibility Report Comment Form--Draft Feasibility Report

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120	Vorpagel		5	5-32	Table 5-5	Fish and Game Code Section 1602 application	CDFW code 1602 should be included on this list.	
121	Vorpagel		5	5-32	Table 5-5	State Lands cost $25	Please confirm the cost.	
123	Vorpagel		5	5-34	Table 5-6	Laws, Policies, and Plans	Fish and Game code 5650 needs to be added to this list, and the code section 1505 (protecting the spawning gravel below Keswick)...	
124	Vorpagel		5	5-34	First set bullets	Advanced Planning and Design Activities	The project needs to include a cleanup plan for the abandoned mines which will be inundated, as well as a stormwater prevention plan.	
125	Vorpagel		5	5-35	Table 5-7.	Table 5-7. Potential Federal and Non-Federal Responsibilities for Various Project Component O&M	Abandoned mine remediation must be addressed more ully.	
126	Roberts	Global	Global	Global	Global	see comment	When discussing SOD deliveries CVPIA refuge water supply, Section 3406(d) must be included.	

Attachment 2	Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Version December 2012							
Reviewer Name:	Andrew Jensen, M.S., and Patricia Bratcher							Draft Fisheries and Aquatic Ecosystems Technical Report
Reviewer Email:	andrew.jensen@wildlife.ca.gov; patricia.bratcher@wildlife.ca.gov							
Reviewer Agency:	CA Dept. of Fish and Wildlife							
	601 Locust St., Redding, CA 96001							
Date:	3/10/13							
ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT	
1	Jensen	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-3	2nd Paragraph	increased storage and the corresponding increase in surface area results in a greater total biomass and a greater abundance of plankton and fish, because available habitat area is increased.	Broad statement that is unsubstantiated, and does not take into account the loss of biomass that currently exists within the footprint of the increased storage area.	
2	Jensen	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-3	2nd Paragraph	Riffle habitat with gravel substrates and deep pool habitats are abundant in comparison with downstream reaches, although the habitats are still insufficient to support...	This is not necessarily true. Provide supporting documentation/sources.	
3	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-4		This reach provides much of the remaining spawning and rearing habitat of several listed anadromous salmonids, even though the amount of gravel available is insufficient.	Paragraph info seems contradictory; it first says it contains gravel needed for spawning, but then says the amount of gravel is insufficient.	
4	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-5	2nd Paragraph	varying widths, and aquatic habitats consist of shallow riffles, deep runs, deep pools at the bends, glides in the straight reaches, and shallow vegetated floodplain areas that become inundated during	IN the Red Bluff to Colusa reach, there are some levees and/or riprapped areas that have affected river meander. See the bank swallow study information, the TNC Sacramento River study, NODOS studies, and the Army Corps of Engineers Phase II Sacramento River Project for more information.	
5	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-8	1st Paragraph	Sacramento-San Joaquin Delta	To whatever extent it may be needed, this section and other sections discussing the lower Sacramento River should be updated to reflect existing conditions within the BDCP documents.	
6	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-15	1st Paragraph	Increased storage and the corresponding increase in surface area results in a greater total biomass and a greater abundance of plankton and fish...	This has already been commented on above. This is not necessarily true. Additional modeling of the cold water pool and possible changes in stratification, as a result of different dam raises and water outflow management, should be conducted to truly assess quantifiable changes to habitat and population response within the reservoir.	

Page 2

Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Fisheries and Aquatic Ecosystems Technical Report

		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-19	2nd Paragraph	Most of the lower gradient, potentially fish-bearing reaches of tributary streams to Shasta Lake are near their confluence with the reservoir...		
7	Jensen						Increased storage height will likely result in the loss of the currently available lower gradient habitat, fish bearing reaches within the tributary streams.	
		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-20	First paragraph	Misspelling	The scientific name of golden shiner is misspelled (chrysoleucas, not chrysoleucus)	
8	Baumgartner							
		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-33	2nd Paragraph	Redd Bluff Diversion Dam	The operation of the RBDD needs to be updated wherever this is mentioned. It is permanently in a gates up position.	
9	Bratcher							
		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-33	2nd Paragraph	In recent years, changes to RBDD gate operations have been made to provide improved access for upstream and downstream migrating winter-run Chinook salmon.	De-watering of redds due to rapid flow release decreases from Shasta Dam in the fall also has a detrimental impact on winter-run Chinook, as well as the other runs of Chinook.	
10	Jensen							
		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-33	3rd paragraph	The NMFS biological opinion (BO) for winter-run Chinook salmon (NMFS 1993a)...	This should further be elaborated upon to identify the requirements of the 2009 NMFS OCAP BO.	
11	Bratcher							
		Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-34	2nd Paragraph	Spring-Run Chinook Salmon	The Department previously commented on the issue of Spring-run Chinook salmon in our 2008 comment letter, stating that Region 1 has determined that due to the question of genetic integrity of spring-run in the upper Sacramento River, it is not worth including them in the analysis for this project. The extent of spring-run Chinook salmon spawning in the mainstem of the upper Sac River remains unclear. As previously stated, due to geographic overlap of ESU's and resultant hybridization since the construction of Shasta Dam, Chinook salmon that spawn in the mainstem during September are more likely to be early fall-run Chinook rather than spring-run Chinook salmon.	
12	Jensen							
		Draft Fisheries and Aquatic Ecosystems Technical Report	2	2-1	1st Paragraph	As described in the Environmental Impact Statement (EIS) Chapter 11, the SALMOD was used to support technical analysis.	The Department has previously provided comments in several letters on the use of SALMOD in the EIS, outlining the concerns the Department has regarding the use of SALMOD and the correct representation of data. This concern remains valid and needs to be addressed.	
13	Jensen							

Page 3	Shasta Lake Water Resources Investigation Feasibility Report Comment Form—Fisheries and Aquatic Ecosystems Technical Report						
14	Jensen	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-32	6th Paragraph	Juvenile winter-run Chinook salmon rear in the Sacramento River from July through March (Hallock and Fisher 1985). All winter-run Chinook salmon fry pass the RBDD by October; all emigrating pre-smolts and smolts pass the RBDD by March (Martin et al., as cited in NMFS 2009).	Likely not "ALL" winter-run (WR) Chinook fry and/or emigrating pre-smolts and smolts are past the RBDD by Oct and March, respectively. The minimum size of WR in early Nov (in the high 30's mm) is probably still fry sized, thus the statement that all fry are past RBDD by Oct is too inclusive. Department staff have observed that they continue to emigrate out and grow and rear all winter in the mainstem. The USFWS has charts describing WR and other run emigration from RBDD over the past decade or so, which illustrates that MOST WR are out by end of March but there are always a few left coming out so the "ALL" term used is not accurate.
15	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-34	6th Paragraph	Spring-Run Chinook Salmon	The potential for hybridization with fall-run Chinook needs to also be mentioned within this section (for spring-run that may be present on the Sacramento River itself). On the river, there is no natural barrier to separate these two runs. The document should possibly also mention the presence of spring-run Chinook on Clear Creek, which is a significant tributary in the upper Sacramento River system and a CVP stream.
16	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-37		Indirect evidence indicates that green sturgeon spawn mainly in the Sacramento River; spawning has been reported in the mainstem as far north as Red Bluff.	There is a lot of more recent data about green sturgeon. Eggs have been found north of RBDD, for example. This section needs to be updated to reflect current literature on green sturgeon life history.
17	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	1	1-53		New Zealand Mud Snail and Quagga Mussel	Discussion of the mud snail and quagga mussel needs to be updated to reflect current dataand/or reports on their presence and level of threat, including within the reservoir footprint
18	Jensen	2011 DFG Comment Letter	General Comment				The Department has provided numerous comments that have not been sufficiently addressed, specifically from a fisheries perspective including but not limited to the need for clarification on Alternative CP4, use of SALMOD and ongoing concerns the Department has with the use of SALMOD, the discussion and inclusion of spring-run in the project documents, and impacts to the fishery habitat below Shasta Dam. Until these comments are adequately addressed, they will remain valid and the Department will look forward to an adequate response.
19	Bratcher	Draft Fisheries and Aquatic Ecosystems Technical Report	2	2-1		As described in the Environmental Impact Statement (EIS) Chapter 11, the SALMOD was used to support technical analysis.	SALMOD is not designed to be used to address a variety of fisheries-related issues and/or impacts, such as whether or not changes in operation, with a dam raise, would affect the spread of quagga mussels, or the tradeoff in managing for one Chinook run over another. It also mentions the potential effect of redd dewatering but does not quantify or analyze its effect. In addition, the attachments are based upon an older NMFS OCAP BO and therefore do not reflect the impact on anadromous fisheries as per the 2009 NMFS OCAP BO flow requirements.

Page 4	Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Fisheries and Aquatic Ecosystems Technical Report						
		2008 DFG Comment Letter / FR - Descriptions of No-Action Alternative and Comprehensive Plans	3	3-87	Figure 3-13	See 2008 DFG Comment Letter and FR Figure 3-13	The Department submitted substantial comments on the project, many of which have yet to be addressed. Specifically, the Department provided comments on the fact that it appears CP4 really only benefits anadromous fish during dry and critically dry years, which represents only 5-10 percent of the 1922-2003 period of simulation. During all other water-type years there is little change, to a negative change in production for Chinook from implementation of CP4. Clarification should be presented on the percentage of time CP4 will truly benefit the overall production of Chinook salmon, given the above information.
20	Jensen	FR - Descriptions of No-Action Alternative and Comprehensive Plans	3	3-84	4th paragraph	CP4: The adaptive management plan may include operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, as long as there are no conflicts with current operational guidelines or adverse impacts to water supply reliability.	CP4 is being pitched as the alternative that focuses on increasing anadromous fish survival by raising Shasta Dam. To be clear, the Department does not agree that Shasta Dam must be raised to increase anadromous fish survival. Changes in current flow releases, and further improvements in spawning and rearing habitat could also achieve increased fish survival. For example changing flow releases in the fall/late fall to eliminate the dewatering of salmonid redds would increase anadromous fish survival dramatically. Regarding CP4, this alternative is presented as specifically targeted at increasing anadromous fish survival", however on page 3-84 on the 4th paragraph a statement is made that causes the Department to question the true intention of the alternative. Specifically, the statement reads "The adaptive management plan may include operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, as long as there are no conflicts with current operational guidelines or adverse impacts to water supply reliability." If in fact the 378k acre feet of water is specifically for anadromous fish survival, and its use as such may
21	Jensen					Carry over of comment above (line 28); would not fit in one cell	very well have conflicts with current operational guidelines and/or have adverse impacts on water supply reliability, for that specific quantity of increased storage. Therefore, the adaptive management plan in CP4 should include only the operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, irregardless of the potential conflicts or impacts to operations and water supply, respectively.
22							

Attachment 8 **Shasta Lake Water Resources Investigation Feasibility Report Comment Form- Version December 2012**

Reviewer Name: Richard Lis, Brad Henderson

Botanical Resources and Wetlands Technical Report Comments

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Date: January 8 2013

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
1	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-1		This area is referred to as the "impoundment area"	The total acreage of the 1,090-foot impoundment area (i.e., the new lake) should be provided here along with the total acreage of existing terrestrial areas proposed to be inundated (3,000 acres inundated and 3,338 acres of relocation areas?).
2	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-1		"relocation areas"	Total acreage of relocation areas should be provided here.
3	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-1		Subsequently, botany studies have been expanded into select areas...	Please identify number of acres. Identify what percentage of existing terrestrial areas was surveyed. Please identify why the entire area was not surveyed? Surveys should be comprehensive over the entire site, including areas that will be directly or indirectly impacted by the project. Refer to CDFW's protocols for vegetation and plant surveys (2009) and incorporate by reference.
4	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-7		Table 1-1	Impacts: MB 456.59, BBA 91.67, SA 719.61, MCA 435.32, SCA 242.49, Pit A 527.54 Total: 3000.76
5	B. Henderson	"	1	1-8		Text including Barren and other types	This discussion and all following discussions for each land coverage/MCV type would be much more useful if the following information is included: 1. total acreage within the primary project area. 2. total acreage proposed to be altered or impacted via construction, inundation, etc. 3. Whether the plant community is considered to be sensitive by any state or federal agency (could be denoted in the tables as well).
6	B. Henderson	"	1	1-24		Gray Pine	Include the scientific name the first time a species in mentioned in the body of the text.
7	B. Henderson	"	1	1-27		Upper Sacramento River	Please identify if there is some definition for this portion of the project area - i.e., how far beyond the banks of the Sacramento River is the assessment area???
8	B. Henderson	"	1	1-29		Sensitive natural communities may be of special concern to these agencies and conservation organizations for a variety of reasons,	The document should include vegetation communities declining on a statewide level considered special concern (S1-S3 rank). For example, guidance on assessing sensitive plant communities can be found at: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_comm_background.asp

Page 2 SLWRI FR Comment Form—CDFW—Botanical Resources and Wetlands Technical Report

9	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-29		Figures 1-3a through 1-3j map the potential locations of sensitive plant communities along the Sacramento River...	What about sensitive plant communities in the impoundment area??? Why have they not been mentioned? The maps below show an excessive amount of detail for species locations completely outside of the Sacramento River. Life histories for many species depicted are completely unrelated to the River and to this project. Furthermore, The CNDDB is NOT a public dataset, and should not be included on maps that will be made public in reports and other documents. The "Data Use Guidelines" document outlines appropriate ways to put the CNDDB data on maps, and provides details on the symbology http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp.
10	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment				Comment cont'd	These maps need to be substantially cleaned up to depict important resources within a narrowly defined area subject to project effects. This report should not depict tadpole shrimp locations for a project on the Sacramento River. The lack of detail for sensitive species occurrences within the impoundment area, where project impacts will be direct and substantial, is a major omission. Including so much unrelated information is a distraction. Focus on the real issues and the impacts.
11	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-30		Locator Map	Please state why off-site animal occurrences being mapped in a plant report.
12	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-51		These habitat types are tracked in the CNDDB...	This is not necessarily true. Please read the following link which provides more accurate information regarding jurisdictional determinations and rare natural communities: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_comm_background.asp
13	N. Lis	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-72	22 et ff.	In 2004, botanical surveys were conducted...	What about sensitive plant communities in the impoundment area??? Why have they not been mentioned? The maps below show an excessive amount of detail for species locations completely outside of the Sacramento River. Life histories for many species depicted are completely unrelated to the River and to this project. Furthermore, The CNDDB is NOT a public dataset, and should not be included on maps that will be made public in reports and other documents. The "Data Use Guidelines" document outlines appropriate ways to put the CNDDB data on maps, and provides details on the symbology. http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp. These maps need to be substantially cleaned up to depict important resources within a narrowly defined area subject to project effects. This report should not depict tadpole shrimp locations for a project on the Sacramento River.

Page 3									
14	R. Lis	Botanical Resources and Wetlands Technical Report, Affected Environment	1	3-72	35 et al.	Based upon previous surveys resulting in ...	Specific survey reports are mentioned for surveys conducted in 2009 and 2010 on Nemacaulis denudata and Vaccinium sp.; however, these reports are not cited and appear to be unavailable and, thus, survey results are cited here as reference to Vaccinium sp., but not discussed above in reference to Nemacaulis diffusa. These reports and data sets from these reports must be made available and summaries of these reports should be added to the EIR/EIS to validate claims and assertions based upon them.		
15	B. Henderson	"	1	3-72		NSR conducted several botanical survey	Please identify how many total acres have been surveyed to date and what percentage of the direct impact area this represents.		
16	B. Henderson	"	1	3-72		Special status plant species detected during the surveys...in Attachment 3.	'Why are they not discussed here? Sensitive plants detected within the proposed inundation area will suffer a direct loss and should be a primary focus of this report. To put different effects analyses and discussion in different documents makes a complete review of the effects difficult to do.		
17	B. Henderson	"	1	3-72		Based on previous surveys...	This sentence does not make sense- what is meant by "based on"?		
18	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	3-72		...these species outside of the proposed project area...	Please identify why surveys were conducted outside the project area? Why not inside the project area? This discussion should start with whether these species are known from the project area and whether would they be impacted. Secondly, this section should state whether in the opinion of NSR the project area supports potential habitat. The off site survey and genetic analysis should come later.		
19	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	3-73		In 2010, botanical surveys were conducted in all relocation areas.	Please identify what species were observed during these surveys.		
20	R. Lis	Botanical Resources and Wetlands Technical Report, Affected Environment	1	3-74	34 et al.	Shasta snow-wreath is currently known from 23 locations.	Discussion of Nemacaulis diffusa in this section should include discussion of the fact that it is likely that the current distribution of populations of N. diffusa is a small reduced fraction of the original population distribution that existed prior to the completion of Shasta Dam and the filling of Shasta Lake. Although this is briefly mentioned in the Cumulative Effects section of the Draft EIS, p. 3.2-171, where the brevity may be appropriate, it needs to be more thoroughly discussed in the sections discussing the species and remnant populations as they exist today.) The filling of Shasta Lake very likely exterminated many populations of N. diffusa. Of significance is that most of the 23 extant populations occur near the periphery of Shasta Lake, suggesting that its distribution was not historically at much higher elevations and that the remaining populations have may be near some environmental limits that are reflected in the observed elevational limits. Discussion of these issues should be included in the		
						Comment #20 cont'd	affected environment as they are important for assessing levels of significant deleterious effects and for evaluation of any proposed mitigation measures.		
21	B. Henderson					Shasta snow-wreath is currently known from 23 locations...	Please identify if these were previously known or were identified during project-related surveys.		

Page 4 SLWRI FR Comment Form - CDFW - Botanical Resources and Wetlands Technical Report

22	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-74		Of these, 13 Shasta snow-wreath populations were discovered...	Please identify who conducted the surveys.
23	B. Henderson	Botanical Resources and Wetlands Technical Report, Affected Environment	1	1-100		Acreage totals for relocation areas will be provided in the FEIS.	It would be useful to provide an acreage figure for the impoundment and relocation areas outside of the existing lake here. Again, it would differentiate between areas of permanent loss versus temporary impacts to the existing Shasta Lake.
24	B. Henderson	"	1	1-100		The National List of Plant Species That Occur in Wetlands: California Region 0	This reference was updated in 2012.
25	B. Henderson	"	1	1-112		Fish and Game Code authorizes DFG to accept a Federal biological opinion. .both the ESA and the CESA.	This can be done only IF the federal BO is consistent with the provisions of CESA.
26	B. Henderson	"	1	1-112		Project impact on these species are not considered significant...	Reword as "Impacts to these species are considered significant."
27	B. Henderson	"	1	1-112		Paragraph, California Department of Fish and Game Designations	Much of the discussion in this paragraph is incorrect. For example, plants are not included. Refer here for the correct information. http://www.dfg.ca.gov/wildlife/nongame/ssc/
28	B. Henderson	"	2	2-1		"List of Plant Species Observed	Move attachment 2 to the body of the text.
29	R. Lis	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-102	5 et ff.	The only MSCS species known to occur...	Discussion of impacts to Nevusia with a 6.5 foot dam dam raise should discuss the range of environmental effects that occur with the increase water level and how these will change the surrounding micro-climate of any populations not fully flooded by the higher water level. Precise computations should be presented on the populations that will be completely flooded (exterminated) from those that are suggested as only having a portion of the population destroyed. The reasons the populations are postulated as being partially destroyed must be described for each population as assumptions about ground water, local micro-climate, winds, temperatures, etc. may be correct or in error and need specification for proper evaluation for full impacts and potential for survival or extermination.
30	R. Lis	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-118	9 et ff.	Impact Bot-2 (CP2): Loss of MSCS Covered Species	The discussion of impacts with the raise of 6.5 feet on Nevusia was projected to occur on 12 of 23 populations with some having undocumented and unspecified portions of the populations effected. This section omits discussion of the increasing level of population destruction to Nevusia with the additional raise of 6 feet to 12.5 feet. Omitted here in CP2 are discussions of whether additional populations would be impacted. Further omitted are additional impacts to Vaccinium sp. and the other MSCS plant species and how these impacts would increase relative to the initial 6.5 ft. increase. This information is needed to properly evaluate the proposed alternatives and to determine if the mitigation has been properly scaled to meet the increasing level of impact with increasing losses to populations, acreage affected, and the species.

Page 9		[illegible] Comment Form—[illegible]—Botanical Resources and Wetlands Technical Report					
31	R. Lis	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-126	8 et ff.	Impact Bot-2 (CP3): Loss of MSCS Covered Species	The increase of the dam to 18.5 feet omits an adequate discussion of the increase in effects from the 12.5 ft level which was inadequately described and evaluated in CP2. The discussion of impacts with the raise to 18.5 feet on Neviusia is completely unknown as presented in the impact assessment. The impact is stated to be significant with no further description as to how much more significant it would be and how these increasing raises in the dam would increase the level of damage and destruction to the various species. This section omits discussion of the increasing level of population destruction to Neviusia with the additional raise of 6 feet as additional to the 12.5 ft. raise. All MSCS species should be discussed individually with the increasing impacts to the populations and how (particularly with regard to Neviusia and Vaccinium sp.) these increasing impacts will effect the species as a whole in terms of surviving intact populations, genetic and phenotypic diversity and other factors affecting species survival, with some having undocumented and unspecified
						Comment #31 cont'd	portions of the populations effected. Also omitted are discussions of whether additional populations would be impacted. This information is needed to properly evaluate the proposed alternatives and to determine if the mitigation has been properly scaled to meet the increasing level of impact with increasing losses to populations, acreage affected, and the species.
32	R. Lis	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-133	31 et ff.	Impact Bot-2 (CP4): Loss of MSCS Covered Species	This impact would be similar to that discussed in CP3, which was inadequately discussed and described immediately above for CP3.
33	R. Lis	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-152	11 et ff.	Mitigation Measure Bot-2 (CP1)…	First bullet: "When feasible, Reclamation will relocate populations of MSCS plants…" This would primarily pertain to Neviusia cliftonii and would involve approximately 50% of the known populations of the species. There have been no studies conducted that have attempted to reestablish this species in other locations. Studies to date have not been able to determine what factors are important for the species to survive. It apparently is not a species that can easily occupy other habitat as it has limited isolated populations. Most efforts at translocating or relocating native plants have not been successful over the long term (> 25 years). This bullet mentions "when feasible" yet does not indicate how feasibility will be determined and assessed. For most native plants there are no criteria to determine if such a project would be feasible in the sense that it also has a good chance of success. This mitigation measure is highly unlikely to succeed and needs to be fully described for each species that would be involved. Second Bullet: Development of mitigation and monitoring plan, states that

								this plan will identify suitable sites for mitigation, species to be planted, etc.; however, in the second paragraph following the third bullet it is written that potential mitigation lands containing comparable habitat have been identified adjacent to the project. These sites that have been identified should be listed now for each species and each population of each species that would be affected by the dam raise height being addressed. Missing from the discussion of the mitigation measures is what ratio of off-site planting would occur for each population destroyed. For instance a starting point would be to consider that any given new mitigation population may have a 5-10% chance of success for survival of one, over the next 100 years. Therefore for each population destroyed 10-20 or more off site populations should be established in the case of Newtonia, with the potential to destroy 12 populations, it would necessitate to establish 120-240 populations that would require monitoring for at least 50 years. For the other species and populations similar calculations would
	Elk					Comment #33 cont'd		be required. Chance of survival should also be estimated for 500 and 1000 years or more, which may require the establishment of many more hundreds of populations for each species affected. In the case of Newtonia, which could incur 50% destruction just with the 6.5 ft. dam increase additional calculations for threats and long term survival in the face of climate change would be required.
	Elk					Comment #33 cont'd		
33	R. Lia	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-158	21 et ff	Mitigation Measure Bot-2 (CP2);...		This measure is the same as for MM Bot-2 (CP1), thus the comments on this mitigation measure apply here also. In addition, there should be identification for the increase of damage to species and populations with the increase in dam height. This is absent here. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms of threats to each species and the increased costs and potential for success with increase in mitigation required.
35	R. Lia	Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands	12	12-161	1 et ff	Mitigation Measure Bot-2 (CP3);...		This measure is the same as for MM Bot-2 (CP1) and for MM Bot-2 (CP2), thus the comments on these mitigation measures apply here as well and require further data. In addition, there should be identification for the increase of damage to species and populations with the increase in dam height. This is absent here. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms of threats to each species and the increased costs and potential for success with increase in mitigation required.

Page 7								
		Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands			35 et ff.	Mitigation Measure Bot-2 (CP4)...	This measure is the same as for MM Bot-2 (CP1) and for MM Bot-2 (CP2), and MM Bot-2 (CP3), thus the comments on these previous mitigation measures appl here also and need expansion. There should be identification for the increase of damage to species and populations with the increase in dam height. This is absent here. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms o threats to each species and the increased costs and potential for success with increase in mitigation required.
		Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands			5 et ff.	Mitigation Measure Bot-2 (CP5)...	This measure is the same as for MM Bot-2 (CP1) and for MM Bot-2 (CP2), and MM Bot-2 (CP3), thus the comments on these previous mitigation measures appl here also and need expansion. There should be identification for the increase of damage to species and populations with the increase in dam height. This is absent here. There should be a full accounting for the damage to each species and population with the increase in dam height and thus the increase in terms o threats to each species and the increased costs and potential for success with increase in mitigation required.
37	R. Lis							
		Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands					The cumulative effects section is inadequate in addressing the species, habitats, and various effects that have occurred from the dam. This section should identify the cumulative effects that will occur with each proposed level of dam height increase and summarize how these potential effects may be exacerbated by other confounding factors such as climate change, population growth and the continuing demand for water.	
38	R. Lis		12	12-171	11 et ff.	Cumulative Effects		
		Preliminary Draft EIS, July 2012, Botanical Resources and Wetlands			12 et ff.	Although causing similar effects CP1-CP5 differ in magnitude	This sentence correctly identifies that fact that CP1-CP5 would differ in the magnitude of their effects. Unfortunately the botanical effects section does not fully disclose, identify and quantify the increasing effects on the botanical resources. Essentially they are identified as "significant" with little additional detail. The quantification of the effects are vital to assessing the actual costs and losses, so this data can be used to accurately and effectively mitigate the true impacts. The mitigation section is weak, vague and inaccurate because the determination of effects is vague, imprecise, overly general and mostly repetitive of the vague determinations made previously. Even the large degree of mitigation that may be required for all the resources involved may themselves have cumulative effects that should be properly quantified and may require further mitigation.
39	R. Lis		12	12-172				
		Attachment 3 Special-Status plant species known to occur in the Shasta Lake and vicinity portion of the primary study area.	NA	A3-1	1 et ff.	Shasta snow-wreath (Neviusia cliftonii)	This section states that it has been recorded from 17 locations and that 9 of the 17 may be affected by the project. This data conflicts with the newer data stating that it has been found in 23 locations and 12 may be affected by the project. The discrepancy needs correction.	
40	R. Lis							

Attachment 4 — Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Version December 2012

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Date: 12/20/12

Wildlife Resources Technical Report Comments

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
1	Bratcher	Considerations for Describing Affected Environment and Environmental Consequences	1	1-2		Areas subject to physical disturbance as an indirect result of the proposed project (i.e., areas proposed as relocation sites...	Based upon information at the SLWRI PCT meetings, the relocation areas have not been completely identified for a variety of reasons, so the map provided an Figure 1-1 needs to be updated. Subsequently, the effect on fish, wildlife, and botanical species and habitats will need to be updated/completed. Any effects mentioned in this draft are also subsequently inaccurate.
2	Bratcher		1	1-2		The California Natural Diversity Database	Info from both the CNDDB and the USFWS ES Database (ESA Species List) needs to be requested, as the species presence list is over 5 years old.
3	Bratcher		1	1-7		Table 1-1	Table 1-7 of the MSCS identifies vernal pools as a habitat type within the Natural Seasonal Wetland Habitat Type. Vernal pools occur within the primary study area (in and near Redding, for example) and should be included within this table.
4	J. Carlson	Wildlife Resources Technical Report	1	1-3		Table 1-1	This table is kind of thrown into the report and there is very little description about what purpose it serves or how it will be used or interpreted. Clarification needed.
5	J. Carlson	Wildlife Resources Technical Report	1	1-11 to 1-21		Figure 1-2a to 1-2f	These maps are very hard to read due to the scale. Perhaps breaking up the maps into more sections and zooming in would be better. Shouldn't there be more "affected" habitat in the inundation zone that what is shown?
6	J. Carlson	Wildlife Resources Technical Report	1	1-9		Table 1-2 and 1-3	These tables show summary of wildlife habitat in the impoundment area as well as the relocation areas. Does this also reflect the acres of habitat that would be inundated? If so, specifying that would be helpful because it is not evident to me. It would be useful to include a total acreage value by habitat type. The totals of acres by lake arms isn't all that useful from a wildlife perspective.
7	J. Carlson	Wildlife Resources Technical Report	1	1-29		Oak woodlands	The habitat section is very sparse for this habitat type. Including a little more detail would be preferable including species occupying this habitat.
8	J. Carlson	Wildlife Resources Technical Report	1	1-38	Table 1-4	Northern goshawk	The potential for occurrence states that it is known to occur on the upper McCloud arm but does not specify if this is the primary study area or not. Please clarify.
9	R. Lis	Wildlife Technical Report	1	1-41		Shasta salamander	Take and loss of Shasta salamander (SS) is discussed and known from 39 sites surveyed to date. The survey methods were not discusseed in detail and the information about the size of the populations at the site is not given presented, thus it is not possible to calculate the actual take and loss of the SS. This species may be quite limited in its ability to migrate and thus the genetic diversity of the species throughout the study area should be investigated. There may be unique genetic populations dispersed within the impact area that would guide the design of mitigation options. It is likely that this species incurred significant habitat losses when Shasta Dam was built and filled. Further enlargement of the dam will cause further decline in the species habitat that needs to be estimated and included in full assessment of impacts to the species. SS habitat includes subterranean habitat to which access is important during the dry summer months. Therefore the inundation and destruction of habitat must account for the loss of subterranean habitat even if the water level does not completely submerge the habitat.
						Comment #9 cont'd	All sites must be enumerated and sites that may be above full pool elevations must be identified as to whether subterranean habitat would be destroyed such that survival of the site is reduced or rendered impossible. These sites must also be included in mitigation calculations.

Page 2		Shasta Lake Water Resources Investigation Feasibility Report Comment Form–Wildlife Resources Technical Report					
							impacts to the terrestrial mollusks are presented in terms of CWHR habitats and acreage yet there is no discussion about the actual sites where these mollusks were located and what microhabitat conditions exist on site to allow their existence. These mollusks are not equally and evenly distributed across within the habitat of any of the habitat types. They will undoubtedly be found in varying distribution and abundance within and between habitats. Analysis of these variables is needed both to identify complete impacts to the species and for determination of complete mitigation. Additional discussion must include the range of each species and the fraction of destruction to the totality of known populations of each species. These species also would have incurred extirpation of populations with the original construction of Shasta Dam. Estimates of the original destruction of species and the likely remaining is needed to accurately assess the cumulative effects of proposed future actions. Additional analysis should include
10	R. Lis	Wildlife Technical Report	1	1-41		Terrestrial Mollusks	assessment of what limits may exist for each species.
							such as elevation, because certain species may not be able to be exist at the same densities at higher elevations where temperatures and moisture would be subject to greater variation. All of this information is needed to develop complete and species specific
						Comment #10 cont'd	mitigation plans.
							The Mitigation measure in the old SLWRI EIR states that it would not be feasible to quantify the number of salamanders lost in the impoundment area; however, no surrogate measure was proposed or attempted to be calculated for mitigation. Estimates can be made based upon area of habitat, estimated quality of habitat, habitat complexity in terms of moisture, vegetation diversity, and through collecting efforts stratified and allocated among sites. These efforts would yield figures that would allow accurate computation of mitigation needed. Direct loss of individuals can be estimated based upon the factors discussed above and others when properly applied. The statement in this section that this cannot be done is a fallacy and will lead to the severe under-estimation of effects to the salamander.
11	R. Lis	Wildlife Technical Report	1	1-41	Section	Mitigation Measure Wild-1 (CP1)(From the old 2008 SLWRI EIS)	
							The mitigation measure in the older SLWRI EIS states that it would not be feasible to quantify the number of salamanders lost in the impoundment area; however, no surrogate measure was proposed or attempted to be calculated for mitigation. Estimates can be made based upon area of habitat, estimated quality of habitat, habitat complexity in terms of moisture, vegetation diversity, and through collecting efforts stratified and allocated among sites. These efforts would yield figures that would allow accurate computation of mitigation needed. Direct loss of individuals can be estimated based upon the factors discussed above and others when properly applied. This statement in this section that this cannot be done is a fallacy and will lead to the severe under-estimation of effects to these mollusks. The mitigation measure states that opportunities for restoration and enhancement of habitat will be explored and defined. These opportunities cannot be identified later, but must be identified now with extant populations around the lake. The
12	R. Lis	Wildlife Technical Report	1	1-41	Section	Shasta salamander	data collected on the populations that may be extirpated will provide the basic data
							on the species biology and ecology that can be used for such mitigation actions. Delay of these until will result in the determination that the data is not available and no
						Comment #12 cont'd	opportunities can be located for such actions.
							The statement is made that the carnivore surveys and detections of fisher for this project are the southeastern-most occurrences. This is an untrue statement and needs to be removed. Fishers have been detected south of the Fountain Fire area. Detections were both on public and private land, south of Burney and north of Shingletown. Several
13	J. Carlson	Wildlife Resources Technical Report	1	1-67		Pacific fisher	detections of fisher have been recorded in this area.

Page 9		Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Wildlife Resources Technical Report					
							The effects to this and other species needs to be re-evaluated once a project footprint is finalized. To date, the location of sites to be mined for minerals to create cement is not completed, nor are the footprint of relocated facilities, roads, etc. In addition, due to the potential change in water management (including CP4, which includes a dedicated pool for natural resource uses), the potential for effect is largely incomplete. Upon completion of the actual project footprint and management plan, this an other documents that assess effects to species and special habitats needs to be redone. Similarly, using water to manage for one species (e.g. winter-run Chinook) may have negative effects on another species (e.g. bank swallow). This also needs to be analyzed.
14	Bratcher	Wildlife Resources Technical Report	1	1-68		Table 1-5	
15	Bratcher	Wildlife Resources Technical Report	1	1-68		Table 1-5, California Red-legged frog (CARLF)	For the CARLF, only protocol surveys can determine presence/absence as per ESA, so this determination is pre-decisional. Foothill yellow-legged frogs are know to occur in the valley section of tributaries on the west side of the Sacramento River, so this determination is wrong.
16	Bratcher	Wildlife Resources Technical Report	1	1-94		Swainson's Hawk	The species range of this species, as per DFW mapping websites, shows it extending up into the middle of Tehama County, which likes just below Shasta County. In addition, migratory patterns should be taken into account, since this species is known to occur (nest) in the Klamath Basin.
17	Bratcher	Wildlife Resources Technical Report	1	1-104		Land Management	The BLM Land and Resource Management Plan for the Redding Field Office should also be included on this list. BLM manages land on Clear Creek and along the Sacramento River, in addition to inholdings near and/or around Shasta Lake. Similarly, the USFS Mendocino National Forest manages a piece of property adjacent to Red Bluff Diversion Dam.
18	Bratcher	Wildlife Resources Technical Report: Attachments 1-7	Attachment 2	1-1		Table A1-1	Reference to its Land Management Plan should also be included. See comments below. This table is incomplete and needs to be updated to include additional species, particularly MSCS species. The CNDDB search is over 5 years old. See also comment about relying on just CNDDB for presence/absence determinations. As per MSCS, special habitats also need to be addressed. A list of special habitats can be requested and provided by the CDFW.
19	J. Carlson	Wildlife Resources Technical Report: Attachments 1-7	Attachment 2	18		Purple martin	The statement is made that 15-51% of the known nesting colonies for purple martin is along the Shasta Lake shoreline. That seems like a significant part of the nesting habitat for a species that is state-listed threatened.
20	J. Carlson	Wildlife Resources Technical Report: Attachments 1-7	Attachment 2	19		Shasta salamander	It is not specified in the species life history, like for the other species, the extent of the locations or numbers of the shasta salamander detections. Please elaborate on the extent of the detections that would be inundated.
21	Bratcher	Wildlife Resources Technical Report: Attachments 1-7	Attachment 4	A4-4		General Comment	CNDDB should not be the only source of info to determine whether or not a species is present. It is only as good as what is reported by people. USFS records, Audubon studies, Christmas bird count data, and WHR should also be investigated to determine potential presence. I have personally seen black-crowned night herons in the Redding vicinity, and it is a species identified in the MSCS, as are several others below.
22	J. Carlson	Wildlife Resources Technical Report: Attachments 1-7	Attachment 5			State and Federal lists of special-status wildlife species	The lists in the referenced attachment for both state and federal species are outdated. These lists expired in 2007, which is at least 4 years out of date. Please include an updated list within the last year.
23	J. Carlson	2011 DFG comment letter		3	Comment #5		They have not adequately addressed the effects on wildlife as far as quantification of the effect and lack of detail on impacts.
24	J. Carlson	2008 DFG comment letter on the Admin Draft SLWRI DEIS/R		14-17			As far as I can tell, they have not adequately adressed the species in DFW's 2008 letter including: Shasta salamander, peregrine falcon, purple martin, bald eagle, and bank swallow. They did address additional species, i.e. deer range, but could include a map showing these special habitats that will be impacted.

Page 4		Shasta Lake Water Resources Investigation Feasibility Report Comment Form - Wildlife Resources Technical Report						
25	J. Carlson	General	Throughout			Maps	It would be easier to understand what is going on if the maps were not broken up into 10 different smaller maps. One large map would be more helpful when looking at the project at least for the Shasta Lake and vicinity area.
26	J. Carlson	General	Throughout				The wildlife habitat description section could be improved. There are some major inconsistencies among the habitat types described as far as some that include species occupying the habitat, and others do not. Some of the habitat descriptions list the vegetation species that make up the habitat type and others do not. Habitat descriptions at a minimum should include an extensive description of what features make it the habitat it is.
27	J. Carlson	General		1-37	Table 1-4		This table lists wildlife species of concern within the Shasta Lake area, and discusses the potential for each species to occur within the primary study area. However, for some species it is not clear if it is within the primary study area or if it will be impacted. For species like the peregrine falcon, it may not occur within the study area but disturbance impacts could be a possibility. This should be discussed or disclosed.
28	Bratcher	Wildlife Resources Technical Report	General Comment			Shasta salamander	Take and loss of Shasta salamander is discussed and known from 39 sites surveyed to date. The survey methods were not discussed in detail, and the information about the size of the populations at the sites is not presented. Therefore, it is not possible to calculate the actual take and loss of the species.
29	Bratcher	Wildlife Resources Technical Report	General Comment			Shasta salamander	This species may be quite limited in its ability to migrate, so the genetic diversity of the species throughout the study area should be investigated. There may be unique genetic populations dispersed within the impact area that would guide the design of mitigation options. It is likely that this species incurred significant habitat losses when Shasta Dam was built and filled. Enlargement of the dam will cause further decline in the species habitat that needs to be estimated and included in full assessment of impacts to the species.
30	Bratcher	Wildlife Resources Technical Report	General Comment			Shasta salamander	Shasta salamander habitat includes subterranean habitat to which access is important during the dry summer months. Therefore, the inundation and destruction of habitat must account for the loss of subterranean habitat even if the water level does not completely submerge the habitat. All sites must be enumerated and sites that may be above full-pool elevations must be identified as to whether subterranean habitat would be destroyed such that survival of the site is reduced or rendered impossible. These sites must also be included in mitigation calculations.
31	Bratcher	Wildlife Resources Technical Report	General Comment			Peregrine Falcon	Effects to this species and other raptors were not clearly identified. This includes the potential for effect by construction-related impacts during the nesting season. Mitigation measures should include at least one preconstruction survey for this species within the disturbance area boundary and a buffer sufficient to address the potential for disturbance, as supported by scientific literature and/or an accepted peregrine falcon management plans. Clarification is needed on when this preconstruction survey would occur.
32	Bratcher	Wildlife Resources Technical Report	General Comment			Bald Eagle	Although the bald eagle is no longer listed under ESA, it remains listed as Endangered pursuant to CESA. It is also a fully protected species pursuant to FGC Section 3511 and is provided protection pursuant to the Federal Bald and Golden Eagle Protection Act (16 U.S.C. 668a-d). The FR, Technical Reports/Attachments, and future environmental documents need to fully analyze the effect of a loss of habitat and nest trees on individuals and on the population in general, and analyze the entire project footprint (primary study area and extended area combined) to make an overall determination of effects of the project on bald eagle.

Page 5	Shasta Lake Water Resources Investigation Feasibility Report Comment Form--Wildlife Resources Technical Report					
33	Bratcher	Wildlife Resources Technical Report	General Comment			Purple martin could be similarly affected by inundation. The total inundation of snags used by purple martin would result in a temporary, if not permanent, loss of nesting habitat for purple martin, although new habitat could eventually be created after trees are inundated and die. There are very few colonies within Shasta County; Shasta Reservoir represents 14% to 51% of the total interior Northern California population of western purple martin (Williams 1998). No mitigation seems to be proposed for the direct loss of nest trees that will be inundated by Alternatives CP1-CP5. If feasible, mitigation measures must be implemented to offset this impact (which is identified as significant).
34	Bratcher	Wildlife Resources Technical Report	General Comment			Bank Swallow	The FR and Technical Reports/Attachments contain contradictions and relies upon improper information with regard to the potential impact on listed species. An example of this is the impact to the State-listed Threatened bank swallow (Riparia riparia). Use of monthly flow models cannot reflect the daily or hourly flow fluctuations caused by dam releases that can destroy a nesting colony. The 2008 Administrative Draft Environmental Impact Statement/Environmental Impact Report (ADEIS/R) (Reclamation 2008) identified a potentially significant impact.
35	Bratcher	Wildlife Resources Technical Report	General Comment			Bank Swallow	The Sacramento River is estimated to support about 75% of the State's bank swallow population (Garrison 1998). The Department considers the combination of a loss of high flows, which encourage bank erosion, and daily flow fluctuations caused by dam releases during nesting, a potentially significant impact.

Attachment 5 Shasta Lake Water Resources Investigation Feasibility Report Comment Form Version December 2014

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Date: 1/7/13

Water Quality Technical Report Comments

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
1	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	iv	Abbreviation	"...both agencies included an RPA in their Bo's" Page 1-31	This RPA is not included in abbreviation table.
2	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-5	Table 1-1	Table 1-1. Summary of Conventional Water Quality Constituents Collected in the Sacramento River at Red Bluff from 1996 to 1998	This table needs to be corrected. They are not using the correct water quality objectives in several instances. There are special objectives for the areas downstream of Keswick dam, i.e., DO must be 9 mg/l % saturation must be 95%. Copper standards are not from the CTR but special to the Basin Plan. The document needs to state if metals are dissolved or total.
3	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-6	Table 1-1 footnote b	Basin Plan Water Quality Objective	This is incorrect. The Basin Plan has special objectives for areas below Keswick Dam. The levels in this table are not for the specific reach.
4	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-14	Table 1-2 303(d) list	Shasta Lake 2006	This table is incorrect and out of date. Shasta Lake is also listed for mercury. There is some confusion regarding the area where the mines are impacting Squaw Creek. This may be due to the fact that there is a main arm of the Lake called the Squaw Creek arm. Another tributary on the West side is called Squaw Creek. Also known as "West Squaw Creek". It does not enter the Squaw Creek arm but is near Dry Creek, near the dam. The table should be revised, as should the text.
5	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	Page 1-14	Last paragraph	The sources of the metals in the two areas identified in Table 7-2 are associated with the Bully Hill/Rising Star mining complex adjacent to the Squaw Creek Arm.	The table number appears to be incorrect; should be Table 1-2 possibly.
6	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-35	2nd paragraph	Tributaries to the Main Body of Shasta Lake are also a source of metals, along with acid mine drainage from a number of mines in the Dry Creek and Little Backbone watersheds.	Dry Creek is not impacted by acid mine drainage. This is where the Regional Board calls the smaller Squaw Creek, West Squaw Creek. Little Backbone Creek is impacted by acid mine drainage.
7	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-36	4th paragraph	In a USGS study of mercury levels along the Sacramento River at Big Bend above Red Bluff, conducted from February 1996 to May 1998, mercury levels were consistently below the EPA criterion of 50 ng/L (USGS 2000b).	The Sacramento River is listed as impaired for mercury from Red Bluff to the Delta. It is also impaired for unknown toxicity from Keswick Dam to the Delta.

Page 2		Shasta Lake Water Resources Investigation Feasibility Report Comment Form--Water Quality Technical Report					
8	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-25	6th paragraph	For the primary study area the CVRWQCB has jurisdiction, while the extended study area encompasses the San Francisco Bay, Central Coast, Los Angeles, Lahontan...	The extended study area should also include the Trinity River and the North Coast RWQCB
9	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-26	2nd paragraph	For the primary study area the CVRWQCB has jurisdiction. An NPDES would not be required from the RWQCBs within the extended study area because no construction would occur.	The project may need a NPDES permit; please clarify if a stormwater prevention plan is just for the construction. It may need to be for other project activities.
10	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-28	2nd paragraph	The most prevalent contaminants in the Sacramento River basin are for organophosphate pesticides (agricultural runoff) and trace metals (acid mine drainage), for which TMDLs currently are being considered.	TMDL's have already been developed for the metals in the Sacramento River.
11	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-32	2nd paragraph	The CVRWQCB Basin Plan (originally published in 1998, last revised in September 2009) (CVRWQCB 2009) regulates waters of the State located within the primary study area.	The Basin Plan was originally published in 1975, per page 1-34.
12	J Vorpagel	Water Quality Technical Report Chapter 1 affected Environment	1	1-34	3rd paragraph	The most recent edition, the fourth edition, was adopted in 1998 and amended in 2004.	Page 1-32 says it was revised in 2009. Please use the latest revision date.

Attachment 6 — Shasta Lake Water Resources Investigation Feasibility Report Comment Form: Version December 2012

Modeling Appendix Comments

Reviewer Name:	Jason Roberts (JDR), Chad Dibble (CSD)
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Date:	3-Jan-12

ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT
1	Roberts	Modeling Appendix		2-4	unknown	see comment	Federal refuge assumptions are not accurate. 'Firm level 2 water needs' do not encompass level 4 water per CVPIA Refuge Water Supply Section 3406(d).
2	Roberts	Modeling Appendix	Global	Global	Global	see comment	The modeling assumptions are very outdated and need to reflect current BiOps and water quality control plans (e.g. the DCC closures are not accurately depicted for end-of-September storage levels at Shasta).
3	Roberts	Modeling Appendix		Table 1-25	Table 1-25	see comment	The refuge contract section needs to be quality-control reviewed. There is a typo for China Island, and other cells are not necessarily accurate (e.g. Los Banos is 10,470 instead of 16,700). The Department suggests that the table depicts Level 2 Water Supplies (Contract and Non-Project) instead of purely Contract amounts.

Attachment 7	Shasta Lake Water Resources Investigation Feasibility Report Comment Form Version December 2012							
							Geologic Technical Report Comments	
Reviewer Name:	Mark Smelser							
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Reviewer Agency:	California Department of Fish and Wildlife							
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Date:	15-Jan-13							
ITEM	REVIEWER	CHAPTER TITLE	CHAPTER NUMBER	PAGE NUMBER	LINE NUMBER	TEXT	COMMENT	
1	Smelser	Geologic Technical Report	General	N/A	N/A	N/A	A geologist licensed in the State of California is not identified as being responsible for the preparation of the Geologic Technical Report. The report relies on model results and provides interpretations and opinions regarding slope stability and future erosion. Such interpretations and opinions fall under the professional responsibilities of a state licensed geologist or geotechnical engineer. Consequently, such an individual should be formally indentified.	
2	Smelser	Geologic Technical Report	General	N/A	N/A	N/A	The Geologic Technical Report erroneously attributes geologic data to Hackel (1966) when the true reference should be Irwin (Irwin 1966, e.g., p. 23). The reliance on the 1966 reference and the use of outdated terms (e.g., Eastern Klamath Belt instead of Eastern Klamath Terrane) demonstrates that limited research was conducted in the preparation of the report. There has been a significant amount of geologic work conducted within the Klamath Mountains Geomorphic Province over the past several decades, which should be incorporated in this document. Please see USGS Open File Report 2003-306 (Irwin 2003) for an excellent bibliography on geologic research in the Klamath Mountains.	
3	Smelser	Geologic Technical Report	General	N/A	N/A	N/A	The Geologic Technical Report states that the nearest "active" fault to Shasta Dam is the Battle Creek fault zone and they use the term "active" as defined by the Alquist-Priolo Earthquake Fault Zoning Act (AP Act). Review of California's fault activity map (Jennings and Bryant 2010) shows the Battle Creek Fault zone as not exhibiting evidence of surface rupture within the last 11,000 years. Therefore, the Battle Creek fault is not an "active" fault as defined by the Act. The "active fault" declaration in the report again demonstrates limited research and a lack of oversight in the report preparation by a state licensed geologist. Moreover, to state that this fault zone is active and therefore imply the necessity for specific regulatory actions as defined in the AP Act could create undue concern, confusion, and perhaps even low level panic in the inhabitants of the Red Bluff area.	
4	Smelser	Geologic Technical Report	General	N/A	N/A	N/A	The Geologic Technical Report references a "Great Valley thrust fault system". Such a "system" is not formally recognized or documented within California's fault activity map (Jennings and Bryant 2010) so clarifying statements should accompany that statement.	

Responses to Comments from Natural Resources Defense Council

NRDC1-1: Please refer to Master Comment Response NEPA-1, "Sufficiency of the EIS."

NRDC1-2: Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

NRDC1-3: Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

NRDC1-4: Please refer to Master Comment Response CMS-1, "EIS Mitigation Plan," Master Comment Response CEQA-1, "CEQA Compliance," and Master Comment Response CEQA-2, "CEQA Mitigation."

NRDC1-5: Please refer to Master Comment Response CR-12, "Cultural Resources and CEQA," Master Comment Response CR-15, "National Historic Preservation Act Section 106 Consultations," and Master Comment Response CR-1, "Potential Effects to Cultural Resources."

NRDC1-6: Please refer to Master Comment Response CEQA-1, "CEQA Compliance," Master Comment Response P&N-1, "Purpose and Need and Objectives," Master Comment Response ALTR-1, "Range of Alternatives General," Master Comment Response NEPA-1, "Sufficiency of the EIS," Master Comment Response NEPA-2, "Cumulative Impacts," and Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts."

NRDC1-7: Comment noted.

NRDC1-8: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response P&N-1, "Purpose and Need and Objectives," Master Comment Response ALTR-1 "Range of Alternatives General," and Master Comment Response NEPA-1 "Sufficiency of the EIS."

NRDC1-9: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir.

Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions," Master Comment Response

ALTR-1, “Range of Alternatives General,” and Master Comment Response P&N-1, “Purpose and Need and Objectives.”

NRDC1-10: Please refer to Master Comment Response EI-1, “Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts," Master Comment Response NEPA-2, “Cumulative Impacts,” Master Comment Response DSFISH-10, “Methodology for Evaluating Fisheries Impacts,” and Master Comment Response CR-1, “Potential Effects to Cultural Resources.”

NRDC1-11: The commenter does not raise a specific issue, instead the comment is vague and therefore no specific response can be provided.

Please refer to Master Comment Response GEN-1, “Comment Included as Part of the Record,” Master Comment Response EI-1 “Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts,” and Master Comment Response GEN-4, “Best Available Information.”

NRDC1-12: Please refer to Master Comment Response CR-11, “Cultural Resources and NEPA,” and Master Comment Response CR-1, “Potential Effects to Cultural Resources.”

NRDC1-13: Please refer to Master Comment Response WASR-1, “Eligibility of the McCloud River as a Federal Wild and Scenic River,” and Master Comment Response WASR-6, “Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542.”

NRDC1-14: Please refer to Master Comment Response WASR-6, “Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542.”

NRDC1-15: Please refer to Master Comment Response GEN-5, “Some People Support Dam Raise and Others Oppose Dam Raise.”

NRDC1-16: Please refer to Master Comment Response NEPA-1, “Sufficiency of the EIS,” and Master Comment Response CEQA-1, “CEQA Compliance.”

NRDC1-17: Please refer to Master Comment Response ALTR-1, “Range of Alternatives General.”

NRDC1-18: SALMOD modeling results show that there are significant project benefits to anadromous fish in critical and dry years, when Chinook populations are at greatest risk. By increasing production in these years, relative to the base conditions, the risk of extirpation of listed species is greatly reduced, and therefore provides a significant

benefit to the species/run. Many sources identify Upper Sacramento River water temperatures during critical and dry year types as a highly important limiting factor to anadromous fisheries, including the NMFS Recovery Plan and the NMFS 2009 Biological Opinion. This interpretation of SALMOD results with a focus on critical and dry years is consistent with species needs and limitations identified above by fisheries agencies.

Please refer to Master Comment Response ALTR-1, "Range of Alternatives General," Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response P&N-1, "Purpose and Need and Objectives," and DSFISH-5 "Fish and Wildlife Coordination Act Report."

NRDC1-19: USFWS, in the *Draft Fish and Wildlife Coordination Act Report for the Shasta Lake Water Resources Investigation (CAR)* (June 2008), recommended that "…Reclamation should include a SLWRI alternative that evaluates the capability of increasing anadromous fish survival and water supply reliability without raising Shasta Dam." USFWS states that this alternative could be accomplished by a variety of measures. These USFWS measures are either included in the action alternative(s) evaluated in the EIS or were evaluated and eliminated through the plan formulation process.

Each of the USFWS measures is listed below along with Reclamation's response to each measure.

- Modifying the TCD at Shasta Dam to improve temperature control

As stated in Chapter 2, "Alternatives," Section 2.3.1, "Management Measures Common to All Action Alternatives," the Temperature Control Device would be modified to account for an increased dam height and to reduce leakage of warm water into the structure for all action alternatives.

- Improving spawning habitat by gravel augmentation

As stated in Chapter 2, "Alternatives," Section 2.3.6, "CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability," under CP4 and CP4A, spawning-sized gravel would be placed at multiple locations along the Sacramento River between Keswick Dam and the Red Bluff Pumping Plant (RBPP).

- Improving juvenile salmonid rearing habitat through large woody debris and riparian restoration (i.e., shaded riverine aquatic (SRA) cover) in the Keswick – RBDD reach, in lower reaches of the nonnatal tributaries, and in the Sacramento River downstream from Red Bluff Diversion Dam

As stated in Chapter 2, "Alternatives," Section 2.3.6, "CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability," under CP4 and CP4A, riparian, floodplain, and side channel habitat restoration would occur at one or a combination of potential locations along the upper Sacramento River.

As stated in Chapter 1, "Introduction," The location of the RBPP (which is directly adjacent to the Red Bluff Diversion Dam) was chosen as the downstream boundary of the primary study area because cold water released from Shasta Dam significantly influences water temperature conditions in the Sacramento River between Keswick Dam and the RBPP (NMFS 1993). After the RBPP, the river landscape changes to a broader alluvial stream system. The broader, slower nature of an alluvial stream system allows ambient air temperature to have a greater effect on the temperature of the Sacramento River. Therefore, improving juvenile salmonid rearing habitat in the Sacramento River downstream from RBPP was not evaluated under the SLWRI.

- Operational changes to Shasta Dam to increase cold water storage and/or increase minimum flows

As stated in Chapter 2, "Alternatives," Section 2.3.6, "CP4 and CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability," CP4 and CP4A include an adaptive management plan for the cold-water pool. The adaptive management plan may include operational changes to the timing and magnitude of releases from Shasta Dam to benefit anadromous fish, as long as there were no conflicts with current operational guidelines or adverse impacts on water supply reliability.

- Increasing water use efficiency to a specified level (e.g., improve irrigation efficiency in the ACID canal)

As stated in Chapter 2, "Alternatives," Section 2.3.1, "Management Measures Common to All Action Alternatives," all action alternatives would include a water conservation program for increased water deliveries that would be created by the project to augment current water use efficiency practices. While specifics (e.g., which canal might be improved) are not discussed, the proposed program would consist of a 10-year initial program to which Reclamation would allocate approximately $1.6 million to $3.8 million to fund water conservation

efforts. Program actions would be a combination of technical assistance, grants, and loans to support a variety of water conservation projects, such as recycled wastewater projects, irrigation system retrofits, and urban utilities retrofit and replacement programs. Reclamation, in collaboration with project beneficiaries, would identify and develop water conservation projects for funding under the program. Reclamation would then implement an investment strategy, in coordination with project beneficiaries, to identify and prioritize projects which, in conjunction with other water conservation activities, would cost-effectively reduce water demand and increase water conservation.

- Considering conjunctive use of other existing and planned water storage facilities in the Central Valley.

As stated in the Plan Formulation Appendix, Chapter 2, "Management Measures," conservation groundwater storage near the Sacramento River downstream from Shasta Dam was initially retained as a management measure due to significant water supply benefits. However, it was eliminated from further development during the comprehensive plan phase. Subsequent operations modeling indicated tradeoffs between conjunctive use water supply benefits and critical gains in fisheries accomplishments. The resulting reduction in benefits to fisheries operations in dry and critical years was deemed unacceptable in terms of meeting primary project objectives.

Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response ALTR-1, "Range of Alternatives General," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

NRDC1-20: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response ALTR-1, "Range of Alternatives General," and Master Comment Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits."

NRDC1-21: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response ALTR-1, "Range of Alternatives General."

NRDC1-22: Please refer to Master Comment Response ALTR-1, "Range of Alternatives General."

NRDC1-23: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

NRDC1-24: Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

NRDC1-25: The 2008 USFWS BO and 2009 NMFS BO specify target minimum carry-over storages (COS) for Shasta Reservoir at the end of September. These COS targets are not required to be met in any specific year, but rather are required to be met in certain percentages of years of actual operations. This type of standard cannot be directly modeled in CalSim-II and is implemented in the simulation process by review of simulation results and adjustment of operational parameters until the COS requirements are met. The specific CalSim-II assumptions, and how the assumptions are implemented, are included in the Modeling Appendix, Table 2-1.

CalSim-II output tables of Shasta end–of-month storage are included for all alternatives in the Modeling Appendix, Attachment 1. For all action alternatives, the simulated Shasta end-of-month storage is higher than in the No-Action Alternative. The COS is higher in years when the COS target was met in the No-Action Alternative than in the years when the COS target was not met. Furthermore, the percentage of years in which the COS targets were met in the action alternatives is also increased over the No-Action Alternative. This is especially true in CP4 where the simulated COS is 382,000 acre-feet greater than the simulate COS in CP1. This is the expected result of increasing the COS requirement and was obtained, not by changing any direct requirements in the simulation, but by adjusting operations to increase the COS and optimize project benefits. The action alternatives, particularly CP4, all show the same types of impacts that would be the goal of an increased COS requirement, without imposing any specific COS requirements. While the analysis did not explicitly impose a COS requirement the simulation results for all alternatives do include a higher COS.

NRDC1-26: The benefits of the increased COS in the analysis were not obtained by requiring additional COS. Benefits, however, occurred because of the increased storage capacity and the operational assumptions made to optimize the water supply and environmental benefits resulted in increased COS. If Shasta Dam is constructed and operated under similar assumptions and rules to the current operations, then similar results would be expected. Currently the Sacramento River

Temperature Task Group (SRTTG) meets in the spring to develop temperature operation plans for the Shasta and Trinity divisions of the CVP pursuant to State Water Resource Control Board Water Rights Orders 90-5 and 91-1. This group is made up of representatives of Reclamation, NMFS, USFWS, CDFW, State Water Resource Control Board, Western Area Power Administration, and the Hoopa Valley and Yurok tribes. The SRTTG develops an initial plan, and monitors and adjusts the operation plan, including anticipated COS, throughout the year to improve and stabilize the Chinook population in the Sacramento River. The plan and any updates throughout the year are then submitted to the State Water Resources Control board and carried out by Reclamation.

While it is assumed that the benefits of additional COS are a result of the fact that there is more water in Shasta Reservoir at any time; however, the true benefits come from the fact that flow and water temperature in the Sacramento River are improved for the Chinook population by maintaining a larger cold water pool, or by additional releases to enhance flow conditions and reducing downstream in-river heating. Additional regulatory requirements for higher COS could reduce the operational flexibility of the system and impact the ability of this group to effectively manage Shasta Reservoir and Sacramento River temperatures.

This document is an Environmental Impact Statement and analyzes and documents potential environmental impacts of the project. An environmental document does not include recommendations for additional regulatory requirements on potential project operations. Before construction a Biological Assessment would be prepared which could address this topic. Before construction, compliance with the ESA would be completed and may include specific requirements for flows and temperature on the Sacramento River as well as COS in Shasta Reservoir.

NRDC1-27: Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration."

NRDC1-28: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542" and Master Comment Response ALTR-1, "Range of Alternatives General."

NRDC1-29: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record," Master Comment Response

ALTR-1, “Range of Alternatives General,” and Master Comment Response NEPA-1, “Sufficiency of EIS.”

NRDC1-30: Please refer to Master Comment Response P&N-1, “Purpose and Need and Objectives,” and Master Comment Response ALTR-1, “Range of Alternatives General.”

NRDC1-31: Please refer to Master Comment Response P&N-1, “Purpose and Need and Objectives,” and Master Comment Response ALTR-1, “Range of Alternatives General."

NRDC1-32: Please refer to Master Comment Response ALTR-1, “Range of Alternatives General,” Master Comment Response ALTD-2, “Alternative Development- Anadromous Fish Survival,” Master Comment Response ALTD-1, “Alternative Development- Water Supply Reliability,” and Master Comment Response P&N-1, “Purpose and Need and Objectives.”

NRDC1-33: Please refer to Master Comment Response DSFISH-8, “National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions.”

NRDC1-34: Please refer to Master Comment Response DSFISH-8, “National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions.”

Additionally, as shown in Chapter 3, “Considerations for Describing Affected Environment and Environmental Consequences,” Section 3.2.9, “Cumulative Effects,” the CVPIA is in the list of present and reasonably foreseeable future actions included in the analysis of cumulative impacts. CVPIA includes actions that make all reasonable attempts to double the natural production of anadromous fish in the Central Valley streams. This was included in the cumulative effects analysis, and as described in Master Comment Response DSFISH-8, the SLWRI, along with other programs assists Reclamation and other resource agencies in working towards the doubling goal as no one single project can achieve the doubling goal on its own.

Please refer to Master Comment Response DSFISH-8, “National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions.”

NRDC1-35: Please refer to Master Comment Response DSFISH-2, “Other Fisheries Models and Tools.”

NRDC1-36: Please refer to Master Comment Response ALTR-1, “Range of Alternatives General,” Master Comment Response ALTD-2, “Alternative Development- Anadromous Fish Survival,” Master

Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master Comment Response NEPA-1, "Sufficiency of the EIS."

NRDC1-37: The SLWRI has two primary coequal objectives that must be met, and neither must impede or harm the other objective. While the SLWRI is not the only way to improve anadromous fish survival, the most efficient way to meet both primary objectives is to enlarge Shasta Reservoir. The existing Shasta Reservoir cannot be reoperated to benefit anadromous fisheries without impacting water supply reliability.

Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions," and Master Comment Response ALTR-1 "Range of Alternatives General."

NRDC1-38: The project is primarily intended to improve Chinook salmon survival in critical and dry years, particularly in a drought condition, when they are likely to be most at risk of significant population declines or even extinction. While overall benefits to production when all water year types are combined are not as pronounced, benefits in dry and critical years are significant. With the added risks of climate change, the benefit of an increased source of cold water adds to the reliability of suitable habitat available for Chinook salmon and other listed fish in the Sacramento River. Adding to that, the habitat restoration components provides an additional amount of available habitat necessary to improve conditions that can help increase the number of Chinook salmon and other listed fish in the Sacramento River.

Please refer to Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

NRDC1-39: Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

NRDC1-40: Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

NRDC1-41: Modeling results show that there are significant project benefits to anadromous fish in critical and dry years, when Chinook populations are at greatest risk. By increasing production in these years, relative to the base conditions, the risk of extirpation of listed species is greatly reduced, and therefore provides a significant benefit to the species/run. Many sources identify Upper Sacramento River water temperatures during critical and dry year types as a highly important limiting factor to anadromous fisheries, including the NMFS Recovery Plan and the NMFS 2009 Biological Opinion. This interpretation of SALMOD results with a focus on critical and dry years is consistent with species needs and limitations identified above by fisheries agencies.

Please refer to Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report," and Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts."

NRDC1-42: Please refer to Master Comment Response NEPA-1, "Sufficiency of the EIS," Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts," Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master Comment Response GEN-8, "Public Outreach and Involvement."

NRDC1-43: Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," and Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-44: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-45: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

The commenter included comments previously submitted by CDFW in Attachment 1 on the Draft Feasibility Report of the SLWRI. Reclamation was not able to find the referenced comments regarding modeling tools beyond SALMOD in the referenced text.

NRDC1-46: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-47: Negative impacts shown in the modeling results are almost entirely limited to water year types that are wetter than normal, when anadromous fish are at a relatively low risk of large scale flow and temperature related mortality, and potential extirpation. Further, for all plans, annual average changes across all years, and across critical and critical/dry years when fish are most at risk, are either insignificant or significantly beneficial.

Chapter 12, "Botanical Resources and Wetlands" Mitigation Measure Bot-7 has been revised to clarify how Reclamation will implement a riverine ecosystem mitigation and adaptive management plan to mitigate, to the extent feasible, the identified effects of an altered Sacramento River flow regime on existing riparian and wetland communities, and associated instream, riparian, and wetland habitat values for aquatic and terrestrial special-status species along the Sacramento River from Shasta Dam to Colusa (River Mile 144).

Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration," and Master Comment Response DSFISH-9, "Flow-Related Effects on Fish Species of Concern."

NRDC1-48: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

NRDC1-49: SALMOD does incorporate results from IFIM modeling conducted by USFWS, which includes spawning habitat conditions at various flow rates. Therefore, the analysis conducted does evaluate any potential impact to spawning habitat from both changes to flow and water temperature. During the planning stages (development of the Plan Formulation Report), it was identified that the biggest benefits were shown to Chinook salmon came when water temperatures were lowered rather than when flows were adjusted to meet the AFRP flow goals. Therefore, the CP4 was developed specifically to establish a cold water pool for fish benefits. This proved, through the SALMOD results, to have the highest juvenile production. Reclamation recognizes the ecological importance of flow-related geomorphic processes in the Sacramento River, however, the SLWRI does not eliminate these processes, and does restore floodplain and side channel habitat.

NRDC1-50: Chapter 12, "Botanical Resources and Wetlands" Mitigation Measure Bot-7 has been revised to clarify how Reclamation will implement a riverine ecosystem mitigation and adaptive management plan to mitigate, to the extent feasible, the identified effects of an altered Sacramento River flow regime on existing riparian and

wetland communities, and associated instream, riparian, and wetland habitat values for aquatic and terrestrial special-status species along the Sacramento River from Shasta Dam to Colusa (River Mile 144).

Please refer to Master Comment Response DSFISH-9, "Flow-Related Effects on Fish Species of Concern.

NRDC1-51: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-52: Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," and Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-53: Reclamation recognizes there are limitations to the SALMOD model, including the potential that mortality may be underestimated due to the difficulty in quantifying resource competition and predation, but may also be overestimated for some life stages. Please keep in mind that SALMOD was used to compare the proposed action alternatives, and was not intended to produce exact numbers. SALMOD underestimates mortality both under the no action and action alternatives. The identified limitations do not preclude the ability of SALMOD to identify potential effects to Chinook salmon caused by changes in operations.

In addition, SALMOD is a widely accepted tool that was developed with agency input and has been applied for numerous other studies. The SALMOD model was set up based on USFWS Instream Flow Incremental Methodology (IFIM) data, with direct input from USFWS and CDFW personnel (i.e., Mark Gard, Doug Killam), as well as incorporating comments from the resource agencies before completion of the model structure. SALMOD has been one of the primary tools used to evaluate salmonid responses to revised water operations in the upper Sacramento River, including the most recent Biological Assessment on the Continued Long-Term Operations of the CVP and SWP (Reclamation 2008) and resulting 2009 BO and Conference Opinion on the Long-Term Operations of the CVP and SWP (NMFS 2009).

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," Master Comment Response DSFISH-2, "Other Fisheries Models and Tools," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

NRDC1-54: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-55: For the DEIS, the number of spring-run spawners incorporated into the model was revised from 1,000 down to 207 based on USFWS and CDFW comments, and is now based on historical data. The DEIS acknowledges that SALMOD was not designed to address the small spawning populations associated with historic spring-run Chinook spawning numbers, but notes that the historically based spawning number was used because of direction from the CDFW and USFWS. However, there is no model currently available for analyzing low populations of Chinook salmon. As described in DSFISH-1, SALMOD is currently the best (and only) available tool for predicting project-related outcomes for all four Chinook salmon runs in the upper Sacramento River. At present, Reclamation is not aware of any proposed tools and/or analytical approaches that could better assess the potential impacts of the project alternatives on spring-run Chinook salmon. Furthermore, SALMOD was used for spring-run Chinook salmon evaluations in the 2008 Reclamation Long-Term Operation BA and the 2009 NMFS BO. As such, Reclamation believes that its approach to assessing project impacts on spring-run Chinook is consistent with the best available science and analytical tools, and is supported by the direction received from the resource agencies.

Chapter 11, "Fisheries and Aquatic Ecosystem," Section 11.3.1, notes that: "Populations of 500 or more spawning Chinook salmon are considered necessary for accurate results using SALMOD because it is a deterministic model that relies on the "law of large numbers." When populations are "low" (an arbitrary term), mean responses are quickly affected by environmental stochasticity and individual variability, which are factors SALMOD was not designed to address. Therefore, because the 1999 to 2006 average for spring-run Chinook salmon was 207 adult spawners, the criterion of 500 or more fish was not met. However, because of concerns expressed by CDFW and USFWS, the spawning population was left at 207 fish for purposes of the model." However, in the 2009 BO, NMFS used 1,000 adult spring-run spawners to compensate for the fact that the actual spawning population is less than 500 fish.

NRDC1-56: Reclamation acknowledges that SALMOD, like any numerical model, has limitations that must be considered when interpreting its results. However, Reclamation believes that SALMOD is the best available tool, and Reclamation sought resource agency input when developing the model. SALMOD was set up based on USFWS Instream Flow Incremental Methodology (IFIM) data, with direct input from both USFWS and CDFW (i.e., Mark Gard, Doug Killam), as well as incorporating comments from CDFW, USFWS and Reclamation fisheries experts before completing the model structure. The model has been peer reviewed, including by Lisa Thompson and Chris Mosser of U.C. Davis (2011), and despite its limitations has been accepted as a

valid tool for numerous studies, including the most recent Biological Assessment on the Continued Long-Term Operations of the CVP and SWP (Reclamation 2008) and resulting 2009 BO and Conference Opinion on the Long-Term Operations of the CVP and SWP (NMFS 2009).

According to the CDFG 2008 letter, the agency does not believe that egg and juvenile mortality are directly related to water temperature and flows, and that juvenile production is more highly correlated with the number of adult spawners. While this may be true most of the time, and that habitat may not typically be limiting juvenile production, the effects to winter-run Chinook salmon, as shown through the results from SALMOD, are that these fish are at greater risk during critical and dry water years, when water temperatures are more difficult to control. During these times, habitat (particularly cooler water temperature) is likely limiting, as observed during significant dry periods such as 1976 and 1977 and 1987 through 1992. As observed in the Sacramento River in 1976 and 1977, there were a large number of spawners (over 35,000 adults spawners in 1976 and over 17,000 in 1977), however warm waters and low flow conditions in the river precluded successful returning spawners 3 years later. Similar results are shown in the output of SALMOD.

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon," and Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-57: Reclamation acknowledges that SALMOD, like any numerical model, has limitations that must be considered when interpreting its results. However, Reclamation believes that SALMOD is the best available tool, and Reclamation sought resource agency input when developing the model. SALMOD was set up based on USFWS Instream Flow Incremental Methodology (IFIM) data, with direct input from both USFWS and CDFW (i.e., Mark Gard, Doug Killam), as well as incorporating comments from CDFW, USFWS and Reclamation fisheries experts before completing the model structure. The model has been peer reviewed, including by Lisa Thompson and Chris Mosser of U.C. Davis (2011), and despite its limitations has been accepted as a valid tool for numerous studies, including the most recent Biological Assessment on the Continued Long-Term Operations of the CVP and SWP (Reclamation 2008) and resulting 2009 BO and Conference Opinion on the Long-Term Operations of the CVP and SWP (NMFS 2009).

For the DEIS, the number of spring-run spawners incorporated into the model was revised based on USFWS and CDFW comments, and is based on historical data. The DEIS acknowledges that SALMOD was

not designed to address the small spawning populations associated with historic spring-run Chinook spawning numbers, but notes that the historically based spawning number was used because of direction from the CDFW and USFWS. At present, Reclamation is not aware of any proposed tools and/or analytical approaches that could better assess the potential impacts of the project alternatives on spring-run Chinook salmon. As such, Reclamation believes that its approach to assessing project impacts on spring-run Chinook is consistent with the best available science and analytical tools, and is supported by the direction received from the resource agencies.

Chapter 11, "Fisheries and Aquatic Ecosystem," Section 11.3.1, notes that: "Populations of 500 or more spawning Chinook salmon are considered necessary for accurate results using SALMOD because it is a deterministic model that relies on the "law of large numbers." When populations are "low" (an arbitrary term), mean responses are quickly affected by environmental stochasticity and individual variability, which are factors SALMOD was not designed to address. Therefore, because the 1999 to 2006 average for spring-run Chinook salmon was 207 adult spawners, the criterion of 500 or more fish was not met. However, because of concerns expressed by CDFW and USFWS, the spawning population was left at 207 fish for purposes of the model."

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon."

NRDC1-58: For the DEIS, the number of spring-run spawners incorporated into the model was revised based on USFWS and CDFW comments, and is based on historical data. The DEIS acknowledges that SALMOD was not designed to address the small spawning populations associated with historic spring-run Chinook salmon spawning numbers, but notes that the historically based spawning number was used because of direction from the CDFW and USFWS. At present, Reclamation is not aware of any proposed tools and/or analytical approaches that could better assess the potential impacts of the project alternatives on spring-run Chinook salmon. As such, Reclamation believes that its approach to assessing project impacts on spring-run Chinook salmon is consistent with the best available science and analytical tools, and is supported by the direction received from the resource agencies.

NRDC1-59: While Reclamation acknowledges that fish can be impacted by temperature changes on a finer time scale than the weekly average temperatures assessed by SALMOD, Reclamation is not aware of any widely available and agency accepted tools which can be used for long-term simulations of the effect of temperature variations at a finer time scale. Further, Reclamation is not aware of any tool which can be used to develop reliable long term temperature data on a finer time scale,

considering that Calsim-II — the only widely accepted tool for simulating long-term systemwide operations of the CPV/SWP system — operates on a monthly time scale.

SALMOD was set up based on USFWS Instream Flow Incremental Methodology (IFIM) data, with direct input from USFWS and CDFW personnel (i.e., Mark Gard, Doug Killam), as well as incorporating comments from the resource agencies before completion of the model structure. The model has been peer reviewed, including by Lisa Thompson and Chris Mosser of U.C. Davis (2011), and has been accepted as a valid tool for numerous studies, including the most recent Biological Assessment on the Continued Long-Term Operations of the CVP and SWP (Reclamation 2008) and resulting 2009 BO and Conference Opinion on the Long-Term Operations of the CVP and SWP (NMFS 2009).

Please refer to Master Comment Response DSFISH-1, "SALMOD Model for Sacramento River Chinook Salmon."

NRDC1-60: Text was added to clarify that these are factors that can be exacerbated by project operations, however they cannot be directly quantified.

NRDC1-61: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-62: Please refer to Master Comment Response DSFISH-2, "Other Fisheries Models and Tools."

NRDC1-63: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," and Master Comment Response CR-11, "Cultural Resources and NEPA."

NRDC1-64: Please refer to Master Comment Response CR-12, "Cultural Resources and CEQA."

NRDC1-65: Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects," describes in great detail the impacts and benefits to the fisheries in the Sacramento River and Delta. The commenter has not provided any specific example of how the DEIS is misleading.

SALMOD results show that there are significant project benefits to anadromous fish in critical and dry years under CP4, when Chinook populations are at greatest risk. By increasing production in these years, relative to the base conditions, the risk of extirpation of listed species is greatly reduced, and the project therefore provides a significant benefit to the species/run.

Many sources identify that Upper Sacramento River water temperatures, particularly during these year types, are extremely important to anadromous fisheries and are considered one of the limiting factors to these species. Increasing the cold water pool in Shasta Lake to benefit anadromous fish was specifically identified in both the NMFS Draft Recovery Plan (2009) and the Final Recovery Plan (2014), as water temperatures and flow, particularly during dry and critically dry years (e.g., drought periods) are of stressors of "very high" importance for Chinook salmon populations, and those populations are highly vulnerable to prolonged drought conditions. The beneficial impacts claimed from the SALMOD modeling results are consistent with species needs and limitations identified above by fisheries agencies.

Please refer to Master Comment Response DSFISH-3, "Fish Habitat Restoration," and Master Comment Response DSFISH-5, "Fish and Wildlife Coordination Act Report."

NRDC1-66: The commenter does not raise a specific issue, instead the comment is vague and therefore no specific response can be provided.

Please refer to Master Comment Response GEN-4, "Best Available Information," and Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

NRDC1-67: Baseline conditions and alternatives all include the operational RPA requirements. All operations simulation modeling in the DEIS was performed with the CalSim II simulation model, the best available tool for modeling joint CVP/SWP system operations in California. The assumptions in the modeling, used in support of this document, included the 2008/2009 BO's as well as the most recent versions of all other regulatory conditions. Specific details of the assumptions included in the CalSim-II modeling are included in the Modeling Appendix. In the modeling many other water supply and water quality requirements must be met to allow exports. Delta wide requirements are met with the additional releases from the enlarged Shasta reservoir allowing additional pumping. The results of this modeling include the system response to the project including changes in reservoir storages, releases, stream flows, and Delta exports. These results are summarized in the text with full results included in the Modeling Appendix.

Please refer to Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

NRDC1-68: Adaptive management, by definition, allows for adjustments of existing or developments of new rules based on specific,

rare, or unforeseen future conditions that are not adequately covered by existing rule definitions at the time they occur. Since these future conditions are not known at the present time the rules cannot be developed and cannot be implemented in the modeling and analysis. As stated in the Modeling Appendix, Chapter 2, "CalSim-II," Section "Model Assumptions," Reclamation worked collaboratively with NMFS, USFWS, and CDFW to implement the RPAs. During this process the adaptive management provisions were taken into consideration to the extent possible to allow flexibility in future operations if and when required.

NRDC1-69: Table 2-1 in Chapter 2, "CalSim-II," of the DEIS Modeling Appendix lists the assumptions used in the operations modelling using CalSim-II. As described in the DEIS, the Fall X2 RPA Action is implemented in the operations modeling. The full set of CalSim-II outputs for existing and future conditions and all action alternatives were included in the DEIS DVD, which was mailed to all stakeholders on the SLWRI mailing list. However, the results presented in the Attachment 1 to the Fisheries and Aquatic Ecosystems Technical Report were incorrectly summarized in the DEIS. These tables have been revised to correctly summarize the data. Please see the updated information on X2 position in Tables 2-97 through Table 2-120 that show compliance of Fall X2 RPA action requirements.

NRDC1-70: Table 2-1 in Chapter 2, "CALSIM," of DEIS Modeling Appendix lists the assumptions used in the operations modelling using CalSim-II. Part B of RPA Component 1, Action 1 – "First Flush" is included in the DEIS operations modeling using CalSim-II. In the DEIS operations modeling, Part A of the action (December 1-December 20) is not implemented in the model because, it was considered unlikely or rarely to occur on the basis of historical salvage data.

OMR flows reported in the DEIS in wet years during the month of December are highly negative due to the following reasons. CalSim-II is based on monthly time-steps, whereas the Part B of the RPA Action 1 contains a partial-month (14 day) action condition. Therefore, the action is implemented in CalSim-II based on a day-weighted average approach. The OMR regulation is only enforced starting Dec 21 and the monthly average results do not explicitly show the partial-month requirements. And there are a few wet years where the first flush does not occur until January.

NRDC1-71: As stated in Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects," An increase in Delta outflow of 200 to 300 cfs during dry or critical water years would not result in significant impacts to Delta fisheries, particularly at flows between 3,500 and 6,000, while a decrease in Delta outflow in

November by around 700 cfs when outflows are higher in November would also not result in significant impacts to Delta fisheries.

While Delta outflow criteria for delta and longfin smelt, as identified in SWRCB 2010 (the cited report provided by the commenter), are not always met under the action alternatives; they are also not always met under the baseline conditions during those same years (Existing Conditions and No-Action Alternative). Green sturgeon were not listed in Table 2 of SWRCB 2010, Species of Importance, and page 53 of the same report states "No specific Delta outflow requirements are recommended for Chinook salmon."

NRDC1-72: The Modeling Appendix, "Attachment 2 SRWQM," includes the output for all water temperatures and includes the water years. While these results do show up in a monthly format, water temperatures were not calculated as monthly temperatures. The SRWQM calculates water temperatures in 6-hour intervals. These water temperatures were used in the impact assessment, even though the monthly values were shown in the figures.

Please refer to Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts."

NRDC1-73: The Modeling Appendix, "Attachment 2 SRWQM," includes the output for all water temperatures and includes the water years. While these results do show up in a monthly format, water temperatures were not calculated as monthly temperatures. The SRWQM calculates water temperatures in 6-hour intervals. These water temperatures were used in the impact assessment, even though the monthly values were shown in the figures.

Please refer to Master Comment Response DSFISH-10, "Methodology for Evaluating Fisheries Impacts."

NRDC1-74: The assumptions in the modeling used in support of the DEIS included the 2008/2009 BO's as well as the most recent versions of regulatory conditions. Specific details of the assumptions, included in the CalSim II modeling, are included in the Modeling Appendix. As stated in the Modeling Appendix, "It is assumed that either VAMP, a functional equivalent, or SWRCB D-1641 requirements would be in place in 2020. CVP and SWP VAMP export restrictions during the April 15 to May 15 pulse period were not included in CalSim-II modeling."

NRDC1-75: While it is likely that the resource agencies will step in and cease operations before take limits are reached, Reclamation cannot assume at this stage that this will occur. Based on modeling results, if

the resource agencies fail to take this step, these are the number of fish that would be entrained under the operational scenarios. The differences under each action alternative are shown in separate tables in Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects," which show that minimal changes from the baseline conditions would occur. If, however, resource agencies require operations to cease before reaching take limits, then no impact to the listed species would occur.

Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

NRDC1-76: The Wildlife Resources Technical Report, Attachment 11, "California Red-legged Frog Habitat Assessment Report 2012," provides information on the California red-legged frog (*Rana draytonii*) (CRLF) site assessments that were conducted during 2010 and 2012. Following the USFWS guidance, Reclamation conducted CRLF site assessments that included the southern and southwestern portions of Shasta Lake and a standard 1.0-mile radius buffer area.

The Wildlife Resources Technical Report, Attachments 18 – 23, provide information on CRLF Habitat Assessments for potential downstream restoration areas.

NRDC1-77: Please refer to Master Comment Response CEQA-1, "CEQA Compliance," and Master Comment Response CEQA-2, "CEQA Mitigation."

NRDC1-78: Chapter 2, "Alternatives," describes the baselines for comparison. Multiple baselines are used to allow for informed decision-making by describing the 1) differences in the no-action/no-project alternative as compared to the action alternatives and 2) existing conditions as compared to the action alternatives. Efforts were made to simplify the document as much as feasible while meeting the needs to disclose environmental effects to the extent required to meet current legal requirements for full disclosure, including multiple baselines.

Please refer to Master Comment Response CEQA-1, "CEQA Compliance."

NRDC1-79: As stated in Chapter 1, "Introduction," the Final EIS is being published along with the Final Feasibility Report. The Final Feasibility Report incorporates information contained in the Final EIS by reference, and will be used to determine the type and extent of Federal interest in enlarging Shasta Dam and Reservoir. The Final EIS and the Final Feasibility Report will be used together to support the Federal decision. Analysis for the DEIS relied on the updated USFWS

2008 Revised Biological Opinion on the Coordinated Operations of the Central Valley Project and State Water Project in California. (USFWS 2008) and the NMFS 2009 Revised Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (NMFS 2009).

The Draft Feasibility Report was not incorporated by reference into the DEIS. The feasibility report has been updated to reflect the 2008 and 2009 BOs.

Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

NRDC1-80: As stated in Chapter 1, "Introduction," the Final EIS is being published along with the Final Feasibility Report. The Final Feasibility Report incorporates information contained in the Final EIS by reference, and will be used to determine the type and extent of Federal interest in enlarging Shasta Dam and Reservoir. The Final EIS and the Final Feasibility Report will be used together to support the Federal decision. There is no NEPA requirement to update the feasibility report.

NRDC1-81: Comment noted.

NRDC1-82: A discussion of the key indicators of climate change in California based on California Environmental Protection Agency's publication, "Indicators of Climate Change in California," (2013) is presented in Chapter 2, "Summary of Previous Studies of Climate Change in the Study Area," of the Climate Change Modeling Appendix of the EIS.

NRDC1-83: As described in DEIS Chapter 5, "Air Quality and Climate" Section 5.2, "Regulatory Framework," CEQ issued guidance on including GHG emissions and climate change impacts in environmental review documents under NEPA. CEQ's guidance (issued February 18, 2010) suggests that Federal agencies "consider opportunities to reduce GHG [(greenhouse gas)] emissions caused by proposed Federal actions, adapt their actions to climate change impacts throughout the NEPA process, and address these issues in their agency NEPA procedures." The following are the two main factors to consider when addressing climate change in environmental documentation:

- The effects of a proposed action and alternative actions on GHG emissions
- The impacts of climate change on a proposed action or alternatives

Effects of the no-action and action alternatives on GHG emissions are discussed in Chapter 5, "Air Quality and Climate," Section 5.3, "Environmental Consequences and Mitigation Measures."

Cumulative effects of climate change on resource areas are discussed in the "Cumulative Effects" sections in each of the resource section chapters of the DEIS. In addition, the Climate Change Modeling Appendix provides an assessment of the potential to achieve the objectives of the SLWRI under projected future climate change. (See CC-1 for a description of the differences between the Appendix and the information used in the DEIS chapters).

Because of the very uncertainty related to how global climate change will impact runoff and water temperatures at a regional or local scale, the quantitative analysis of future operational scenarios becomes speculative and must, by nature incorporate a number of scenarios, each of which may be more or less likely than other scenarios. Reclamation used the best available information and science in developing Chapter 5, "Air Quality and Climate," and the Climate Change Modeling Appendix.

Please refer to Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations."

NRDC1-84: Please refer to Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations."

NRDC1-85: As described in DEIS Chapter 5, "Air Quality and Climate," Section 5.2, "Regulatory Framework," CEQ issued guidance on including GHG emissions and climate change impacts in environmental review documents under NEPA. CEQ's guidance (issued February 18, 2010) suggests that Federal agencies "consider opportunities to reduce GHG [(greenhouse gas)] emissions caused by proposed Federal actions, adapt their actions to climate change impacts throughout the NEPA process, and address these issues in their agency NEPA procedures." The following are the two main factors to consider when addressing climate change in environmental documentation:

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- The impacts of climate change on a proposed action or alternatives

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Please refer to Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations," and Master Comment Response CC-2, "Climate Change Projections."

NRDC1-86: Reclamation as the lead agency has determined the appropriate baseline assumptions and tools for analysis and has consulted other agencies, tribal members, and the public through the scoping process. Please see Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.3.1, "Methods and Assumptions," and the Modeling Appendix for a further discussion on this topic. The EIS relies on the most current RPAs in the 2008 and 2009 Biological Opinions that avoid jeopardy.

Please refer to Master Comment Response ALTR-1, "Range of Alternatives General," Master Comment Response DSFISH-2, "Other Fisheries Models and Tools," Master Comment Response ALTS-1, "Alternative Selection," and Master Comment Response ESA-1, "Compliance with the Endangered Species Act."

NRDC1-87: The discussion of cumulative impacts within each resource area (Chapters 4–25) focuses on significant and potentially significant cumulative impacts, and mitigation is provided for adverse cumulative impacts, where feasible. As described in EIS Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," cumulative impacts were evaluated both qualitatively and quantitatively.

Quantitative cumulative impacts evaluations were generally based on evaluations using existing and future conditions modeling. Modeling for both existing and future conditions reflect operations described in the

2008 Reclamation Long-Term Operation BA and operational requirements in the 2008 USFWS BO and the 2009 NMFS BO, as described in Table 2-2 of the Modeling Appendix. Existing conditions modeling was based on a 2005 level of development and current facilities, as defined in 2012 (referred to as a 2005 baseline). Future conditions (No-Action Alternative) modeling was based on a projected 2020 level of development for the Sacramento Valley, a projected 2030 level of development for the San Joaquin Valley, and reasonably foreseeable future projects and facilities (referred to as a 2030 baseline).

The Final EIS has been revised to reflect, for each resource category, where the analysis of cumulative impacts was quantitative, and where the analysis was qualitative. For example, cumulative effects on hydrologic conditions for the proposed project were analyzed quantitatively using modeling runs with the No-Action Alternative (future conditions) compared to modeling runs with existing conditions. The No-Action Alternative was compared to existing conditions to identify the cumulative impacts of reasonably foreseeable future projects and conditions on hydrologic conditions. Similarly, project alternatives were compared to existing conditions (thus satisfying CEQA requirements) and to the No-Action Alternative (satisfying NEPA requirements) to identify the combined cumulative effect of project alternatives and other foreseeable projects and facilities. As described above, the SLWRI No Action Alternative (2030 baseline) includes forecasted 2020-2030 level of development and related demands for water. This quantitative analysis of cumulative impacts for hydrologic conditions is beyond perfunctory.

Another example of a quantitative analysis can be found in Chapter 5, "Air Quality and Climate." For the analysis of cumulative impacts on air quality for the project, a quantitative assessment of effects was made to assess the regional cumulative impacts on air quality quantitatively using modeling analyses. As described in Chapter 5, "Air Quality and Climate," significance thresholds for the Shasta County Air Quality Management District (SCAQMD) are defined in the Shasta County General Plan (SCAQMD 2004). The analysis of local cumulative impacts is based on both the plan approach, which defines impact thresholds, and the list approach, which identifies projects that may emit pollutants in the same area as the SLWRI. SCAQMD standards for criteria pollutants have been established to limit the emissions of individual projects when considering the cumulative effect of all projects on regional pollutant concentrations. Therefore, a significant direct project impact would also be a cumulatively considerable incremental contribution to a significant cumulative impact. This quantitative analysis of cumulative impacts for air quality conditions is beyond perfunctory.

As a related example, the cumulative effect of the SLWRI comprehensive plans in combination with other past, present, and reasonably foreseeable projects is evaluated in the EIS for climate change on a quantitative basis. The ways in which the project would affect GHG production are described in Chapter 5, "Air Quality and Climate." The Climate Change Modeling Appendix provides a summary of global climate forecasts and a discussion of the cumulative implications of climate change for California water resources. This appendix also includes quantitative analyses of climate change for selected comprehensive plans on relevant resource areas. The discussion of climate change implications provided in the Climate Change Modeling Appendix provides context for consideration of cumulative conditions. The cumulative effects analysis of the SLWRI was tiered to the CALFED analysis with updated projects and modeling. Reclamation believes that this analysis of cumulative impacts is more than perfunctory, satisfies NEPA requirements, and provides a "useful analysis of the cumulative impacts of past, present and future projects" as referenced by the commenter.

Please refer to Master Comment Response NEPA-2, "Cumulative Impacts."

NRDC1-88: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," and Master Comment Response EI-7, "Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS."

NRDC1-89: Please refer to Master Comment Response BDCP-1, "Relationship of the SLWRI to the Bay Delta Conservation Plan," Master Comment Response EI-7, "Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS."

NRDC1-90: Both the North-of-Delta Offstream Storage Investigation (Sites Reservoir) and the Upper San Joaquin River Basin Storage Investigation (Temperance Flat) are still planning studies with multiple potential alternatives. Because actions have not been authorized for either study by Congress at this time, Reclamation considers that a selection of any one alternative is too speculative at this point in time for consideration in the quantitative analysis. Both studies are considered in the qualitative cumulative effects analysis and considered in the cumulative effects analysis for relevant resource areas throughout the DEIS qualitatively in combination with one another. The text in Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," of the Final EIS has been amended to

reflect project updates for the storage projects in the assessment of qualitative cumulative impacts.

Please refer to Master Comment Response EI-7, “Bay Delta Conservation Plan Too Speculative to Provide Meaningful Quantitative Cumulative Analysis in SLWRI EIS," and Master Comment Response NEPA-2, “Cumulative Impacts.”

NRDC1-91: It is unlikely that any of the regulatory requirements, including those established in the BOs or by the SWRCB, in the reasonably foreseeable future would be removed. These standards require that specific X2, Delta outflow, OMR and entrainment requirements are met so as to protect fish species in the Delta. As a result, there would be minimal cumulative impacts to Delta fish, as identified in Chapter 11, “Fisheries and Aquatic Ecosystems,” Section 11.3.5, “Cumulative Effects.”

Please refer to Master Comment Response NEPA-2, “Cumulative Impacts.”

NRDC1-92: Please refer to Master Comment Response CEQA-1, “CEQA Compliance,” and Master Comment Response CEQA-2, “CEQA Mitigation.”

NRDC1-93: Please refer to Master Comment Response FISHPASS-1, “Fish Passage Above Shasta Dam.”

NRDC1-94: Please refer to Master Comment Response CR-1, “Potential Effects to Cultural Resources,” Master Comment Response ALTD-2, “Alternative Development- Anadromous Fish Survival,” and Master Comment Response ALTD-1, “Alternative Development- Water Supply Reliability.”

NRDC1-95: Please refer to Master Comment Response CR-1, “Potential Effects to Cultural Resources,” and Master Comment Response CR-11, “Cultural Resources and NEPA.”

NRDC1-96: Please refer to Master Comment Response CR-15, “National Historic Preservation Act Section 106 Consultations.”

NRDC1-97: Please refer to Master Comment Response CR-1, “Potential Effects to Cultural Resources,” and Master Comment Response CR-11, “Cultural Resources and NEPA.”

NRDC1-98: Please refer to Master Comment Response WASR-6, “Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542.”

NRDC1-99: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

NRDC1-100: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," and Master Comment Response ALTR-1, "Range of Alternatives General."

NRDC1-101: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River."

NRDC1-102: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response CEQA-1, "CEQA Compliance," Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," and Master Comment Response NEPA-1 "Sufficiency of EIS."

NRDC1-103: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability, "Master Comment Response CEQA-1," "CEQA Compliance," Master Comment Response NEPA-1, "Sufficiency of the EIS," Master Comment Response CR-1, "Potential Effects to Cultural Resources," Master Comment Response CR-11, "Cultural Resources and NEPA," WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival."

NRDC1-104: Please refer to Master Comment Response NEPA-1, "Sufficiency of the EIS."

33.10.26 Natural Resources Defense Council

BISON CONNECT

Fwd: NRDC comments on SLWRI - attachments (2 of 2 emails)

KATRINA CHOW <kchow@usbr.gov> Wed, Oct 23, 2013 at 1:09 PM
To: KATHLEEN DUNCAN <kduncan@usbr.gov>

Sent from my iPhone

Begin forwarded message:

From: "Obegi, Doug" <dobegi@nrdc.org>
Date: September 30, 2013, 5:10:56 PM PDT
To: "KChow@usbr.gov" <KChow@usbr.gov>
Cc: "Rachel Zwillinger (external)" <rzwillinger@altshulerberzon.com>
Subject: NRDC comments on SLWRI - attachments (2 of 2 emails)

Dear Ms. Chow,

Attachments 2 and 3 to our comments are included with this email.
Please let me know if you have any problems opening the attachments.

Sincerely,

Doug

Doug Obegi

Staff Attorney*

Water Program

Natural Resources Defense Council

111 Sutter Street, 20th Floor

San Francisco, CA 94104

415.875.6100 (phone)

415.875.6161 (facsimile)

* *Admitted to practice in California*

2 attachments

Attachment 2.pdf
1989K

Attachment 3.pdf
33K

NRDC

NATURAL RESOURCES DEFENSE COUNCIL

January 28, 2013

Katrina Chow
Project Manager
Bureau of Reclamation
2800 Cottage Way, MP-720
Sacramento, CA 95825-1893

Sent via email to BOR-MPR-SLWRI@usbr.gov

RE: Comments on Draft Feasibility Report for Shasta Lake Water Resources Investigation

Dear Ms. Chow:

On behalf of the Natural Resources Defense Council, which has more than 250,000 members and activists in California, I am writing to provide brief comments on the draft feasibility report for the Shasta Lake Water Resources Investigation ("SLWRI"). The draft feasibility report and preliminary draft environmental impact statement ("preliminary DEIS") are significantly flawed, and do not accurately analyze the cultural and environmental impacts of the project. Below we highlight several of the problems with the analysis.

NRDC4-1

First, the SLWRI will cause significant and unavoidable effects on cultural and tribal resources. The Winnemem Wintu Tribe has prepared detailed comments on the draft feasibility report, and we support their comments on the significant adverse effects of the project on cultural and tribal resources.

NRDC4-2

Second, the draft feasibility report and preliminary draft environmental impact statement ("preliminary DEIS") are fatally flawed because they analyze effects based on an unlawful operational scenario (2004 OCAP). *See* draft feasibility report at ES-11, 2-42 to 2-44, 6-13. The analysis wholly ignores requirements in more recent biological opinions regarding Shasta Lake minimum end of September reservoir storage, as well as restrictions on operations in the Delta to avoid jeopardizing the continued existence and recovery of winter run Chinook salmon and other native fish species.[1] As a result, the analysis overestimates benefits to fish and wildlife and to water supply. *See id.* at 5-20 to 5-21 (acknowledging that implementation of the existing

NRDC4-3

NRDC4-4

[1] The 2009 NMFS biological opinion is available online at: http://www.swr.noaa.gov/ocap/NMFS_Biological_and_Conference_Opinion_on_the_Long-Term_Operations_of_the_CVP_and_SWP.pdf. The 2008 U.S. Fish and Wildlife Service biological opinion is available online at: http://www.fws.gov/sfbaydelta/documents/SWP-CVP_OPs_BO_12-15_final_OCR.pdf. These documents are incorporated by reference. The Bureau of Reclamation has recently reiterated in filings with the Federal District Court for the Eastern District of California that it will continue to operate in compliance with these biological opinions and RPA actions. *See, e.g., Consolidated Salmonid Cases*, Case No. 1:09-cv-00407-LJO-DLB, Doc. 726. Therefore, the draft feasibility report must utilize an operational scenario that is consistent with these existing biological opinions in the analysis of the effects of the SLWRI.

NRDC4-3 CONTD

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NRDC4-4 CONTD

RPA actions will reduce water supply benefits shown in the analysis, and acknowledging that there is "significant uncertainty" as to the magnitude of benefits from implementing the RPA actions and the SLWRI).

NRDC4-5

In order to provide accurate information to the public, consistent with the requirements of NEPA, the draft feasibility report and preliminary DEIS must be substantially revised to incorporate the existing biological opinions. In addition, the documents must include an analysis of climate change effects in order to provide adequate information on the potential impacts of the project. *See id.* at 5-28. The effects of climate change are part of the regulatory baseline.

NRDC4-6

Similarly, the preliminary DEIS acknowledges that the SLWRI is likely to reduce Delta outflow, but it unlawfully assumes that the only significant impacts would be in December and January, and that any changes in delta outflow (or X2) that still meet the minimum requirements of D-1641 would not cause a significant impact. *See* Preliminary DEIS at 6-36.

NRDC4-7

However, reductions in Delta outflow are likely to result in a significant environmental impact, including impacts on longfin smelt (which is listed under the California Endangered Species Act) and numerous other fish and wildlife species.[2]

NRDC4-8

In addition, the wild and scenic resources of the McCloud River are protected under California law. Cal. Public Res. Code §§ 5093.50 *et seq.* However, the documents demonstrate that the SLWRI will inundate protected segments of the McCloud River, in violation of state law, and it appears that the project likely will adversely affect its wild trout and fishery. *See* Preliminary DEIS, Chapter 25.

NRDC4-9

Finally, the draft feasibility report assumes that the vast majority of the costs would be for fish and wildlife purposes. However, because the analysis largely ignores the improved carryover storage requirements for Shasta Reservoir under the existing biological opinion (NMFS 2009) to protect salmon listed under the Endangered Species Act ("ESA"), the analysis appears to dramatically overstate the ecological benefits of increased storage by ignoring these ESA requirements. As a result, the cost-benefit analysis is highly flawed and unreliable. Meeting existing mitigation or other legal requirements, such as ESA requirements in the 2009 NMFS biological opinion, cannot result in fish and wildlife benefits of the project; any fish and wildlife benefits must be in addition to existing legal requirements.

NRDC4-10

The cost-benefit analysis must be entirely redone, utilizing a lawful operational scenario and only assessing fish and wildlife benefits for additional protections (not existing mitigation or other requirements). The assessment of benefits to fish and wildlife must also incorporate the adverse effects of the project, and cannot only consider beneficial effects.

NRDC4-11

The current cost: benefit analysis appears to propose that the public should pay for mitigation that is already required, for effects that are likely to harm the Bay-Delta ecosystem, and for effects that significantly and unavoidably harm the Winnemem Wintu Tribe, its tribal heritage, and the wild and scenic resources of the McCloud River. That is wholly inappropriate.

NRDC4-7 CONTD

[2] For instance, the State Water Resources Control Board's 2010 Public Trust flow report concluded that, based on the best available science, the abundance of longfin smelt (as well as the abundance of other species, such as *Eurytemora affinis*) is positively correlated with Delta outflow, and that substantial increases in Delta outflow are necessary to fully protect longfin smelt and other Public Trust resources. That report is available online at: www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/deltaflow/docs/final_rpt080310.pdf and is incorporated by reference.

NRDC comments on SLWRI Preliminary Feasibility Report
January 28, 2013

Thank you for consideration of our views. Please contact us at your convenience if you have any questions about these comments or would like to discuss them further.

Sincerely,

Doug Obegi
Staff Attorney

ATTACHMENT 3:
See Copy of letter to the Bureau of Reclamation, January, 2006, on SALMOD enclosed.

State of California The Resources Agency ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
601 Locust Street
Redding, CA 96001
(530) 225-2363

February 3, 2006

Mr. James DeStaso
U.S. Bureau of Reclamation
16349 Shasta Dam Boulevard
Shasta Lake, CA 96019

Dear Mr. DeStaso:

Initial Comments on the SALMOD Model and Shasta Lake Water Resources Investigation Related to Enlarging Shasta Dam

The U.S. Bureau of Reclamation (BOR) is planning to use the SALMOD fisheries model on the upper Sacramento River in their effort to analyze the effects of the Enlarged Shasta Project (Project). The Department of Fish and Game (DFG) is providing our concerns and comments for BOR to consider in using and/or modifying the SALMOD model. The DFG is also providing other sources of information and tools that should be considered in the Project evaluation and an initial list of natural resource issues that should be addressed, in addition to fisheries, as part of the Project investigation.

The DFG has three general areas of concern with the use of SALMOD as an evaluation tool for the Project. We have divided our comments into these three areas of concern which include, but may not be limited to, the assumptions used in the model, validation of the model, and further considerations. We provide the following specific concerns and comments for your consideration.

SALMOD Assumptions:

We question whether the primary assumption of the model is valid (i.e., egg and juvenile fish mortality are directly related to spatially and temporally variable microhabitat limitations which are directly related to the timing and quantity of stream flow). Data collected in recent years for winter-run Chinook salmon (*Oncorhynchus tshawytscha*) at Red Bluff Diversion Dam indicate the number of juveniles emigrating from the upper Sacramento River correlates very closely with the number of adult spawners (Gaines and Poytress 2003). This suggests that at the current winter-run population levels, over the range of flows and water temperatures that have occurred in recent years, physical habitat does not appear to be limiting juvenile production. The upper Sacramento River is a

very large and complex system, much larger than the Trinity River system where SALMOD has been used. It is not intuitive that physical habitat for rearing of a few million juvenile salmon would currently be limiting their production on the Sacramento River.

The DFG is concerned that the SALMOD input assumptions may not adequately address species habitat preference, selection and behavior. SALMOD is based on the premise that egg and fish mortality is directly related to spatial and temporally variable micro and macrohabitats. It is our understanding that SALMOD assumes that mesohabitats with more suitable habitat have a higher capacity than those with less suitable habitat. However, it has been our experience on the Klamath River that habitat-induced movements may be substantially influenced by the presence or absence of specific micro, submeso, meso, or macrohabitat types. Consequently, a habitat use, preference and availability investigation should be conducted for various anadromous salmonid races and life stages to obtain appropriate input data before using SALMOD on the Sacramento River. Such an investigation may identify other important subhabitat components which should be included in the SALMOD analysis. The DFG recommends that BOR review the available information and literature for micro, submeso, meso, and macrohabitat availability and species life stage habitat selection on the Sacramento River. We also recommend using the functional cover type definitions on pages 17 and 18 of Hardin (2005). If insufficient information is available to identify habitat availability and importance, BOR should conduct necessary investigations to obtain these data.

DFG believes BOR should consider work completed on the Klamath River as an example of the importance of considering other subhabitat components in salmonid habitat preference, selection and availability analyses. Meso and submesohabitat units have been shown to be important to young salmonids in the Klamath River. Inundation of specific vegetation (e.g., emergent and nonemergent aquatics, young willows, grasses, etc.) during specific times of the year provides critical habitat for coho fry (*Oncorhynchus Kisutch*), but somewhat less so for Chinook. Hard substrate elements (rocks, boulders, etc.) are not used extensively (Smith, 2005). In addition to the specific inundated vegetative component, the proximity of the component to the fish (or in the case of a model, the modeled station or focal point) may also be critical. For example, on the Klamath River approximately 96% of nearly 7,000 observed Chinook fry (across several different years and flows) were found within two feet of inundated vegetation. The vast majority of these fish were not within (i.e., actively using) the vegetation. This was termed "escape cover," as the fish are not actively using the component (Smith, 2005). Sacramento River anadromous salmonids may or may not demonstrate similar habitat selection and/or orientation as their

Klamath River counterparts. Moreover, Sacramento River habitat availability (existing and/or restored) may differ from the Klamath River. Thus, Klamath River data should not be applied on the Sacramento without validation of transferability.

Bartholow (2003) states, "...I have assumed that the four races do not use, and compete for, the same microhabitat at the same time...". We believe this assumption is an over-simplication because it implies that juveniles of each Chinook race sequentially use rearing habitat in the upper river and have no overlap in residence period. Chinook juveniles of all sizes and multiple races rear in the upper river year-round and should be addressed in the model.

Superimposition of redds is also a factor in the SALMOD model which is assumed to limit spawning success. At current population levels, superimposition is not commonly observed and probably is not a significant factor influencing production of anadromous salmonids in the upper Sacramento River. Consequently, the DFG recommends removing this factor as a model assumption.

Another assumption that should be dealt with carefully is the temperature tolerance function in the model. The overall temperature tolerance criteria currently used in SALMOD meets the regulatory objectives. The life stage data pertaining to temperature criteria are also valid. The DFG believes it is important whenever possible to meet these regulatory standards for anadromous fish in the upper Sacramento River and to use the best available scientific information. However, it is also important from a fishery management perspective to use the precautionary principle, i.e. there is the need to take action in advance of having complete, conclusive data in order to avoid potentially catastrophic events. This is particularly true for a listed species such as winter-run Chinook salmon. The use of only regulatory temperature assumptions in SALMOD could limit the length of habitat judged to be suitable for future temperature management of the Sacramento River. There are foreseeable drought conditions when cold water reserves in Lake Shasta will not meet the regulatory temperature objectives for the survival of winter-run Chinook. Predictions from a planning report for the Shasta outflow temperature control device indicates in at least ten out of every 100 years, cold water reserves will be limited (USBR 1991). Under these conditions BOR and fishery managers will have to make difficult decisions on how and when to use those limited cold water reserves. Temperature-induced mortality of eggs and fry is dependent upon both temperature and exposure time (FWS 1990). The USFWS (1999) evaluated the effects of temperature on survival of winter-run Chinook at four stages of embryonic development. The USFWS study was not rigorous enough to clearly identify a critical life stage for which to provide the regulatory temperature of 56°F. However, the study did show the importance of maintaining low temperatures at the earliest life stages of embryonic development.

DFG requests that modeling runs be conducted for dry and critically dry years which take into account the potential increased survival rates of these early life-history stages when provided cooler water. Modeling results of this sort will be valuable to BOR and fishery management agencies in developing management strategies to best ensure the survival of winter-run Chinook salmon under drought conditions in the Sacramento River.

Modeling runs should also include the current operations of Shasta Dam and operations under an enlarged Shasta scenario. A comparison of modeling outputs with and without the Project will help identify potential benefits or detriments of the Project.

SALMOD Validation:

SALMOD appears to have potential value, but has not been adequately validated for the upper Sacramento River except on a very gross scale. SALMOD should be used in conjunction with other models and empirical studies to validate output before it is used in a decision making process. For example, C-Pop, which was developed by Biosystems, Inc. (under contract with National Marine Fisheries Service), is another resource for assessing fall-run and winter-run Chinook (two separate models). The main scientist and modeler for C-Pop is Wim Kimmerer, who is now a member of the California Bay Delta Authority, Ecosystem Restoration Program Science Board. Population dynamics factors used in the SALMOD model must be validated if the model is to be of any use for the Sacramento River.

The DFG is concerned with the current lack of validation regarding the model's density-dependent assumptions for juvenile life stages. Given the large size of the Sacramento River and its length, it will be difficult to work with a density-dependent model. The validation step will be extremely difficult and will require a detailed evaluation of the Instream Flow Incremental Methodology (IFIM) study which has recently been completed on the Sacramento River by USFWS. Minimally, some effort should be made to run the model with populations that were present in the 1960's since the density of juveniles was much higher then. Quantitative juvenile Chinook data are also available from rotary screw trap sampling at Red Bluff Diversion Dam (RBDD) and could be used to validate model predictions.

Further Considerations for SALMOD:

Bartholow (2003) indicates the downstream extent of the study area for the original SALMOD model was the mouth of Battle Creek because hatchery-reared salmon from Coleman National Fish Hatchery on Battle Creek confound the enumeration of natural spawned salmon in the Sacramento River downstream of

that point. A noticeable proportion of fall-run Chinook spawning, which takes place in the Sacramento River upstream of the mouth of Battle Creek, also includes hatchery origin fish (Killam and Arrison 2005). The influence of these hatchery origin salmon on the production of natural fall-run Chinook from the Sacramento River above and below Battle Creek should be taken into consideration in the SALMOD modeling analysis.

Tributaries to the Sacramento River must also be considered for their substantial role in providing habitat to juvenile salmonids as they migrate downstream. Large perennial tributaries to the Sacramento River provide spawning and rearing habitat (e.g., Battle Creek, Cow Creek, Clear Creek, Cottonwood Creek, Deer Creek, Mill Creek, and others). Smaller tributaries also play a role in providing non-natal rearing habitat for juveniles (Maslin, et. al. 1996). We recommend consideration of non-natal tributary rearing habitat and natal tributary production and rearing habitat as important factors in your modeling efforts.

There is doubt that a distinct spring-run Chinook salmon population still spawns in the main-stem upper Sacramento River, because spawn timing and areas overlap with fall-run Chinook spawning. However, main-stem and tributary rearing habitat for juvenile spring-run Chinook should still be considered for known tributary populations including Clear Creek, Battle Creek, Beegum Creek, Antelope Creek, Mill Creek, Deer Creek and Butte Creek.

To the degree it is applicable and/or comparable to conditions on the Sacramento River, we recommend review of Trinity River Record of Decision (ROD), implementation plan and flow evaluation report. There is also a detailed science framework being developed that will incorporate SALMOD as one of the tools to evaluate success of the program. The use and limitations of SALMOD on the Trinity River should be consistent with its use on the Sacramento River.

Further Project Considerations:

The DFG is concerned with the geographic scope for Project modeling and impact analysis. The recent notice of intent filed on the Shasta Lake Water Resources Investigation (SLWRI), identifies the primary study area as Shasta Dam and Reservoir; tributary rivers and streams including the upper reaches of the Sacramento River, McCloud River, Pit River, and Squaw Creek; and the Sacramento River downstream from Shasta Dam to about the RBDD. Because of the potential influence of a Shasta Dam modification on natural resources along the Sacramento River and on programs and projects in the Central Valley, the extended study area includes other major tributaries to the Sacramento River, the Sacramento-San Joaquin Delta, San Joaquin River basin, and service

areas of the Central Valley Project (CVP) and State Water Project (SWP). The DFG wants to clarify that the extended study area should also include all of the Sacramento River from Shasta Dam to the Delta. We believe that any modeling effort or impact analysis for the Project must cover the entire Sacramento River system, tributaries and the Sacramento-San Joaquin Delta.

The Project analyses should consider existing conditions, other foreseeable water projects and restoration efforts, legislated programs, applicable permits and likely conditions if the Project is implemented. For example, we recommend review and consideration of coordinated operations and cumulative impacts of the Project with a potential North of Delta Offstream Storage Project (NODOS) currently being evaluated by the California Department of Water Resources (DWR). Restoration Programs such as the Trinity River Restoration Program (TRRP), California Bay Delta Authority (CBDA) Ecosystem Restoration Program (ERP), and Central Valley Project Improvement Act (CVPIA) Anadromous Fish Restoration Program (AFRP), are good sources for current and foreseeable restoration projects. The Project must also be evaluated with respect to mandates and guidance from the CVPIA, CALFED and CBDA programs and programmatic environmental documents, the Water Rights Permit for Shasta Dam and the Trinity River Record of Decision.

As an example, the water rights permit for Shasta Lake requires the same flows below Red Bluff Diversion Dam (RBDD) as below Keswick Dam. Flows below Red Bluff may be affected by the NODOS Program if Sites Reservoir is built. The BOR flow and impact analysis of the Project should consider scenarios with and without a Sites Project. The analysis must also address how to meet the requirements of the Shasta Lake water rights permit.

The programmatic environmental documents for CVPIA and CALFED; relevant technical analyses on the Sacramento River; fisheries survey data for adult and juveniles from the USFWS and DFG programs; and hearing records for the upstream of Delta elements of the SWRCB Bay Delta Hearing process (SWRCB 2000) are examples of references available for developing baseline information.

There are also State and Federal numeric restoration goals that have been legislatively mandated and should be considered, such as doubling anadromous fish populations identified in the AFRP Working Paper (1995) and CBDA ERP milestones, targets, and actions.

BOR should also consider limiting factors developed by the AFRP in its Project analyses. Based upon the Working Paper on Restoration Needs, Volume 3 (1995), there are six primary limiting factors affecting salmon and steelhead in

the upper main-stem Sacramento River:

1) changes in the natural frequency, magnitude, and timing of flows;
2) water temperature changes;
3) passage at artificial migration barriers;
4) toxic discharges;
5) effects of hatchery stocks on natural stocks; and
6) loss of riparian forests and associated rearing habitat and water temperature moderation capacity.

Some of the identified solutions developed by AFRP have been implemented (e.g., correcting fish passage problems at the Anderson Cottonwood Diversion Dam and Glenn Colusa Irrigation District Dam, and maintaining water temperatures in the river), but many are still relevant (Table 1). These limiting factors should be considered by BOR with regard to its enlarged Shasta studies and evaluations to avoid exacerbating existing conditions or undoing some of the accomplishments and investments made by CVPIA and the CBDA.

Table 1. Upper Main Stem Sacramento River Limiting Factors as per the AFRP Working Paper (1995):

Limiting Factors	Potential Solutions
Instream flows	1. Regulate CVP flow releases to provide adequate spawning and rearing habitat 2. Avoid flow fluctuations to avert dewatering redds or stranding or isolating adults and juveniles 3. Consider all effects of flow on ecosystem
Water temperatures	1. Maintain water temperatures at or below 56 F to at least Bend Bridge to Keswick Dam except in extreme water years
Passage at artificial impairments is inadequate	1. Correct migration problems at RBDD 2. Correct fish passage and other problems at the ACID's diversion dam 3. Avoid entrapment of adults at Keswick Dam stilling basin 4. Correct unscreened pump diversions 5. Correct problems at the GCID water diversions
Contaminants	1. Remedy water quality problems associated with Iron Mountain Mine and other toxic discharges
Effects of hatchery stocks on natural spawning stocks is unknown	1. Evaluate competitive displacement between hatchery and natural stocks 2. Evaluate displacement of natural stocks by hatchery stocks 3. Maintain genetic diversity in hatchery stocks 4. Evaluate disease relationships between hatchery and natural stocks
Loss of riparian forests	1. Restore and preserve riparian forests

Limiting factors for the lower Sacramento River are not identified in the AFRP Working Paper. However, there are limiting factors identified for its tributaries (as well as the tributaries of the upper Sacramento River). These should be considered to the extent those tributaries may be affected by changes in flows as a result of enlarging Shasta Dam.

The final recommended flows to benefit fish species as a result of the Project will also have a potential effect on other natural resources associated with the Sacramento River. Consequently, the DFG has developed an initial list of other items to consider in concert with the fisheries analysis. As part of the fisheries analysis and management recommendations, the following ecological components are needed to better assess the entire ecosystem.

- **Retention and enhancement of riparian forests:** Analysis of the effect of the Project on riparian habitat should be included within the SLWRI. Riparian habitat in systems such as the Sacramento Valley is dependent upon large-scale physical processes of the river. These processes include, but are not limited to, channel migration or meander, erosion and deposition, hydrology of flooding, summer low flow cycles, and such issues as cottonwood recruitment.

  By the 1980's less than 5% of the Sacramento River's riparian habitat remained (Sacramento River Conservation Area Forum 1989). State Senate Bill 1086, which passed in 1986, established the Upper Sacramento River Fisheries and Riparian Habitat Advisory Council. This multi-agency, multi-interest advisory council developed plans and procedures to solve fisheries and riparian habitat problems of the Sacramento River and tributaries - from Keswick Dam to the mouth of the Feather River. SB-1086 also called for a management plan to protect, restore, and enhance fish and riparian habitat and associated wildlife of the upper Sacramento River. The law evolved from two separate bills, one to inventory riparian habitat and the second to develop an Upper Sacramento River Fisheries and Riparian Habitat Management Plan.

  The plan (completed in 1989) identifies specific actions that will help restore the Sacramento River fishery to its optimum state and protect and restore riparian habitat. An additional document, the Sacramento River Conservation Area Handbook, was also prepared by the Sacramento River Conservation Area Forum (SRCAF) which provides river managers with a framework of ecology and policy to guide on the ground decisions. The DFG believes that recommendations and action items in the plan and handbook should be incorporated into the SLWRI analysis and environmental impacts analysis. You may also wish to coordinate with the SRCAF in Red Bluff (Burt Bundy, SRCAF Manager, [530] 528-7411).

With respect to regulatory considerations, DFG has a policy of no net loss of wetland habitat (Fish and Game Code §§ 1600-1607, 1775-1779.5, and 1790-1792.5). Fish and Game Code §§ 1385-1391, which describes the California Riparian Habitat Conservation Program, also identifies the importance of, and criteria for, protecting river and riparian natural resources. In addition to requirements for implementing a program to double natural production of Central Valley anadromous fish, the CVPIA *(Title 34 of Public law 102-575, Section 3406(b)(1))* requires giving first priority to measures which protect and restore natural channel and riparian habitat values through habitat restoration actions, modifications to Central Valley Project operations, and implementation of the supporting measures mandated by the CVPIA.

- **Terrestrial species:** Many terrestrial species, including Federal and State listed species and species of concern, utilize the river system for foraging, dispersal, and reproduction. Neotropical migratory birds are heavily reliant on healthy riparian forests, as are a number of amphibian species, insects, and mammals. An evaluation of the impacts of the Project should also assess the effect on these species.

- **Floodplain management/inundation benefits:** Some of the most significant impacts dams can have on the character and functioning of rivers are through changes of geomorphic processes. This includes affecting sediment transport processes, channel erosion rates, inundation of the floodplain, riparian habitat loss, riparian encroachment, accelerated invasion of noxious and invasive plants and maintenance of instream habitat conditions (e.g., spawning gravel). While the proposed management of flow associated with the Project has not yet been determined, we have concerns that enlarging Shasta will further reduce flood frequency and thereby degrade floodplain conditions. An analysis of geomorphic processes and consideration of implementing a natural hydrograph is an essential part of the SLWRI.

Other Analytical Tools:

The DFG has significant concerns regarding use of the SALMOD model to evaluate effects of changes in flow management in the upper Sacramento River on Chinook salmon production. It is DFG policy to use IFIM and Physical Habitat Simulation (PHABSIM) modeling to evaluate instream flow needs in California. We therefore recommend that BOR use IFIM and PHABSIM to evaluate the Project. Analyses should include additional habitat suitability and availability investigations, and validation of PHABSIM outputs to evaluate flows associated with the Project.

Biosystems, Inc. developed C-Pop, which is actually two models for specifically assessing fall-run and winter-run Chinook salmon on the Sacramento River. We recommend that BOR coordinates closely with the lead scientist (Wim Kimmerer) of Biosystems, Inc. to consider C-Pop as an additional tool in your Project evaluations. Biosystems' experience in developing C-Pop may help BOR in avoiding past difficulties in modeling anadromous fish on the Sacramento River, in identifying limitations of past modeling efforts and in refining assumptions for SALMOD.

Analysis of water temperature changes related to the Project will be important. The Nature Conservancy's Indicators of Hydrologic Alteration tool (IHA) (Richter, et al., 1996) could be used to assess the effects of changes either toward or away from unimpaired flow conditions. In 2001, the DWR, Northern District, initiated work as part of the Integrated Storage Investigation. To perform the required tasks, it was necessary to establish baseline conditions to provide a context for future analysis. DWR used the IHA methodology to establish a baseline for determining potential alterations caused by an offstream storage reservoir. The analysis and data files (on CD-ROM) are available at the DWR, Northern District office. The DWR contact is Stacy Cepello at (530) 529-7352 or cepello@water.ca.gov.

The DFG recommends that the SALMOD model be validated wherever possible. Model limitations should be stated very clearly. An adaptive management program should be developed that identifies key uncertainties in the major model assumptions. Hypotheses should be prepared for those assumptions, and then experiments developed to test the model. Based upon experiment results, model assumptions should be changed and retested. This concludes our initial comments on SALMOD and the SLWRI. Should you require further assistance, please contact Patricia Bratcher of my staff at (530) 225-3845 or pbratcher@dfg.ca.gov.

Sincerely,

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Responses to Comments from Natural Resources Defense Council

NRDC4-1: Please refer to Master Comment Response NEPA-1, "Sufficiency of the EIS," Master Comment Response CR-1, "Potential Effects to Cultural Resources," Master Comment Response CR-11, "Cultural Resources and NEPA," and Master Comment Response EI-1, "Intent of NEPA Process is to Provide Fair and Full Discussion of Significant Environmental Impacts."

NRDC4-2: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources."

NRDC4-3: The Commenter is incorrect. Analysis for the DEIS relied on the updated USFWS 2008 Revised Biological Opinion on the Coordinated Operations of the Central Valley Project and State Water Project in California. (USFWS 2008) and the NMFS 2009 Revised Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (NMFS 2009).

Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act," and Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

NRDC4-4: The Commenter is incorrect and reviewed a previous version of the EIS. Analysis for the DEIS relied on the updated USFWS 2008 Revised Biological Opinion on the Coordinated Operations of the Central Valley Project and State Water Project in California. (USFWS 2008) and the NMFS 2009 Revised Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (NMFS 2009).

Please refer to Master Comment Response ESA-1, "Compliance with the Endangered Species Act," and Master Comment Response DSFISH-4, "Maintaining Sacramento River Flows to Meet Fish Needs and Regulatory Requirements."

NRDC4-5: As stated in Chapter 1, "Introduction," the Final EIS is being published along with the Final Feasibility Report. The Final Feasibility Report incorporates information contained in the Final EIS by reference, and will be used to determine the type and extent of Federal interest in enlarging Shasta Dam and Reservoir. The Final EIS and the Final Feasibility Report will be used together to support the Federal decision. Analysis for the DEIS relied on the updated USFWS 2008 Revised Biological Opinion on the Coordinated Operations of the Central Valley Project and State Water Project in California. (USFWS 2008) and the NMFS 2009 Revised Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (NMFS 2009).

The feasibility report has been updated to reflect the USFWS and NMFS 2008 and 2009 BOs.

As described in DEIS Chapter 5, "Air Quality and Climate," Section 5.2, "Regulatory Framework," CEQ issued guidance on including GHG emissions and climate change impacts in environmental review documents under NEPA. CEQ's guidance (issued February 18, 2010) suggests that Federal agencies "consider opportunities to reduce GHG emissions caused by proposed Federal actions, adapt their actions to climate change impacts throughout the NEPA process, and address these issues in their agency NEPA procedures." The following are the two main factors to consider when addressing climate change in environmental documentation:

- The effects of a proposed action and alternative actions on GHG emissions

- The impacts of climate change on a proposed action or alternatives

Effects of the no-action and action alternatives on GHG emissions are discussed in Chapter 5, "Air Quality and Climate," Section 5.3, "Environmental Consequences and Mitigation Measures."

Cumulative effects of climate change on resource areas are discussed in the "Cumulative Effects" sections in each of the resource section chapters of the DEIS. In addition, The Climate Change Modeling Appendix provides an assessment of the potential to achieve the objectives of the SLWRI under projected future climate change. (See Master Comment Response CC-1 for a description of the differences between the Appendix and the information used in the DEIS chapters).

Because of the very uncertainty related to how global climate change will impact runoff and water temperatures at a regional or local scale, the quantitative analysis of future operational scenarios becomes speculative and must, by nature incorporate a number of scenarios, each of which may be more or less likely than other scenarios. Reclamation used the best available information and science in developing Chapter 5, "Air Quality and Climate," and the Climate Change Modeling Appendix.

Please refer to Master Comment Response CC-1, "Climate Change Uncertainty and Related Evaluations, "Master Comment Response NEPA-1, "Sufficiency of the EIS," and Master Comment Response NEPA-2, "Cumulative Impacts."

NRDC4-6: The Commenter is incorrect and reviewed a previous version of the EIS. Analysis for the DEIS relied on the updated USFWS 2008 Revised Biological Opinion on the Coordinated Operations of the Central Valley Project and State Water Project in California. (USFWS 2008) and the NMFS 2009 Revised Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (NMFS 2009).

NRDC4-7: As stated in Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects," "An increase in Delta outflow of 200 to 300 cfs during dry or critical water years would not result in significant impacts to Delta fisheries, particularly at flows between 3,500 and 6,000, while a decrease in Delta outflow in November by around 700 cfs when outflows are higher in November would also not result in significant impacts to Delta fisheries."

While Delta outflow criteria for delta and longfin smelt, as identified in the cited report provided by the commenter are not always met, they are

not met under the baseline conditions (Existing Conditions and No-Action Alternative). Green sturgeon were not listed in Table 2. Species of Importance, and on page 53 of the report, it states: "No specific Delta outflow requirements are recommended for Chinook salmon."

NRDC4-8: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

NRDC4-9: This comment appears to be related to the Draft Feasibility Report, not the DEIS, which is the subject of these responses. To provide information related to this topic, please refer to DEIS Chapter 3, "Considerations for Describing Affected Environment and Environmental Consequences," Section 3.2.3, "Methods and Assumptions," and Chapter 2, "Alternatives," Section 2.1.6, "Development and Refinement of Comprehensive Plans." As described in the DEIS, legal challenges resulted in uncertainty regarding operational constraints for the CVP and SWP. As a result, evaluations in the Preliminary DEIS, and correspondingly the Draft Feasibility Report, which were both released to the public in February 2012, were based on available modeling and analysis at that time. This modeling and analysis reflected operations described in the 2004 OCAP BA and the Coordinated Operations Agreement between Reclamation and DWR for the CVP and SWP. These analyses were suitable for comparison purposes, and reflected expected variation among the alternatives, including the type and relative magnitude of anticipated impacts and benefits.

As described in the DEIS Chapter 3, Section 3.2.3, and Chapter 2, Section 2.1.6, subsequent to the release of the Draft Feasibility Report, the SLWRI action alternatives were further refined based on several factors, including updates to CVP and SWP operational assumptions and stakeholder input. Water operations modeling and related evaluations for the DEIS were updated to reflect the 2008 Long-Term Operation BA, 2008 USFWS BO, 2009 NMFS BO, and additional changes in CVP and SWP facilities and operations, such as implementation of the San Joaquin River Restoration Program. Evaluations in the Final Feasibility Report, including cost-benefit analyses for all comprehensive plans, were updated based on alternatives refinements and updated CVP and SWP operational assumptions included in the DEIS, including the 2008 Long-Term Operation BA, 2008 USFWS BO, and 2009 NMFS BO.

Please refer to Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report."

NRDC4-10: This comment appears to be related to the Draft Feasibility Report, not the DEIS, which is the subject of these responses. Please see response for NRDC4-9 related to the cost-benefit analyses for action alternatives and related operational scenarios. Effects to fish and wildlife, both adverse and beneficial, are evaluated in EIS Chapter 11, "Fisheries and Aquatic Ecosystems," Section 11.3.3, "Direct and Indirect Effects," and EIS Chapter 13, "Wildlife Resources," Section 13.3.4, "Direct and Indirect Effects."

Please refer to Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report."

NRDC4-11: Per, NEPA 40 CFR Section 1502.23, "…the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations." Accordingly, a cost-benefit analysis was not included in the DEIS. A preliminary cost-benefit analysis was included in the SLWRI Draft Feasibility Report, which was released to the public in February 2012. Estimated costs and benefits of action alternatives presented in the Draft Feasibility Report were determined by comparison of the with-project (action alternative) and without-project (No-Action Alternative) conditions, consistent with the Federal planning process identified in the U.S. Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&G). Evaluations in the SLWRI Final Feasibility Report, including economic feasibility evaluations, were updated based on alternatives refinements and updated CVP and SWP operational assumptions included in the SLWRI DEIS, including the 2008 Long-Term Operation BA, 2008 USFWS BO, and 2009 NMFS BO.

According to NEPA requirements, potential effects to the Delta ecosystem are evaluated in the EIS in Chapter 7, "Water Quality," Chapter 11, "Fisheries and Aquatic Ecosystems, Chapter 12, "Botanical Resources and Wetlands," and Chapter 13, "Wildlife Resources." Potential effects to wild and scenic resources of the McCloud River are evaluated in DEIS Chapter 25, "Wild and Scenic River Considerations for McCloud River."

Please refer to Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report," and Master Comment Response CR-1, "Potential Effects to Cultural Resources."

33.10.27 Northstate Women's Health Network

PUBLIC COMMENT CARD

Name: Joy L. Newcom-Wade RN, FNP, PA Organization: Northstate ♀ Health Network
Address: 3702 Fujiyama Way V.P. Board of Directors
Email:
Written (NWHN1-1 | The Water Education Foundation, W.H.O, B.I.A, and Nobel Prize economist, E.F. Schumacher Small Is Beautiful and The World Policy Institute ALL believe taking out dams, replumbing, filtering, conserving, separating, Terracing and beautification projects are MORE NECESSARY and MORE COST-EFFECTIVE than HUGE, NOISE-POLLUTING, AIR-POLLUTING, EARTH-DESTROYING DESERTIFICATION projects whose so-called "irrigation" has led to deforestation, air-pollution, pesticides, G.M.O.'s, global warming and UNSUSTAINABILITY. Build dam-raising where water-torrents warrant it — NOT where NO ONE WANTS or NEEDS IT. | Sierra Pacific Industries cogeneration PLUS solar, wind, hydro-fuel could fuel the DESALINATION
NWHN1-2 PLANT in SAND, CA.

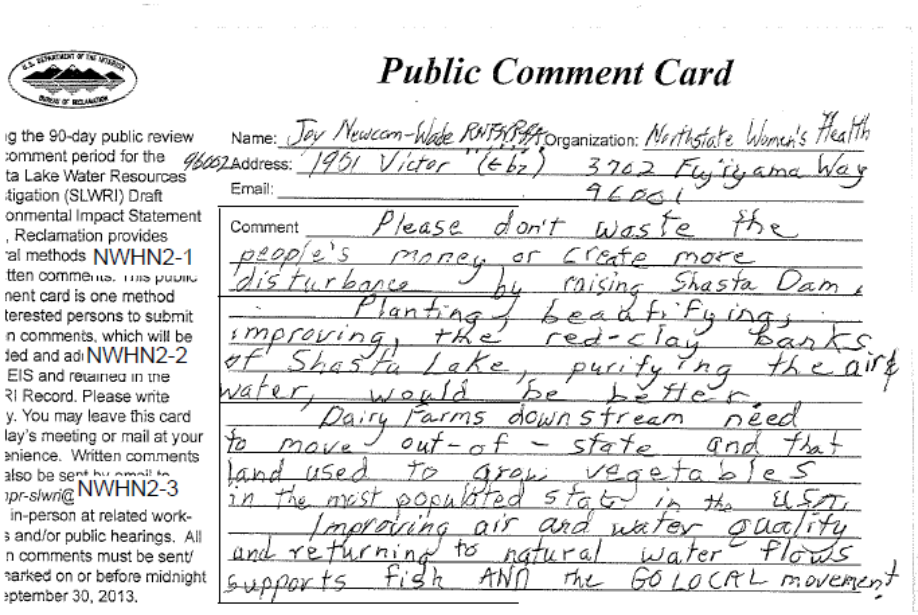
Responses to Comments from Northstate Women's Health Network

NWHN-1: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response ALTD-2, "Alternative Development- Anadromous Fish Survival," and Master Comment Response ALTR-1, "Range of Alternatives General."

NWHN-2: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," and Master Comment Response ALTR-1, "Range of Alternatives General."

33.10.28 Northstate Women's Health Network

NWHN2



Public Comment Card

...g the 90-day public review ...comment period for the ...ta Lake Water Resources ...tigation (SLWRI) Draft ...onmental Impact Statement ..., Reclamation provides ...al methods NWHN2-1 ...tten comments. This public ...nent card is one method ...terested persons to submit ...n comments, which will be ...ded and adi NWHN2-2 ...EIS and retained in the ...RI Record. Please write ...y. You may leave this card ...lay's meeting or mail at your ...enience. Written comments ...also be sent by email to ...pr-slwri@ NWHN2-3 ...in-person at related work- ...s and/or public hearings. All ...n comments must be sent/ ...marked on or before midnight ...eptember 30, 2013.

Name: Joy Newcom-Wade RN FNP-BC Organization: Northstate Women's Health
Address: 1951 Victor (Ebz) 3702 Fujiyama Way 96002 96001
Email:

Comment: Please don't waste the people's money or create more disturbance by raising Shasta Dam. Planting, beautifying, improving the red-clay banks of Shasta Lake, purifying the air & water, would be better. Dairy farms downstream need to move out-of-state and that land used to grow vegetables in the most populated state in the U.S.A. Improving air and water quality and returning to natural water flows supports fish AND the GO LOCAL movement

Responses to Comments from Northstate Women's Health Network

NWHN2-1: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

NWHN2-2: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

NWHN2-3: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

33.10.29 Pacific Forest Trust

PACIFIC FOREST TRUST

california water impact network

Katrina Chow, Project Manager
United States Department of the Interior
Bureau of Reclamation, Mid-Pacific Region
2800 Cottage Way, MP-700
Sacramento, CA 95825-1893

Copy sent via email to: BOR-MPR-SLWRI@usbr.gov

September 30th 2013

Dear Ms. Chow,

PFT1-1

The undersigned organizations thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) recently published as part of the Shasta Lake Water Resources Investigation (SLWRI). We are active members of the Shasta Lake watershed community and have a significant interest in the outcomes of the SLWRI.

We are opposed to the proposals outlined in the DEIS to raise the Shasta Dam. Our opposition is centered on the Bureau of Reclamation's failure to address broader watershed conservation in the DEIS. A single-minded focus on raising the height of Shasta Dam without working to conserve and protect the landscape that supplies water to Shasta Lake is short-sighted. The watershed as a whole is the true reservoir – Shasta Lake is only its most visible manifestation. By failing to conserve the broader watershed in any way, the Bureau is endangering the source of the water that it covets.

Thank you again for the opportunity to comment on the DEIS.

Sincerely,

Patrick Doherty
Policy Associate
Pacific Forest Trust
1001-A O'Reilly Ave.
San Francisco, CA 94129
e-mail: pdoherty@pacificforest.org

Carolee Krieger
President and Executive Director
California Water Impact Network
808 Romero Canyon Road
Santa Barbara, CA 93108
e-mail: caroleekrieger7@gmail.com

Responses to Comments from Pacific Forest Trust

PFT1-1: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master

Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts."

33.10.30 Pacific Forest Trust

PFT2

PACIFIC FOREST TRUST

Katrina Chow, Project Manager
United States Department of the Interior
Bureau of Reclamation, Mid-Pacific Region
2800 Cottage Way, MP-700
Sacramento, CA 95825-1893

Copy sent via email to: BOR-MPR-SLWRI@usbr.gov

September 30th 2013

Dear Ms. Chow,

PFT2-1 Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) recently published as part of the Shasta Lake Water Resources Investigation (SLWRI). The Pacific Forest Trust (PFT) holds several large conservation easements in the Shasta region, and is the convener of the Klamath-Cascade Advisory Council – a local group of stakeholders interested in economic development and forest health in the Shasta region. As a result, PFT has interests in the region that are directly affected by the SLWRI and the proposal to raise the Shasta Dam (the proposal).

PFT2-2 Overall, PFT believes that all five of the proposal's action options are anachronistic and their analysis wholly inadequate. While the original Shasta Dam may have been an appropriate way to address flood control, water storage and electricity generation, the 21st century introduces new challenges with respect to climate change and water security, and consequently new solutions are required.

PFT2-3 The Bureau of Reclamation (the Bureau) should not spend billions of dollars to raise the Shasta Dam, while simultaneously ignoring more cost-effective means of increasing water security and regulating water supply. Modest investments in forest conservation and wet meadow restoration in the upper watersheds of Shasta Lake would be a more efficient and more flexible investment, especially in the face of uncertain changes to our environment.

PFT2-4 PFT opposes the proposal and the five action options considered by the DEIS for implementing it. The reasons for our opposition are:

- The proposal is illegal in its effects by interfering with the free-flowing conditions of the McCloud River.

PFT2-5
- The proposal's process is illegal, as it requires collaboration with state agencies that is prohibited by law.

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PFT2-6
- The rationale for the proposal is hollow as the action options will not reduce expected unfulfilled CVP contractual obligations, making the high cost of the proposal unjustifiable.

PFT2-7
- The current full pool of Shasta Lake is rarely reached, which suggests that projections of future full pool levels will be rarely reached as well.

PFT2-8
- The DEIS does not consider a preferred alternative encompassing forest conservation and restoration activities.

PFT2-9
Further, PFT finds that the DEIS fails to analyze the range of alternatives fully as the DEIS:

- Fails to consider in any form the value of forest conservation and wet meadow restoration projects and their ability to increase water security and supply for Shasta Lake.

PFT2-10
- Fails to account for greenhouse gas (GHG) emissions from flooded vegetation, cement manufacture and decay, and foregone sequestration.

PFT2-11
- Fails to consider the overall policy landscape for renewable energy in California, and therefore significantly overestimates the GHG emission mitigations that will result from increased hydroelectric power generation.

PFT2-12
General Comments

As noted by the SLWRI's Draft Feasibility Report (DFR), the total increase in demand for water in California by 2050 is expected to range between -1.5 to 8 million acre-feet (MAF), depending on the model of population growth used. However, when one looks at those numbers broken down by sector it becomes apparent that none of the increase in demand by 2050 is expected to come from the agricultural sector. Under all of the growth scenarios cited by the DFR, the agricultural sector is expected to consume less water in 2050 compared to the present day.

The Shasta Dam, as the largest reservoir serving the Central Valley Project (CVP), supplies water mainly to the CVP and its contractors. As you are well aware, the vast majority of CVP water is used by the agricultural sector. According to the Bureau's own record of CVP contractors as at February 22nd 2012, the agricultural sector is allocated 87% of the CVP's water service supplies.

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PFT2-12 CONTD

While it may be that current CVP contractual obligations go unfulfilled, it does not follow that raising the Shasta Dam will satisfy those unmet obligations. The DEIS notes that under various projections of the impacts of climate change, the reduction in unmet demand to CVP contractors will be small (DEIS Climate Change Modeling Appendix (CCMA), page 3-114). Given that the annual unmet CVP obligations under various climate models are expected to range from 2.7 to 8.2 MAF per year (CCMA, p. 3-73), the expected reduction in unmet demand for CVP contractors is, literally, a drop in the bucket.

Therefore, an argument to raise the Shasta Dam premised on the need to secure a greater supply of water for CVP contractors is fundamentally flawed. The vast majority of water that the CVP is contracted to supply is owed to a sector that is not projected to require more water in the future than it does today, and the DEIS CCMA makes clear that whatever new storage is created will likely be inconsequential to expected unmet contractual obligations.

Given that the underlying rationale for the project is hollow, any significant cost for the project would be a waste of financing. The DEIS's estimated costs for the proposal to raise the dam are enormous. Each of the five different action options for raising Shasta Dam is expected to cost approximately $1 billion merely for construction. Once ongoing costs are added, the total cost for the action options range from $4.2 billion to $5.4 billion.

PFT2-13

It truly stretches credibility to argue that federal taxpayers, state taxpayers, and CVP contractors should be expected to pay these gigantic sums for CVP water storage where there is no projected increase in demand for the agricultural sector, and where any new storage created will likely not affect expected unmet obligations. While there may be some agricultural CVP contractors "at the back of the line" for water distributions that desire to see the dam raised, their particular interests should not be used to justify such enormous expenditures and unavoidable environmental degradation.

Significant and Unavoidable Impacts on the Free-Flowing Conditions of the McCloud River

PFT2-14

In general, PFT opposes the proposal to raise the Shasta Dam on the grounds that it will negatively affect the free-flowing conditions of the McCloud River. As noted by the DEIS, the free-flowing conditions of the McCloud River are protected by state law, and these conditions would be negatively impacted by all five of the proposal's action options.

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PFT2-14 CONTD

While PFT appreciates that the DEIS is forthright enough to admit to the proposal would violate state law protecting the free-flowing conditions of the McCloud River, PFT is deeply concerned that despite this acknowledgement, there appears to be no mitigation proposed for these effects on the McCloud River. Rather, they are identified as "significant and unavoidable" impacts on page ES-123 of the DEIS.

It may be stating the obvious, but if the Bureau cannot mitigate or otherwise resolve impacts that make the proposal illegal, then the Bureau should not pursue the proposal. This is because executive agencies are entrusted with enforcing the law of the land. It is a fundamental premise of our system of government that the executive is not allowed to break the law. Therefore, PFT urges the Bureau to cease work on a proposal that it has identified as being plainly illegal in its effects.

Illegality of the Process as it Relates to State Agencies

Of the several unresolved issues noted on pages ES-29 to ES-32 of the DEIS, one of the most striking is the fact that cooperation on the Shasta Dam proposal between state agencies and the Bureau is likely illegal. This is because state law generally prohibits California state agencies from working with federal agencies on proposals that would have an adverse effect on the free-flowing conditions of the McCloud River – which is exactly what the proposal would do.[1]

PFT2-15

PFT urges the Bureau to discontinue its efforts to coordinate with state agencies on this proposal. This includes efforts that seek or otherwise result in permits or approvals for the proposal required by applicable law. Should the Bureau continue to attempt to coordinate with state agencies as a part of this process, PFT will urge the Attorney General of the state of California to prevent the Bureau from working with state agencies on the proposal.

Given that the DEIS identifies the likely illegality of working with state agencies on this proposal, PFT is dismayed that the Bureau would continue working through a process – including the preparation of the DEIS itself – that appears to be plainly illegal. It suggests that the Bureau values the desired outcomes of the project more than the law itself, which is a dangerous position for any executive agency entrusted with enforcement of the law to take.

Low Likelihood of Attainment Maximum Water Storage Under Any Option

PFT2-16

Each of the five action options for raising Shasta Dam in the DEIS would result in large increases to the total maximum potential water storage (aka "full pool") for Shasta Lake, ranging from 256,000 to 634,000 acre-feet. However, as noted by the

PFT2-15 CONTD

[1] Our comments on this issue do not relate to the participation of the Department of Water Resources in studies involving the technical and economic feasibility of enlargement of Shasta Dam, which is

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DFS, the *current* full pool is rarely reached. The figure on page 2-26 of the DFS suggests that full pool has been reached only once since 1999.

PFT2-16 CONTD

Given that the current full pool of Shasta Lake is only rarely reached, PFT does not believe there is a strong rationale for expanding the potential full pool. Shasta Dam currently fulfills its flood protection duties, and as noted above demand for water from the agricultural sector is expected to decrease by 2050. As a result, there does not appear to be a compelling need to cause widespread environmental harm and incur billions of dollars in costs.

PFT2-17

While the DFS argues that increased surface storage is necessary given variability in California's precipitation and water usage patterns (see, eg, page 2-9), this argument fails to account for finite limits on precipitation to be expected in California in the future. In essence, building a bigger dam will not make more rain or snow fall, and as a result the shortage of supply that is highlighted by the DFS and DEIS as a rationale for the proposal will not be truly addressed. Below, we point out that modest investments in the upper watersheds of Shasta Lake can actually increase water security while not requiring an increase in the dam's height.

No Consideration of the Value of Green Infrastructure

While the Bureau insists that increasing the height of the Shasta Dam is essential for flood management and water supply in the face of climate change, the reality is that investments in upper watershed forest conservation and restoration – an example of so-called "green infrastructure" – can provide a more cost-effective means of meeting this goal.

PFT2-18

Forest conservation is a practical and cost-effective means of ensuring the security and quality of large watersheds. Conservation reduces fragmentation of forested landscapes and enhances forest cover structure. This not only assists with water security, but it also provides significant co-benefits for wildlife. Forest conservation is also a proven tool in this context. A famous example is the conservation of forestland in New York's Catskill Mountains by New York City, to ensure a high level of water quality and security for the city's public water system. Widespread use of conservation easements on forestland in the Catskills was found to be extremely cost-effective, and saved New York City billions of dollars that would have otherwise been spent on manmade water treatment facilities.

PFT2-19

As a complement to forest conservation, restoring wet meadows within forests can increase water storage, reduce winter flood flows, and make more water available later in the year when competing demands are at their peak. Forest restoration

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PFT2-19 CONTD

projects that reduce over-stocked stands can also increase surface snowpack during the winter and reduce the amount of biological uptake of water.

PFT2-20

The absence of such modest investment options from the DEIS is striking. PFT recommends that the Bureau include a preferred option that focuses on green infrastructure investments that will enhance the ability of the forests of the upper watersheds to filter, regulate and increase water supplies to Shasta Lake. These sensible investments can provide proven economic benefits to downstream users of Shasta Lake waters, and they would likely result in greater benefits for a greater number of stakeholders than simply raising the height of the dam.

Accounting of Greenhouse Gas Emissions

PFT2-21

Page 5-43 of the DEIS laudably states that careful accounting of GHG emissions from vegetation loss is conducted "to ensure that underestimating would not occur." Unfortunately, the spirit of this pledge is not reflected in the overall GHG accounting provided by the DEIS. Instead, the DEIS ignores significant sources of GHG emissions arising from the proposal's five action options, including:

- GHG emissions from flooded, decomposing vegetation.
- GHG emissions from foregone sequestration.
- GHG emissions from cement manufacture and decay.

Perhaps most striking is the DEIS's statement on page 5-45 that increases in GHG emissions from foregone sequestration and decomposing organic matter are "speculative and infeasible to calculate at this time." This is simply not true, as illustrated below.

For GHG emissions from flooded and decomposing vegetation, it is possible to estimate these – particularly as it pertains to methane in the hydroelectric generation context. As noted by the DEIS, methane is a potent GHG. As noted by PFT in our comments on the DFS, methane emissions are a primary reason why hydroelectric power generation should not be considered GHG beneficial. We repeat our previous comments on the DFS, and remind the Bureau that:

> Hydroelectric facilities are not as green as they first appear, particularly when the release of methane from anaerobically digested plant matter is taken into account. We note that a study publicized last year by researchers at Washington State University found that methane emissions jumped 20-fold when the water level was drawn down at Lacamas Lake in Clark County, Washington after analyzing dissolved gases in the lake.

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The researchers also sampled bubbles rising from the lake mud and measured a 36-fold increase in methane during a drawdown.

PFT is disappointed that despite bringing the issue of GHG emissions from anaerobic digestion of plant material to the attention of the Bureau in March, this source of GHG emissions is not considered in the DEIS. We repeat our comment that the GHG emissions of the proposal's five action options cannot be considered complete unless such an analysis occurs.

With respect to foregone sequestration benefits from flooded vegetation, the EPA's publicly available Greenhouse Gas Equivalencies Calculator (available at http://www.epa.gov/cleanenergy/energy-resources/calculator.html), clearly refers to a metric for calculating foregone sequestration per acre of converted forestland. It is strange, then, that the DEIS would claim that such a calculation is speculative and infeasible.

PFT2-21 CONTD

Page 10-17 of the DEIS (Table 10-4) estimates that a maximum of 4,675 acres of forestland will be lost as a result of the proposal. Using the EPA's public calculator of forest sequestration potential, this means that a maximum of 5,704 metric tons of potential annual CO_2e sequestration will be eliminated by the proposal.[2]

Over the lifetime of the project (assuming 100 years), this amounts to 570,400 metric tons of lost CO_2e sequestration. Not accounting for such a large source of GHG emissions – and foregone sequestration is a GHG source – demonstrates that the DEIS does not accurately describe the GHG emissions that would result from the proposal. Consequently, the DEIS's finding that the proposal's GHG emissions are "less than significant" is unfounded.

Not accounting for the contribution of cement manufacture and decomposition to the GHG emissions of the proposal also contradicts established mechanisms for GHG accounting. Cement manufacture is well known as a particularly GHG-intensive industry. The California Air Resources Board (ARB) estimated that in 2011 California cement plants emitted 6.14 million metric tons of CO_2e. This is roughly equivalent to the emissions required to provide electricity to over 900,000 average American homes.[3]

PFT2-22

[2] This number is probably an underestimate as the EPA's calculator uses an average for forests nationwide – the forests of northern California are very productive and sequester larger amounts of carbon per acre than the national average.

[3] Using the EPA's greenhouse gas equivalency calculator available at: http://www.epa.gov/cleanenergy/energy-resources/calculator.html.

PFT2-21 CONTD

PFT2-22 CONTD

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PFT2-22 CONTD

Given that such a large contribution to GHG emissions occurs when cement is manufactured, to say nothing of the GHG emitted as concrete decomposes, the DEIS must account for these emissions. The failure to do so is glaring, and must be corrected in order for the DEIS to credibly claim that it accounts for the GHG emissions of the proposal.

PFT2-23

With respect to the DEIS's general finding that GHG emissions from the proposal are expected to be "less than significant," this finding appears to be based primarily on the assumption that increased hydroelectric power output will offset GHG emissions from electricity created by fossil fuels. This finding relies on two assumptions that are flawed:

- That there will be increased water supply (until 2030) to power at least 2.7GWh of increased hydroelectric generation.
- That but for the raising of the Shasta Dam, fossil fuel generation of at least 2.7GWh would occur.

As noted by the DEIS, "future conditions" will not be as favorable to increased water supply for hydroelectric power generation. One of the many expected impacts of climate change is a greater variability in precipitation and, consequently, water supply to Shasta Lake. As noted in our comments above concerning green infrastructure, the Bureau is missing an opportunity to secure clean and dependable increases in water supply by failing to include forest and wet meadow restoration in the upper watersheds as part of its proposal for Shasta Dam.

The result of this increased variability is that it is simply not certain that increased water supply – even to 2030 – would be available to generate at least 2.7GWh of increased hydroelectric power. Therefore, the DEIS should not assume that such a large increase in power could be generated annually to 2030.

PFT2-24

The second flawed assumption of the DEIS is that but for the raising of the Shasta Dam and the generation of increased hydroelectric power, such power would be sourced from fossil fuels. There is simply no reason to make this assumption.

PFT2-25

California law requires that 33% of the state's electricity be generated by renewable sources by 2020. This is known as the renewable portfolio standard (RPS). Between the three largest utilities in California, only about 20% of power is currently sourced from renewable sources.[4] This means that California's three main utilities must increase their supply of renewable power by around 50% over the

[4] Please see http://www.cpuc.ca.gov/PUC/energy/Renewables/index.htm.

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PFT2-25 CONTD

next seven years to comply with the RPS. This is an ambitious target that means renewable power will be in high demand.

PFT2-26

Any new hydroelectric generation that would be provided by the proposal would almost certainly be used by utilities to meet their goal under the RPS, as hydroelectric power qualifies as renewable energy. Simply put, it is infeasible that a California utility would source fossil fuel power to replace foregone hydroelectric power. In order to meet the requirement of the RPS, a utility would need to source that power from another renewable source – such as solar or wind.

Given that the water supply for the additional hydroelectric power is unreliable, and given that the additional hydroelectric power would almost certainly not be alternatively supplied by fossil fuels, the DEIS's finding that the GHG emissions from all five action options are less than significant is incorrect. In light of this, the Bureau should reevaluate the potential GHG emissions of the proposal and grant that the impacts will actually be significant and in need of mitigation.

Conclusion

PFT2-27

PFT opposes the proposal and the five action options considered by the DEIS for implementing it. The reasons for our opposition are:

- The proposal is illegal in its effects by interfering with the free-flowing conditions of the McCloud River.

PFT2-28

- The proposal's process is illegal, as it requires collaboration with state agencies that is prohibited by law.

PFT2-29

- The rationale for the proposal is hollow as the action options will likely not substantially reduce expected unfulfilled CVP contractual obligations, making the high cost of the proposal unjustifiable.

PFT2-30

- The current full pool of Shasta Lake is rarely reached, which suggests that projections of future full pool levels will be rarely reached as well.

PFT2-31

- The DEIS does not consider a preferred alternative encompassing forest conservation and restoration activities.

PFT2-32

Further, PFT finds that the DEIS fails to analyze the range of alternatives fully as the DEIS:

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PFT2-32 CONTD
- Fails to consider in any form the value of forest conservation and wet meadow restoration projects and their ability to increase water security and supply for Shasta Lake.

PFT2-33
- Fails to account for GHG emissions from flooded vegetation, cement manufacture and decay, and foregone sequestration.

PFT2-34
- Fails to consider the overall policy landscape for renewable energy in California, and therefore significantly overestimates the proposal's potential mitigation of GHG emissions.

PFT2-35
Due to the DEIS's failure to accurately account for GHG emissions and its overestimate of the benefits of hydroelectric power, the DEIS's finding that the GHG emissions of the proposal are less than significant is incorrect. Failure to address this issue in the final EIS could significantly delay the proposal.

Thank you again for the opportunity to comment on the DEIS. Please contact me if you have any questions about our comments or wish to discuss PFT's concerns in more detail. I can be reached at (415) 561-0700 x39 or by email at pdoherty@pacificforest.org.

Sincerely,

Patrick Doherty
Policy Associate

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Responses to Comments from Pacific Forest Trust

PFT2-1: Comment Noted.

PFT2-2: Please refer to Master Comment Response ALTR-1, "Range of Alternatives General," and Master Comment Response P&N-1, "Purpose and Need and Objectives."

PFT2-3: Please refer to Master Comment Response P&N-1, "Purpose and Need and Objectives," Master Comment Response ALTD-1, "Alternative Development-Water Supply Reliability," and Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts."

PFT2-4: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

PFT2-5: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," and Master Comment Response CEQA-1, "CEQA Compliance."

PFT2-6: Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," Master Comment Response COST/BEN-3, "Estimated Increased Water Supply Reliability Under Action Alternatives."

PFT2-7: Please refer to Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir."

PFT2-8: Reclamation understands the value of forest conservation and restoration activities for watershed improvements. These types of programs can benefit overall water supply, but were not included as alternatives in the current Feasibility Planning phase of the SLWRI.

Please refer to Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master Comment Response ALTR-1, "Range of Alternatives General."

PFT2-9: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," and Master Comment Response P&N-1, "Purpose and Need and Objectives."

PFT2-10: The commenter states that the GHG analysis in the DEIS "fails to account for greenhouse gas (GHG) emissions from flooded vegetation, cement manufacture and decay, and foregone sequestration." Please refer to Master Comment Response AQ-3, "Potential for Greenhouse Gas Emissions Generated by the Decomposition of Soil and Vegetative Material in the Expanded Reservoir," regarding the level of GHG emissions associated with the decomposition of vegetation that would be inundated by the expanded reservoir. Please refer to Master Comment Response AQ-4, "Greenhouse Gas Emissions Associated with Cement Production," regarding the level of Greenhouse Gas Emissions

Associated with Cement Production. Please refer to Master Comment Response AQ-2, "Loss of Carbon Sequestration and Carbon Sequestration Potential," regarding the level of GHG emissions from decreased sequestration from vegetation that will be removed from inundated areas.

PFT2-11: The commenter states that the GHG analysis in the DEIS "fails to consider the overall policy landscape for renewable energy in California, and therefore significantly overestimates the GHG emission mitigations that will result from increased hydroelectric power generation." Please refer to Master Comment Response AQ-1, "Offsetting Greenhouse Gas Emissions with Increased Hydropower," regarding the GHG benefits of increased hydropower of the proposed project in the regulator context of AB 32 and the Renewable Electricity Standard.

PFT2-12: Please refer to Master Comment Response ALTD-1 "Alternative Development – Water Supply Reliability."

PFT2-13: Total annual costs for action alternatives are included in Attachment 1, "Cost Estimates for Comprehensive Plans," to the DEIS Engineering Appendix. Operations and maintenance costs are included in total annual cost estimates for SLWRI action alternatives. Annual costs for action alternatives in the DEIS ranged from $44 million per year for CP1 to $61 million per year for CP5.

Predicted changes in agricultural water demand by 2050 in the SLWRI Draft Feasibility Report and DEIS were based on evaluations in DWR's California Water Plan Update 2009. A corresponding discussion of estimated unmet agricultural water demands in the Central Valley through 2050 was not provided in Update 2009, but can be found in DWR's California Water Plan Update 2013. Figure 5-10 in Update 2013 Chapter 5, "Managing an Uncertain Future," shows simulated agricultural supply, demands, and unmet demands in portions of the Central Valley through 2050 for a scenario representing historical supply conditions and current trends for population and urban density. As shown in Figure 5-10 of the California Water Plan Update 2013, although agricultural demands are anticipated to decrease by 2050, evaluations indicate significant unmet agricultural water demands in portions of the Central Valley will persist through 2050.

Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," Master Comment Response COST/BEN-3, "Estimated Increased Water Supply Reliability Under Action Alternatives," and Master Comment Response WSR-1, "Water Supply Demands, Supplies, and Project Benefits."

PFT2-14: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," and Master Comment Response WASR-8, "Effects to the Eligibility of Rivers for Inclusion in the Federal Wild and Scenic River System."

PFT2-15: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

PFT2-16: The reference to the "figure on page 2-26 of the DFS" appears to be related to the SLWRI Draft Feasibility Report not the DEIS, which is the subject of these responses. To provide information related to Shasta Reservoir water operations, please refer to Chapter 6 of the DEIS, "Hydrology, Hydraulics, and Water Management." It should be noted that the referenced figure also reflects Shasta Reservoir flood control operations. If Shasta Dam was raised, the "Bottom of the Flood Control Space" would also be raised. As described in Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir," flood control releases occur before Shasta Lake is physically full, and are driven by the flood control storage regulatory limitations. An enlarged Shasta Reservoir would allow capture of a portion of these releases due to the larger available usable storage under the flood control storage limits.

Predicted changes in agricultural water demand by 2050 in the SLWRI Draft Feasibility Report and DEIS were based on evaluations in DWR's California Water Plan Update 2009. A corresponding discussion of estimated unmet agricultural water demands in the Central Valley through 2050 was not provided in Update 2009, but can be found in DWR's California Water Plan Update 2013 Public Review Draft. Figures 5-8 and 5-9 in Update 2013 Chapter 5, "Managing an Uncertain Future," show simulated Central Valley agricultural supply, demands, and unmet demands through 2050 for a scenario representing historical supply conditions and current trends for population and urban density. As shown in Figures 5-8 and 5-9, although agricultural demands are anticipated to decrease by 2050, evaluations indicate significant unmet agricultural water demands in the Central Valley will persist through 2050.

Please refer to Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir," and Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

PFT2-17: Please refer to Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir."

PFT2-18: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response P&N-1, "Purpose and Need and Objectives," and Master Comment Response GEN-1, "Comment Included as Part of the Record."

PFT2-19: Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," Master Comment Response P&N-1, "Purpose and Need and Objectives," Master Comment Response ALTR-1, "Range of Alternatives General," and Master Comment Response GEN-1 "Comment Included as Part of the Record."

PFT2-20: Please refer to Master Comment Response ALTR-1, "Range of Alternatives General," Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," and Master Comment Response P&N-1, "Purpose and Need and Objectives."

PFT2-21: The commenter disagrees with the DEIS's statement on page 5-45 that it would be speculative and infeasible to quantify the potential for increased GHG emissions due to loss of vegetation presently in the area that would be inundated by the expanded reservoir. Please refer to Master Comment Response AQ-2, "Loss of Carbon Sequestration and Carbon Sequestration Potential."

The commenter also disagrees with the DEIS's statement on page 5-45 that it would be speculative and infeasible to quantify level of increased GHG emissions generated by the decomposition of soil and vegetative material in the expanded reservoir. There is a lack of established methods for estimating GHGs generated by the decomposition of organic material inundated by reservoirs. Please refer to Master Comment Response AQ-3, "Potential for Greenhouse Gas Emissions Generated by the Decomposition of Soil and Vegetative Material in the Expanded Reservoir."

The commenter mentions a single poster presented by a Washington State University doctoral student at the Society for Freshwater Science Annual Meeting in Louisville, Kentucky in 2012 called *Water level drawdown affects methane and nitrous oxide production in a small eutrophic reservoir: Lacamas Lake, Washington* (Deemer *et al.* 2012). However, the comment does not provide evidence to support the idea that the dynamics and GHG pathways in Lacamas Lake are similar to those of Shasta Lake, which is a major dominant factor for applicability. Also, Reclamation and its consultants have not been able to attain the poster presentation despite contacting the lead author. As stated in the

United Nations Educational, Scientific and Cultural Organization and the International Hydropower Association *GHG Measurement Guidelines for Freshwater Reservoirs* (UNESCO and IAH 2010), "factors that result in varied GHG exchanges among reservoirs may include carbon/nutrient loading from the catchment; temperature; oxygen concentration; type and density of the flooded vegetation; aquatic flora and fauna; residence time; wind seed; thermal structure; reservoir topography and shape; and water level." The Guidelines also state, "Most studies of reservoirs indicate that GHG emissions can significantly vary (up to two orders of magnitude) from one reservoir to another, or in the same reservoir for samples collected at different times of the year, or at the same times of year but in different areas (time/space variability)." Also, without reviewing the study it's not clear whether the measurements of methane and nitrous oxide accounted for the seasonality—that is, like many ecosystems, lakes, wetlands, reservoirs and release GHG emissions during some times of the year and absorb carbon during other times of the year and it's the annual net change that is important to understand.

The commenter suggests that the GHGs associated with the production of cement used to construct the project should be accounted for in the GHG analysis. Please refer to Master Comment Response AQ-4, "Greenhouse Gas Emissions Associated with Cement Production," regarding the level of Greenhouse Gas Emissions Associated with Cement Production.

PFT2-22: The commenter criticizes the GHG analysis for not accounted for the GHGs associated with the manufacturing of the cement that would be used in project construction. Please refer to Master Comment Response AQ-4, "Greenhouse Gas Emissions Associated with Cement Production."

The commenter also suggests that the GHG analysis should account for GHGs from flooded, decomposition of vegetation. Please refer to Master Comment Response AQ-3, "Potential for Greenhouse Gas Emissions Generated by the Decomposition of Soil and Vegetative Material in the Expanded Reservoir."

PFT2-23: The commenter questions the assumption that increased hydroelectric power output would offset GHG emissions from electricity created by fossil fuels.

Please refer to Master Comment Response AQ-1, "Offsetting Greenhouse Gas Emissions with Increased Hydropower," for a discussion that supports this assumption.

The commenter also questions that there would be sufficient water supply to support increased hydropower production due to the many expected effects of climate change, particularly the increasing variability in precipitation levels. The commenter states that Reclamation "is missing an opportunity to secure clean and dependable increases in water supply by failing to include forest and wet meadow restoration in the upper watersheds as part of its proposal for Shasta Dam." The DEIS explain the use of the CalSim-II model, in collaboration with DWR, for estimating future water supply availability beginning on page ES-27 of the Executive Summary of the DEIS.

As explained in Chapter 6, "Hydrology, Hydraulics, and Water Management," on page 6-31 of the DEIS, the SLWRI 2012 Version CalSim-II model was used to simulate CVP and SWP operations, determining the surface water flows, storages, and deliveries associated with each alternative. CalSim-II is a specific application of the Water Resources Integrated Modeling System (WRIMS) to simulate CVP and SWP water operations. CalSim-II typically simulates system operations for an 82-year period and therefore accounts for a wide range of climatic variability. A detailed description of the SLWRI 2012 Version CalSim-II model, including modeling assumptions, is included in Chapter 2 of the Modeling Appendix.

Furthermore, the effects of climate change on operations at Shasta Lake, is discussed in Section 6.3.5, "Cumulative Effects," on page 6-134 of the DEIS. Here the DEIS acknowledges that the effects of climate change could result in changes to hydrology, hydraulics, and water management. As described in the Climate Change Modeling Appendix, climate change could result in higher reservoir releases in the winter and early spring because of an increase in runoff during these times. The change in winter and early spring releases could necessitate managing flood events resulting from potentially larger storms. Similarly, climate change could result in lower reservoir inflows and Sacramento tributary flows during the late spring and summer because of a decreased snow pack. This reduction in inflow and tributary flow could result in Shasta Lake storage being reduced because of both a reduced ability to capture flows and an increased need to make releases to meet downstream requirements.

In addition, further relevant discussion is provided in the cumulative impact analysis that begins on page 6-134. Here it is explained that effects of climate change on operations of Shasta Lake could include increased inflows and releases at certain times of the year, and decreased inflows at other times. The additional storage associated with all the action alternatives potentially would diminish these effects and allow Shasta Lake to capture some of the increased runoff in the winter and early spring for release in late spring and summer.

The commenter does not provide any evidence for why the use of the CalSim-II model is insufficient or why the cumulative analysis, which addresses climate change-related uncertainties, is insufficient.

PFT2-24: The commenter questions the assumption that "but for the raising of the Shasta Dam and the generation of increased hydroelectric power, such power would be sourced from fossil fuels. There is simply no reason to make this assumption." Please refer to Master Comment Response AQ-1, "Offsetting Greenhouse Gas Emissions with Increased Hydropower."

PFT2-25: The commenter falsely assumes that hydropower generated at Shasta Dam would be eligible as renewable power in the context of RES.

Please refer to Master Comment Response AQ-1, "Offsetting Greenhouse Gas Emissions with Increased Hydropower," for an explanation about why it was assumed that fossil fuel-based power would be generated but for the increased hydropower production at Shasta Dam.

PFT2-26: The commenter states that "any new hydroelectric generation that would be provided by the proposal would almost certainly be used by utilities to meet their goal under the [RES], as hydroelectric power qualifies as renewable energy." This is incorrect. Please refer to Master Comment Response AQ-1, "Offsetting Greenhouse Gas Emissions with Increased Hydropower," for an explanation about why it was assumed that fossil fuel-based power would be generated but for the increased hydropower production at Shasta Dam.

The commenter also states that "the water supply for the additional hydroelectric power is unreliable." Please refer to Response PFT2-23.

PFT2-27: Please refer to Master Comment Response WASR-1, "Eligibility of the McCloud River as a Federal Wild and Scenic River," and Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542."

PFT2-28: Please refer to Master Comment Response WASR-6, "Protections of the Lower McCloud River as Identified in the California Public Resources Code, Section 5093.542," and Master Comment Response CEQA-1, "CEQA Compliance."

PFT2-29: Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," and Master Comment Response COST/BEN-3, "Estimated Increased Water Supply Reliability Under Action Alternatives."

PFT2-30: Please refer to Master Comment Response RAH-1, "Available Water to Fill an Enlarged Reservoir."

PFT2-31: Reclamation understands the value of forest conservation and restoration activities for watershed improvements. These types of programs can benefit overall water supply, but were not included as alternatives in the current Feasibility Planning phase of the SLWRI.

Please refer to Master Comment Response P&N-1, "Purpose and Need and Objectives," Master Comment Response ALTR-1, "Range of Alternatives General," and Master Comment Response ALTS-1, "Alternative Selection."

PFT2-32: Reclamation understands the value of forest conservation and restoration activities for watershed improvements. These types of programs can benefit overall water supply, but were not included as alternatives in the current Feasibility Planning phase of the SLWRI.

Please refer to Master Comment Response ALTD-1, "Alternative Development- Water Supply Reliability," and Master Comment Response P&N-1, "Purpose and Need and Objectives."

PFT2-33: Please refer to Master Comment Response AQ-2, "Loss of Carbon Sequestration and Carbon Sequestration Potential," Master Comment Response AQ-3, "Potential for Greenhouse Gas Emissions Generated by the Decomposition of Soil and Vegetative Material in the Expanded Reservoir," and Master Comment Response AQ-4, "Greenhouse Gas Emissions Associated with Cement Production."

PFT2-34: Please refer to Master Comment Response AQ-1, "Offsetting Greenhouse Gas Emissions with Increased Hydropower."

PFT2-35: Please refer to Master Comment Response AQ-1, "Offsetting Greenhouse Gas Emissions with Increased Hydropower."

33.10.31 Pacific Gas & Electric Company

PGE1

Pacific Gas and Electric Company

Law Department
77 Beale Street, B30A
San Francisco, CA 94105
Mailing Address
P.O. Box 7442
San Francisco, CA 94120
Fax: 415.973.5520

July 8, 2013

Ms. Katrina Chow, Project Manager
Bureau of Reclamation, Planning Division
2800 Cottage Way, MP-700
Sacramento, CA 95825-1893

Re: Draft Environmental Impact Statement for Shasta Lake Water Resources Investigation

Dear Ms. Chow:

We are in receipt of the June 25, 2013 letter to Interested Parties for the Public Review and Comment on the Draft Environmental Impact Statement for Shasta Lake Water Resources Investigation, along with a copy of the DVD. The envelope was addressed to Ms. Madelin Mailander, Senior Legal Assistant and Case Manager at P. O. Box 7442, San Francisco, CA 94120 (copy enclosed).

Would you be so kind and delete Ms. Mailander's name from the list of "Interested Parties" and instead add the following name in place of hers:

Annette Faraglia, Esq.
Law Department
PACIFIC GAS AND ELECTRIC COMPANY
P. O. Box 7442
San Francisco, CA 94120-7442

PGE1-1

Thank you.

Very truly yours,

Betsie Diamond

Betsie Diamond, Secretary to
ANNETTE FARAGLIA

BD
Enclosures

cc: Ms. Madelin Mailander, Legal Assistant
Annette Faraglia, Esq.

Responses to Comments from Pacific Gas & Electric Company

PGE1-1: Please refer to Master Comment Response MAILINGLIST-1, "Addition or Change to the Mailing List."

33.10.32 Pacific Gas & Electric Company

PGE2

From: **Klobas, John** <JTK2@pge.com>
Date: Mon, Sep 2, 2013 at 10:22 AM
Subject: PG&E Information Request
To: "kchow@usbr.gov" <kchow@usbr.gov>
Cc: "nrezeau@fs.fed.us" <nrezeau@fs.fed.us>

Katrina,

PGE2-1 PG&E is looking for two things that would be very helpful in reviewing and commenting on BOR's Draft Environmental Impact Statement (DEIS):

1) The proposed high water line, shown in either a GIS Shape file or a KML file.

PGE2-2 2) A hard copy, a file, or a link to the Shasta Lake Water Resources Investigation (SLWRI) Pit 7 Dam and Powerhouse Facilities Report (Reclamation 2008); this report is referenced on page3-26, of the DEIS - Engineering Summary Appendix.

I would appreciate if you could provide both of the above items to me as soon as possible so PG&E may complete an adequate review of the DEIS and provide timely comments.

Thank you!

John Klobas, MBA, PMP
PG&E Hydro Licensing
Senior Project Manager
McCloud-Pit & UNFFR
Internal 8-765-5653
External (530) 335-5653
Mobile (530) 941-2002
john.klobas@pge.com

Responses to Comments from Pacific Gas & Electric Company

PGE2-1: Pit 7 Dam and Powerhouse Facilities Report was provided to PG&E via email on September 17, 2013.

PGE2-2: Reclamation provided the information that PG&E requested via email on September 20, 2013.

33.10.33 Pacific Gas & Electric Company

9/30/13 DEPARTMENT OF THE INTERIOR Mail - PG&E Information Request PGE3

CHOW, KATRINA <kchow@usbr.gov>

PG&E Information Request

Klobas, John <JTK2@pge.com> Mon, Sep 23, 2013 at 10:29 AM
To: "Danelle Bertrand (Danelle.Bertrand@mwhglobal.com)" <Danelle.Bertrand@mwhglobal.com>
Cc: "kchow@usbr.gov" <kchow@usbr.gov>, "Faraglia, Annette (Law)" <ARF3@pge.com>, "Cummings, Jody E" <JECi@pge.com>

Danelle,

Thank you for sending the GIS shape files.

PGE3-1 PG&E has transmission lines and distribution lines as well as the Pit 7 development that will be impacted by the raising of Shasta Dam. Consequently, PG&E needs additional files to fully evaluate impacts to all PG&E facilities.

PGE3-2 I've included Jody Cummings on this E-mail; Jody is a GIS application engineer. Perhaps the two of you can work out the file size issue and determine which files are necessary to properly evaluate impacts to PG&E facilities.

Jody, please keep me posted on the progress.

Thank you!

John Klobas, MBA, PMP
PG&E Hydro Licensing
Senior Project Manager
McCloud-Pit & UNFFR
Internal 8-765-5653
External (530) 335-5653
Mobile (530) 941-2002
john.klobas@pge.com<mailto:john.klobas@pge.com>

From: Danelle Bertrand [mailto:Danelle.Bertrand@mwhglobal.com]
Sent: Friday, September 20, 2013 9:57 AM
To: Klobas, John
Cc: Chow, Katrina C; Mary Paasch; Klobas, John
Subject: Re: PG&E Information Request

John,

Attached are the GIS shape files PG&E requested of the high water lines under the 6.5-foot, 12.5-foot, and 18.5-foot Shasta Dam raise alternatives presented in the SLWRI Draft EIS. The extent of the spatial data has been limited to the area above the Pit 7 afterbay weir to keep file sizes reasonable.

Please let us know if you have any questions about this data.

Warm Regards,

Danelle

9/30/13 DEPARTMENT OF THE INTERIOR Mail - PG&E Information Request

From: Klobas, John
Sent: Monday, September 02, 2013 10:22 AM
To: 'kchow@usbr.gov<mailto:kchow@usbr.gov>'
Cc: 'nrezeau@fs.fed.us<mailto:nrezeau@fs.fed.us>'
Subject: PG&E Information Request

Katrina,

PG&E is looking for two things that would be very helpful in reviewing and commenting on BOR's Draft Environmental Impact Statement (DEIS):

1) The proposed high water line, shown in either a GIS Shape file or a KML file.

2) A hard copy, a file, or a link to the Shasta Lake Water Resources Investigation (SLWRI) Pit 7 Dam and Powerhouse Facilities Report (Reclamation 2008); this report is referenced on page3-26, of the DEIS - Engineering Summary Appendix.

I would appreciate if you could provide both of the above items to me as soon as possible so PG&E may complete an adequate review of the DEIS and provide timely comments.

Thank you!

John Klobas, MBA, PMP
PG&E Hydro Licensing
Senior Project Manager
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Internal 8-765-5653
External (530) 335-5653
Mobile (530) 941-2002
john.klobas@pge.com<mailto:john.klobas@pge.com>

–

Katrina Chow

Project Manager/Civil Engineer

Bureau of Reclamation, Sacramento

2800 Cottage Way, Sacramento, CA 95825

916-978-5067

kchow@usbr.gov<mailto:kchow@usbr.gov>
[Quoted text hidden]

2 attachments

9/30/13 DEPARTMENT OF THE INTERIOR Mail - PG&E Information Request

JohnKlobas_Pit7are_Pools_Contours_20130912.zip
2957K

Pit7area_Pools_Contours_20130912.zip
2957K

Responses to Comments from Pacific Gas & Electric Company

PGE3-1: Reclamation provided the requested information to PG&E in response to this comment.

PGE3-2: Reclamation provided the requested information to PG&E in response to this comment.

33.10.34 Pacific Gas & Electric Company

9/30/13 DEPARTMENT OF THE INTERIOR Mail - Sept. 26th Submittal of Comments re Shasta Lake DEIS . . . PGE4

CHOW, KATRINA <kchow@usbr.gov>

Sept. 26th Submittal of Comments re Shasta Lake DEIS . . .

1 message

Diamond, Elizabeth <EJDd@pge.com> Mon, Sep 23, 2013 at 4:36 PM
To: "kchow@usbr.gov" <kchow@usbr.gov>
Cc: "Faraglia, Annette (Law)" <ARF3@pge.com>

09/23/13

Dear Ms. Chow:

PGE4-1 I am the legal secretary for Annette Faraglia in the PG&E Law Department, and we are preparing our comments for submittal on Thursday, September 26th, in regard to the Shasta Lake DEIS. PG&E's comments, along with the attachments, are approximately **47 MG in size**, and I am wondering if the BOR had a limit on the size of the comments that can be submitted to the BOR.

If there is a limit to the size of the comments to be submitted, can you please let me know what that limit is.

Thank you!

Betsie Diamond
PG&E Law Dept.
77 Beale St., B30A-2482
San Francisco, CA 94105-1814
Telephone: (415) 973-6644
Facsimile: (415) 972-5952
E-Mail: ejdd@pge.com

Responses to Comments from Pacific Gas & Electric Company

PGE4-1: Comment noted.

33.10.35 Pacific Gas & Electric Company

Pacific Gas and Electric Company®

PGE5

COPY

Annette Faraglia
Attorney at Law

Street/Courier Address:
Law Department
77 Beale Street, B30A
San Francisco, CA 94105

Mailing Address:
Mail Code B30A
P. O. Box 7442
San Francisco, CA 94120

415.973.7145
Fax: 415.973.5520
E-Mail: ARF3@pge.com

September 25, 2013

Via UPS Next Day Air

Ms. Katrina Chow, Project Manager
Bureau of Reclamation – Planning Division
2800 Cottage Way, MP-700
Sacramento, CA 95825-1893

Re: Pacific Gas and Electric Company's Comments on the Draft Environmental Impact Statement for the Shasta Lake Water Resources Investigation

Dear Ms. Chow:

Pursuant to the June 25, 2013 public notice for comments on the United States Department of Interior, Bureau of Reclamation's ("BOR" or "Reclamation") Draft Environmental Impact Statement ("DEIS") for the Shasta Lake Water Resources Investigation ("SLWRI"), Pacific Gas and Electric Company ("PG&E") hereby submits these comments on the DEIS.

PGE5-1 PG&E appreciates the opportunity to submit comments on the DEIS. As discussed herein, PG&E believes there are deficiencies in the DEIS' level of analysis regarding the extent, and the types of impacts, that increasing the height of Shasta Dam, by 18.5 feet (Alternatives CP3, CP4, CP5) will have on PG&E and its customers. Consequently, until BOR updates its

PGE5-2 analyses to correct these deficiencies and comprehensively addresses the full scope of adverse impacts, PG&E opposes increasing the height of Shasta Dam.

BACKGROUND

PGE5-3 PG&E is the owner and holder of the Federal Energy Regulatory Commission ("FERC") License for the McCloud-Pit Project, FERC Project No. 2106 ("McCloud-Pit Project" or "Project"). The Project is located on the McCloud and Pit Rivers. Included in the McCloud-Pit Project is the Pit 7 Development located on the Pit River. It includes the Pit 7 Dam, Reservoir, Powerhouse (containing two generating units with a combined installed capacity of 112 MW), an Afterbay, and an Afterbay Dam. PG&E also has high voltage power line facilities located within the SLWRI area and electric distribution facilities that cross Shasta Lake.

PGE5-4 In a November 30, 2005 letter to the BOR, PG&E provided scoping comments for the SLWRI. (A copy of PG&E's November 30, 2005 letter is attached as Attachment 1.) As PG&E's letter explained, the proposals to raise Shasta Dam, by 18.5 feet, could have serious adverse impacts on the Pit 7 Development, including inundation of the Pit 7 Afterbay Dam, reduction in generation, overtopping and flooding of the Pit 7 Powerhouse deck, alteration of the

PGE5-4 CONTD

hydraulic characteristics of the spillway basin, and increasing the risk of damage to PG&E facilities.

On January 28, 2013, PG&E provided comments on BOR's Draft Feasibility Report for the SLWRI. PG&E again expressed concern that BOR's proposals to raise Shasta Dam would have serious adverse impacts on PG&E and its customers. (A copy of PG&E's January 28, 2013 is attached as Attachment 2.)

COMMENTS

PGE5-5

Although PG&E's November 30, 2005 and January 28, 2013 letters advised BOR that raising the height of Shasta Dam by 18.5 feet could cause significant adverse impacts to the Pit 7 Development, the DEIS did not fully consider those impacts. In fact, the DEIS only briefly discusses two impacts at the Pit 7 Powerhouse:

1. A <5% decrease in Power Plant energy generation; and
2. The necessity to install a tailwater depression system.

PGE5-6

The DEIS further categorized the decrease in Power Plant energy generation as less than significant and provided an optimistic estimate of only $230K to install a tailwater depression system in the powerhouse.

The Engineering Summary also appeared rather optimistic stating:

PGE5-7

1. No modifications to the Main Dam or Afterbay facilities are necessary;
2. The only necessary powerhouse modification is the installation of a tailwater depression system;
3. The turbines would function normally with the new maximum tailwater levels;
4. The existing Powerhouse structure would not require modifications to accommodate any of the proposed tailwater elevations;
5. The draft tube gates are considered adequate; and
6. No modifications are recommended at Pit 7 Afterbay Dam other than routine inspections of steel reinforcement.

PGE5-8 The overall DEIS analysis of potential impacts at the Pit 7 Development is woefully insufficient. BOR did not address the majority of concerns PG&E raised in its November 30, 2005 and January 28, 2013 letters.

PGE5-9 Accordingly, a more comprehensive assessment of all potential impacts is still required.

PGE5-10 In an effort to help the BOR, PG&E contracted with Black & Veatch to prepare a Technical Memorandum entitled *Shasta Dam Raise Impacts on PG&E's Pit 7 Development*. A copy of this Technical Memorandum is attached as Attachment 3. It is PG&E's intention that this document will form the foundation for future dialog between BOR and PG&E seeking resolution to the impacts at the Pit 7 Development.

PGE5-11 As noted above, PG&E has electric distribution facilities located within the BOR SLWRI study area. Preliminary review of the new water mark based on the model produced by PG&E's Geographic Information Systems Group indicates that PG&E will need to relocate fifty-nine distribution transformers and upgrade twenty-nine distribution transformers at an estimated cost of $914,000. These poles are part of the Antler 1101, Stillwater 1101, and Stillwater 1102 12 kV circuits serving small communities such as parts of Lakehead and Mountain Gate. (See Attachment 4 for more detail.)

PGE5-12 PG&E also has two high voltage power line facilities located within the SLWRI study area, the Crag View-Cascade 115 kV line, and the Delta-Mountain Gate Junction 60kV line. The two lines roughly parallel each other within the study area with the 115 kV line the more westerly of the two circuits. In addition, the 115 kV line supports a fiber optic communication cable.

PGE5-13 Approximately twenty-four PG&E structures will be affected by BOR's proposed project and may require replacement. The replacement of the structures that support electrical conductors that span large bodies of water will require significantly taller structures (approximately 40 to 50 feet taller). The taller structures are needed for the following reasons:

1. The increase in span lengths between structures;
2. The raise in the water level; and
3. Since the original construction of the power lines, the State of California clearance requirements over water has increased by an additional 20 feet.

The projected cost to modify the high voltage power lines, due to BOR's proposed project, is approximately $15 million but costs could be significantly higher. PG&E would

PGE5-13 CONTD

require a minimum of thirty to forty months to engineer and construct the modifications. (See Attachment 5 for additional details.)

PGE5-14

PG&E noted in its January 28, 2013 comments on BOR's Draft Feasibility Report that BOR needed to comply with its obligations under the National Environmental Policy Act. These obligations include identification and consideration of the potential environmental effects that could result from modifications to PG&E facilities as a result of any BOR decision to raise Shasta Dam.

PGE5-15

In addition, BOR is required to comprehensively examine the alternatives for raising Shasta Dam.

PGE5-16

Therefore, BOR should, in its next level of analyses in the Investigation and associated Final EIS, thoroughly examine all potential impacts on PG&E's operations and facilities.

PGE5-17

As indicated, PG&E is providing BOR with Black & Veatch's Technical Memorandum on the Shasta Dam raise impacts. (See Attachment 3.) Also, Attachments 4 and 5 to these comments provide details regarding the impact to PG&E's distribution and transmission systems. Should BOR have any questions on these materials, PG&E is willing to meet and discuss them with BOR and its representatives.

CONCLUSION

PGE5-18

Until all impacts of the Shasta Dam raise on the Pit 7 Development, the electric transmission and distribution facilities, and hence PG&E and its customers are identified, thoroughly analyzed, and satisfactory mitigation measures are proposed, PG&E continues to oppose raising Shasta Dam.

PG&E looks forward to cooperating with BOR and appreciates the opportunity to comment. If you have any questions or would like to discuss these comments, please contact either Alvin Thoma, Director of Hydro Licensing, at (415) 973-4466 or at ALT5@pge.com, or myself at (415) 973-7145 or at ARF3@pge.com.

Very truly yours,

Alvin L. Thoma
Director – Hydro Licensing

Annette Faraglia
Law Department

Attachments (5)

ATTACHMENT 1

Pacific Gas and Electric Company

Hydro Generation

245 Market Street
San Francisco, CA 94105

Mailing Address
Mail Code N11C
P.O. Box 770000
San Francisco, CA 94177

415.973.5323

November 30, 2005

Ms. Donna C. Garcia, Project Manager
Bureau of Reclamation, MP-700
2800 Cottage Way
Sacramento, CA 95825-1898

Shasta Lake Water Resources Investigation
Scoping Meeting Comments

Dear Ms. Garcia:

This letter provides the scoping comments of Pacific Gas and Electric Company (PG&E or Company) on the Shasta Lake Water Resources Investigation (Investigation). PG&E's representative attended the Scoping Meeting for this Investigation on November 1, 2005, in Fresno. The open house scoping exhibits were very informative and the team members very helpful in explaining the process and answering questions.

PG&E is a public utility engaged in the generation, transmission, and distribution of electric energy and the transmission and distribution of natural gas to its customers in northern and central California. It has a long and proud history of operating hydroelectric generating facilities in the Cascade and Sierra Nevada mountain ranges of California. The Company owns and operates 26 hydroelectric projects (with 65 powerhouses) licensed by the Federal Energy Regulatory Commission (FERC) and three additional hydro facilities that are not under FERC jurisdiction.

The Investigation includes alternatives that would impact PG&E's McCloud-Pit Project, FERC No. 2106, upstream of Shasta Dam. This project includes 3 powerhouses with a combined capacity of more than 360 megawatts (MW) and combined average annual generation of more than 1,542 megawatt-hours (MWH). The feasibility analysis of additional water storage in Lake Shasta should consider the potential impacts to existing electric generating facilities in the basin and the resulting impacts on the customers, employees, and owners of these facilities.

PGE5-19

PG&E has reviewed the Bureau of Reclamation's Overview of Initial Alternatives (August 2004) and Appraisal Assessment of the Potential for Enlarging Shasta Dam and Reservoir (May 1998). Raising Shasta Dam would increase the water surface elevation of Lake Shasta and periodically increase the tailwater elevation for the Pit 7 Powerhouse and reduce that generating unit's maximum capacity and average annual generation.

The five initial alternatives for enlargement of Shasta Dam and Reservoir (by 6.5 feet or 18.5 feet) would cause adverse impacts to PG&E's facilities and operation at the Pit 7 Afterbay Dam and Pit 7 Powerhouse.

ATTACHMENT 1

The proposed alternatives would frequently inundate the Pit 7 Afterbay Dam and force the Pit 7 Powerhouse to frequently operate with a higher tailwater level resulting in less generation of electricity. The FERC license-required gaging station (PH-47) would be inundated for much of every year. Currently, this gage is affected whenever storage in Shasta Lake exceeds 3.8 million acre-feet. This condition can last from one to six months in a year depending on the water conditions. With a raise of Shasta Dam, this condition is likely to last for most of the year.

PGE5-19
CONTD

The 18.5-foot-raise of Shasta Dam would also increase the likelihood of overtopping and flooding the Pit 7 Powerhouse deck. The higher water surface elevation in Lake Shasta would also inundate the Pit 7 Dam spillway flip bucket and affect the hydraulic characteristics of the spillway basin. This would likely result in higher water levels at the powerhouse and associated switchyard during spill conditions and increase the risk of damage to PG&E's facilities.

PG&E understands the need for additional water storage projects in California. It is not opposed to an increase in the storage capacity of Lake Shasta. However, PG&E's customers, shareholders, and employees expect that impacts to our existing facilities from such a project be mitigated and compensated at a value fully commensurate with those impacts. One way of accomplishing this would be for PG&E to own and operate any new hydroelectric facilities built at Shasta Dam that benefit from the increased storage capacity of Lake Shasta.

PG&E appreciates the opportunity to submit scoping comments on the Investigation and looks forward to working cooperatively with the Bureau of Reclamation and California Department of Water Resources in the future. Please call me at (415) 973-5358 or send an email to njm1@pge.com if you have any questions or would like to schedule follow-up technical meetings.

Sincerely,

Nicholas J. Markevich

Nicholas J. Markevich
Senior License Coordinator
Hydro Generation Department
Pacific Gas and Electric Company

ATTACHMENT 2

Pacific Gas and Electric Company

Power Generation

245 Market Street
San Francisco, CA 94105

Mailing Address
Mail Code N11C
P.O. Box 770000
San Francisco, CA 94177

COPY

January 28, 2013

E-Filing
BOR-MPR-SLWRI@USBR.GOV

Ms. Katrina Chow, Project Manager
BUREAU OF RECLAMATION
2800 Cottage Way, MP-270
Sacramento, CA 95825-1893

Re: Pacific Gas and Electric Company's Comments on Draft Feasibility Report for the Shasta Lake Water Resources Investigation

Dear Ms. Chow:

Pursuant to the December 7, 2012 public notice extending the due date for comments on the Bureau of Reclamation's ("BOR" or "Reclamation") Draft Feasibility Report for the Shasta Lake Water Resources Investigation ("Report"), Pacific Gas and Electric Company ("PG&E") hereby submits comments on the Report.

PG&E appreciates the extended opportunity to submit comments on the Report. As discussed herein, PG&E believes there are deficiencies in the Report's level of analysis regarding the impacts that increasing the height of Shasta Dam, by 18.5 feet (CP3, CP4, CP5), will have on PG&E and its customers. Consequently, until BOR updates its analyses to correct these deficiencies and comprehensively addresses the full scope of adverse impacts, PG&E opposes increasing the height of Shasta Dam.

PGE5-20

BACKGROUND

PG&E is the owner and holder of a license issued by the Federal Energy Regulatory Commission ("FERC") for the McCloud-Pit Project, FERC Project No. 2106 ("McCloud-Pit Project"). The Project is located on the McCloud and Pit Rivers. Included in the McCloud-Pit Project is the Pit 7 Development located on the Pit River. It includes the Pit 7 Dam, Reservoir, Powerhouse (containing two generating units with a combined installed capacity of 112 MW), an Afterbay, and an Afterbay Dam.

In a November 30, 2005 letter to the BOR (copy attached), PG&E provided scoping comments for the Shasta Dam Water Resources Investigation. As PG&E's letter explained, the proposals to raise Shasta Dam, by 18.5 feet, could have serious adverse impacts on the Pit 7 Development, including inundation of the Pit 7 Afterbay Dam, reduction in generation, overtopping and flooding of the Pit 7 Powerhouse deck, alteration of the hydraulic characteristics of the spillway basin, and increasing the risk of damage to PG&E facilities.

ATTACHMENT 2

COMMENTS

Although PG&E's November 30, 2005 letter advised BOR that raising the height of Shasta Dam by 18.5 feet could cause significant adverse impacts to the Pit 7 Development, the BOR's Report did not fully consider those impacts. It appears the Report only acknowledges that raising Shasta Dam would cause water to back up onto the downstream flip bucket lip and powerhouse wall at the Pit 7 Powerhouse. The Report asserts that this could be addressed by developing operating procedures for Shasta Dam to keep full pool elevations below a certain level during specific periods. (*See* p. 5-4 of the Report.) PG&E is not convinced that operating procedures alone will mitigate this impact. Higher tailwater on the flip bucket will alter the hydraulic characteristics and performance of the spill channel design. Noting that spillway use may be required at any time due to unplanned events, this is a facility safety issue that must be thoroughly analyzed by experts and may ultimately require extensive spillway modifications.

PGE5-20 CONTD

The Report also states that the increased tailwater elevation caused by raising Shasta Dam would require the installation of a tailwater depression system to lower the water in the draft tubes before the units could be switched to synchronous mode. (*Id.* and Table 3-9) While a tailwater depression system may be necessary, the installation of such a system may require other major upgrades not mentioned in the Report such as new wicket gates and/or turbine runner seals. Furthermore, the amount of additional submergence for the current turbine runner design may not be practical. It may be necessary to install re-designed turbine runners to accommodate the additional submergence. These issues must also be thoroughly analyzed by experts and may ultimately require extensive turbine modifications.

The Report overlooks other potential impacts such as, but not limited to, the potential of flood to the interior of the Powerhouse through discharge piping from the building sump pumps, draft tube de-watering pumps, and equipment cooling water systems. The proposed 18.5 foot raise places the Shasta Lake maximum elevation above the level of all three interior Powerhouse floors. Attached as a separate PDF is a *confidential* CEII drawing which provides in more detail impacts to the Powerhouse. PG&E requests that BOR keep this drawing *confidential*.

Clearly, the overall analysis of potential impacts at the Pit 7 Development included in the Report is woefully insufficient and more comprehensive assessments of *all* potential impacts are warranted.

According to Table 3-15 of the Report, the construction and annual costs of modifications to the Pit 7 Development would be $200,000. This estimate is based on an insufficient analysis, and PG&E expects significantly higher costs. Cost estimates cannot be even modestly accurate

PGE5-20
CONTD

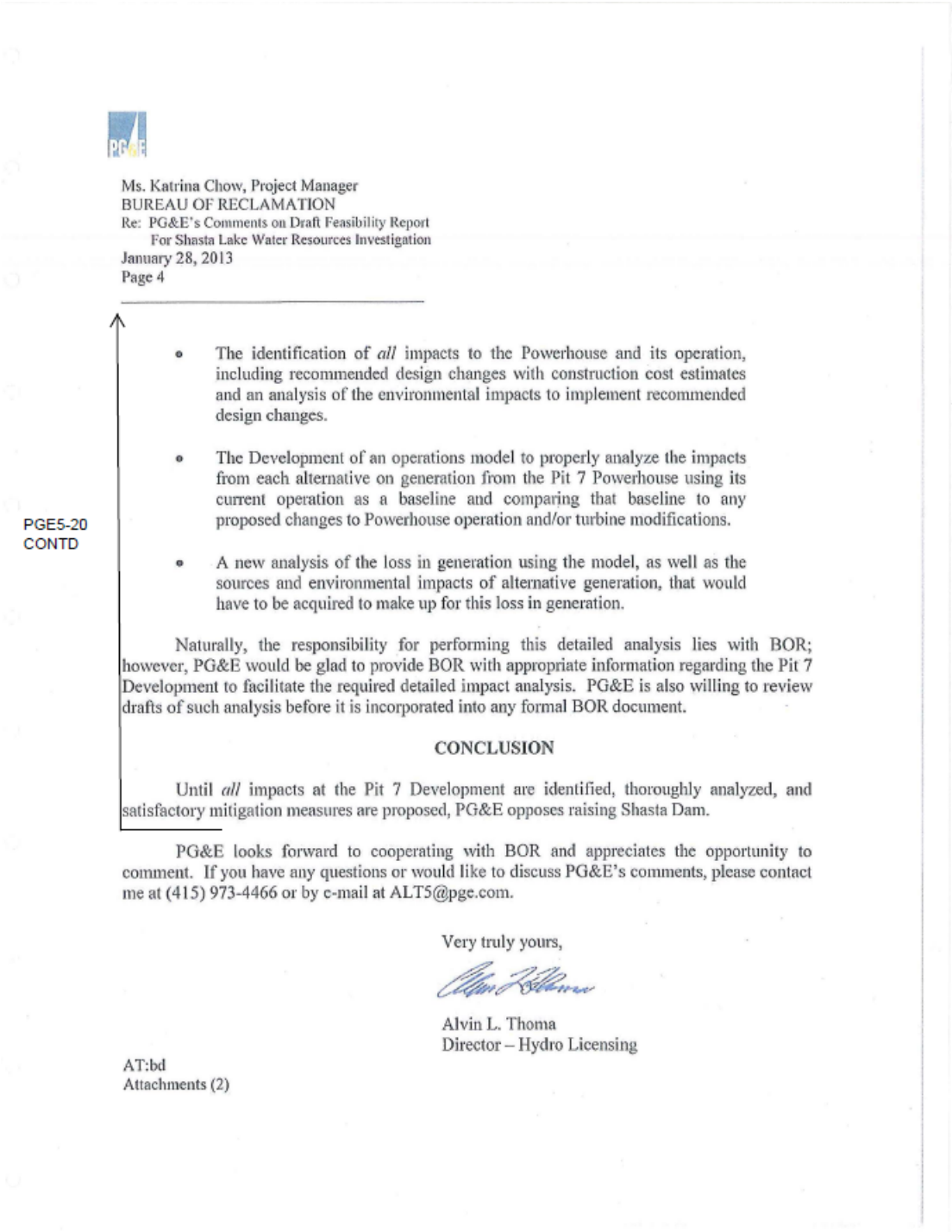
until all impacts are analyzed and Powerhouse and Dam modifications are developed and recommended. The range of possibilities varies from very few modifications to a complete re-design of the Powerhouse and possibly including the spillway and channel.

In association with its review of the Report, PG&E reviewed the Preliminary Draft Environmental Impact Statement ("DEIS") prepared in association with the Investigation. The DEIS also discusses the tailwater depression system. (DEIS at p. 2-31 and Table 2-8) However, the DEIS notes that the increase in tailwater elevation at the Pit 7 Powerhouse, caused by the increase in Shasta Dam, would cause losses in generation. Such losses would be considered significant if the monthly average generation was reduced by more than 5% in any month, and that losses exceeded the 5% amount for numerous months under all of the alternatives for an 18.5 feet raise of Shasta Dam (the alternative for a 12.5 feet raise). (*See* DEIS at pp. 23-8 to 23-11 and 23-27 to 23-56.) The DEIS confirms in Table 23-42 that these decreases in net generation were potentially significant. Finally, the DEIS concludes that these decreases in net generation constitute an unavoidable environmental impact that cannot be mitigated. (DEIS at pp. 26-1 to 26-2) For analysis of impacts on generation from the Pit 7 Powerhouse, BOR used a spreadsheet post-processor in lieu of a model. (DEIS at pp. 23.8 to 23.9) To properly analyze impacts on generation, a model should be developed of the current Pit 7 Powerhouse operation and be used as a baseline to compare with any proposed changes to Powerhouse operation and/or turbine modifications.

PG&E appreciates that the Shasta Dam Water Resources Investigation is still ongoing and that the Report acknowledges (at p. 5-4) that other effects to the Pit 7 Development will have to be considered and addressed. However, given PG&E's November 30, 2005 letter, PG&E had hoped for a more thorough analysis of the potential impacts on the Pit 7 Development.

PG&E notes that to comply with its obligations under the National Environmental Policy Act ("NEPA"), BOR is required to comprehensively examine the alternatives for raising Shasta Dam. Therefore, BOR should, in its next level of analyses in the Investigation and associated NEPA document, thoroughly examine all potential impacts on operations and facilities at PG&E's Pit 7 Development. These include:

- The impacts of higher tailwater to facility safety for the entire Pit 7 Development, including impacts to and the performance of the spill channel. Such an analysis must include recommended design changes with construction cost estimates and an analysis of the environmental impacts to implement recommended design changes.



Ms. Katrina Chow, Project Manager
BUREAU OF RECLAMATION
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- The identification of *all* impacts to the Powerhouse and its operation, including recommended design changes with construction cost estimates and an analysis of the environmental impacts to implement recommended design changes.

- The Development of an operations model to properly analyze the impacts from each alternative on generation from the Pit 7 Powerhouse using its current operation as a baseline and comparing that baseline to any proposed changes to Powerhouse operation and/or turbine modifications.

- A new analysis of the loss in generation using the model, as well as the sources and environmental impacts of alternative generation, that would have to be acquired to make up for this loss in generation.

Naturally, the responsibility for performing this detailed analysis lies with BOR; however, PG&E would be glad to provide BOR with appropriate information regarding the Pit 7 Development to facilitate the required detailed impact analysis. PG&E is also willing to review drafts of such analysis before it is incorporated into any formal BOR document.

CONCLUSION

Until *all* impacts at the Pit 7 Development are identified, thoroughly analyzed, and satisfactory mitigation measures are proposed, PG&E opposes raising Shasta Dam.

PG&E looks forward to cooperating with BOR and appreciates the opportunity to comment. If you have any questions or would like to discuss PG&E's comments, please contact me at (415) 973-4466 or by e-mail at ALT5@pge.com.

Very truly yours,

Alvin L. Thoma
Director – Hydro Licensing

AT:bd
Attachments (2)

PGE5-20
CONTD

Responses to Comments from Pacific Gas & Electric Company

PGE5-1: During the public comment period for the SLWRI, PG&E provided comments regarding their facilities that are operated on the Pit River, and transmission facilities within the primary study area. Some of the concerns were the reduced generation capacity of hydropower facilities on the Pit River due to higher tailwater levels, and operational effects of the current Pit 7 Dam spillway and afterbay dam. PG&E also

raised concern of the proposed modifications to two of transmission facilities in the area.

During development of the D EIS, Reclamation coordinated with PG&E to obtain information needed to conduct analyses on the effects on PG&E facilities, and the potential reduction in long term generation of power. The information provided by PG&E to Reclamation was used in the development of both designs and cost estimates that were developed for the DEIS. All analysis of PG&E facilities for the DEIS was the best available to Reclamation at the time of development. During the public comment period PG&E expressed concern regarding the analysis that was done regarding the Pit 7 facility, transmission and distribution lines, and long term power generation. During this time PG&E provided Reclamation with additional information to improve the level of analysis of these facilities. Based on this additional information, Reclamation has refined their analyses related to PG&E facilities in the Final EIS, including:

- Modifications to the Pit 7 Dam spillway have been incorporated into all action alternatives (see Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities.")

- Modifications to Pit 7 Powerhouse have been refined in all action alternatives (see Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities.")

- To offset reduced power generation capabilities at Pit 7 Powerhouse due to increased tailwater effects of an enlarged Shasta Lake, all action alternatives include in-kind power replacement (see Chapter 2, "Alternatives," Section 2.3, "Action Alternatives.")

The following features have been updated in the cost estimates to reflect the refinements to the Pit 7 Powerhouse Mechanical Modifications, additional dewatering pumping capacity at gallery, extend dam erosion protection, stabilize flooded roadway section with concrete paving, relocate gaging station and cableway, extend boat barriers, rehab existing boat ramp, relocate security fence, relocate miscellaneous signage, relocate early warning system, and increase height of the existing left and right concrete training walls.

Pit 7 Dam and Powerhouse With the additional information provided during the public comment period for the DEIS about Pit 7 facilities, additional analysis has been performed and information is included in the Final EIS Engineering Summary Appendix, Chapter 3, "Design Considerations for Dam and Appurtenances of Dam Enlargements." The additional analysis required additional items to be added to the cost

estimate for Pit 7 and can be found in the Final EIS Engineering Summary Appendix Attachment 2, "6.5-Foot Raise and Reservoir Area Infrastructure Costs," Attachment 3, "12.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates," and Attachment 4, "18.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates." The cost estimates in the DEIS and in the Final EIS have been developed consistent with Reclamation Manual, Directives and Standards FAC 09-01, 09-02, and 09-03, and if Congress authorizes the project more detailed cost estimates at a more significant level of design will be developed.

Transmission Lines With the additional information provided during the public comment regarding design standards and constraints on the transmission line relocations, designs were updated for the EIS. A description of the transmission line work can be found in the EIS Engineering Summary Appendix, Chapter 4, "Design Considerations for Reservoir Area Infrastructure Modifications and/or Relocations." The cost estimate for the new transmission line relocations can be found in the EIS Engineering Summary Appendix Attachment 2, "6.5-Foot Raise and Reservoir Area Infrastructure Costs," Attachment 3, "12.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates," and Attachment 4, "18.5-Foot Raise and Reservoir Area Infrastructure Cost Estimates." The cost estimates in the DEIS and Final EIS have been developed consistent with Reclamation Manual, Directives and Standards FAC 09-01, 09-02, and 09-03, and if Congress authorizes the project more detailed cost estimates at a more significant level of design will be developed.

Effects to Long Term Generation at Pit 7 Powerhouse Analysis within the DEIS was performed by Reclamation with the best available information at the time of preparation. As stated in the DEIS Chapter 23 "Power and Energy," Section 23.3.2, "Criteria for Determining Significance of Effects":

> *The thresholds of significance for impacts to power and energy are based on the environmental checklist in Appendix G of the State CEQA Guidelines, as amended. These thresholds also encompass the factors taken into account under NEPA to determine the significance of an action in terms of its context and the intensity of its impacts. An alternative would be considered to have a potentially significant impact on regional hydropower production if the average annual energy generation or consumption is greater than 5 percent.*

With the information and tools available to Reclamation at the time of development of the DEIS the impacts were considered less than

significant. The results of the hydropower generation analysis can be found in Table 23-2 through Table 23-8 for the No-Action Alternative, CP1, CP2, CP3, CP4, CP4A, and CP5, respectively.

While under the significance criteria the impact is not significant, Reclamation recognizes that the loss of power generation will result in a loss of PG&E revenue. Reclamation will provide in kind power in a method that will be determined after congressional authorization, to offset the reduced generation at Pit 7 dam and facilities. Chapter 2, "Alternatives," has been revised to reflect Reclamation providing in kind power. Further, Chapter 23, "Power and Energy," has been revised to reflect Reclamations commitment to providing in kind power.

Future Coordination with PG&E Reclamation recognizes that if Congress authorizes the SLWRI that additional planning, engineering analysis, design and cost estimates will need to be performed before construction. Reclamation in coordination with PG&E will discuss and investigate the affects and analysis that will be required for the Pit 7 facilities and other PG&E facilities. Some of the suggested study topics and possible requirements are included in the following Table 33.10-2.

Table 33.10-2. Shasta Dam Raise Impacts on PG&E Pit 7 Development

Impact of Raise	Action Required
Regulatory and Non-Regulatory Documents	
License Amendment FERC Project Boundary/Document Updates PG&E Internal Document Updates	Prepare license amendment, flood plain study, survey maps, and legal recording, update documents
Pit 7 Dam	
Spillway flip bucket overspray and inundation	Physical modeling study
Uplift and additional load on dam	High hazard stability analysis to Shasta PMF water levels
Dam foundation seepage drain system	Redesign pump system at gallery
Two 96 inch low level outlets flooded at Shasta IDF levels	Study to verify no capacity reductions
Diversion tunnel flooding	Geotechnical study on left abutment slope stability
Right abutment groin drainage	Study impact of higher water on existing dam leakage
Spillway channel bank erosion protection	Slope stability and re-design of bank erosion protection

Table 33.10-2. Shasta Dam Raise Impacts on PG&E Pit 7 Development (contd.)

Impact of Raise	Action Required
Pit 7 Powerhouse	
Mechanical	
Tailwater depression system	Study to determine is a depression system will be required, design water depression system, and add compressors, receivers and controls
Governor pressure tanks and air receiver	Secure against buoyancy
Turbine shaft seals	Seal study and test with higher TW.
Turbine Modifications - Loss of efficiency, adverse change in rough operating zone and increased vibration	Study and/or test these impacts
Flood interior of powerhouse	Study measures to reduce risk
Electrical equipment associated with mechanical equipment relocation	Study measures to reduce risk of shorting out electrical equipment on turbine floor due to flooding
Building sump pumps, cooling water, draft tube de-watering pumps	Study pump H/Q curves for higher TW
Oil separators	Study for sizing
Spiral case access with higher TW	No technical solution available
Electrical	
Electrical equipment relocation	1) All electrical equipment on turbine floor (elev. 1069.0') and basement floor (Elev. 1056.75') will be under water. They should be relocated above the proposed normal tailwater Elev. 1087.5'. 2) The lower portion of electrical equipment including components installed on the switchboard and panels mounted on the generator floor (1084.5') will be under water. They should be relocated above the proposed normal tailwater Elev. 1087.5'
Automation system upgrade	1) All rack mounted devices below proposed normal tailwater Elev. 1087.5' need to be relocated. 2) Add floor monitoring alarm systems
Civil	
Powerhouse building stability	Structural analysis for sliding and uplift
Powerhouse building structural adequacy	Analyze powerhouse walls and other structural member for new differential head load cases
New construction and anchors verification for equipment	Design and structural verification for flooded powerhouse loads
Draft tube stop log gates	Structural analysis, hoisting system, and gate seal verification
Powerhouse and road surface drainage system discharging into diversion tunnel outlet	Study powerhouse and road surface drain system
Powerhouse walls and dewatering capacity system	Condition assessment for leakage due to higher TW
Septic tank floatation	Verify stability and efficacy of tank
Operation	
Loss of Generation Shasta IDF and PMF levels impacts on operation	Study based on proposed reservoir elevations and current PG&E operation

Table 33.10-2. Shasta Dam Raise Impacts on PG&E Pit 7 Development (contd.)

Impact of Raise	Action Required
PIT 7 Afterbay Dam	
Civil Works	
Hydrostatic loads on the Pit 7 Afterbay Dam (rapid drawdown)	Rock dam structural stability (significant hazard)
Uplift on weir structure	Stability analysis
Pit 7 Afterbay Dam abutment erosion protection	Design to extend dam erosion protection to new water surface elevation
Reservoir	
Slope stability of river banks for 20.5 feet higher inundation area	Geotechnical investigation
Self-flushing capacity of reservoir	Sediment passage study
Afterbay, Fender's Ferry Camp, and PH-47 Gaging Station Access Road, and PH-47 Gaging Station and cableway	Re-design to meet USGS requirements for higher water level
Public Safety	
Public access conflicts with the current location of the Pit 7 Afterbay Dam for higher water levels	Evaluate Pit 7 Afterbay Dam potential relocation upstream to meet USFS requirements
Boat barrier	Re-design
Boat ramp relocation as a result of the higher water levels	Re-design to meet USFS requirements and upgrade public safety plan
Dam boat barrier cable and signage	Re-design and upgrade to meet USFS requirements
Security fence relocation	Flood plain study , re-design layout, and update public safety plan
Fender's Ferry Camp relocation	Re-design, flood plain study, and public safety plan to meet USFS requirements
Signage relocation	Re-design signage plan, update public safety plan
Warning siren system	Relocate system and update public safety plan

Key:
Elev. = elevation
FERC = Federal Energy Regulatory Commission
IDF = Inflow design flood
PG&E = Pacific Gas and Electric Company
PMF = probable maximum flood
TW = Tailwater
USFS = U.S. Forest Service
USGS =U.S. Geological Survey

If a project is authorized for construction, Reclamation will coordinate with PG&E to identify the specific studies, and additional analysis will be performed. In addition, Reclamation will work with PG&E to development long-term agreements for power replacement to offset effects to Pit 7 generation during high water levels in the expanded reservoir.

PGE5-2: Please refer to Master Comment Response GEN-5, “Some People Support Dam Raise and Others Oppose Dam Raise.”

PGE5-3: As described in the Engineering Summary Appendix Reclamation recognizes the facilities mentioned in the public comment as being in the primary study area and owned and operated by PG&E.

PGE5-4: Following receipt of PG&E's November 30, 2005 letter Reclamation coordinated with PG&E to obtain information on PG&E facilities. This information, although limited, was the basis for the analysis and evaluations presented in the DEIS. Following the DEIS Reclamation has coordinated with PG&E to obtain additional facility information. See also response to PGE5-1.

PGE5-5: See response to PGE5-1. Based on additional information provided by PG&E following the DEIS comment period, Reclamation has performed additional analysis on PG&E facilities within the primary study area. Based on additional analysis and coordination with PG&E, the Final EIS has been updated to reflect the commitment to provide in kind power to offset reduced power generation at Pit 7 Powerhouse due to impacts of action alternatives.

PGE5-6: See response to PGE5-1. Based on additional information provided by PG&E following the DEIS comment period, Reclamation has performed additional analysis on PG&E facilities within the primary study area. Based on additional analysis and coordination with PG&E, the Final EIS has been updated to reflect the refinements to tailwater depression analysis, designs, and cost estimates.

PGE5-7: See response to PGE5-1. Based on additional information provided by PG&E following the DEIS comment period, Reclamation has performed additional analysis on PG&E facilities within the primary study area. Based on additional analysis and coordination with PG&E, the Final EIS has been updated to reflect the refinements to the Pit 7 Powerhouse Mechanical Modifications, additional dewatering pumping capacity at gallery, extend dam erosion protection, stabilize flooded roadway section with concrete paving, relocate gaging station and cableway, extend boat barriers, rehab existing boat ramp, relocate security fence, relocate miscellaneous signage, relocate early warning system, and increase height of the existing left and right concrete training walls.

PGE5-8: Following receipt of PG&E's November 30, 2005 letter, Reclamation coordinated with PG&E to obtain information on PG&E facilities. This information, although limited, was the basis for the analysis and evaluations presented in the DEIS. Following the DEIS Reclamation has coordinated with PG&E to obtain additional facility information. The Engineering Summary Appendix Chapter 3 "Design Considerations for Dam and Appurtenances of Dam Enlargement," has been updated to include additional analysis performed on PG&E

facilities using additional information provided to Reclamation from PG&E. See also response to PGE5-1.

PGE5-9: Based on additional information provided by PG&E following the DEIS comment period, Reclamation has performed additional analysis on PG&E facilities within the primary study area. Based on additional analysis and coordination with PG&E, the Final EIS has been updated to reflect the refinements to the Pit 7 Powerhouse Mechanical Modifications, additional dewatering pumping capacity at gallery, extend dam erosion protection, stabilize flooded roadway section with concrete paving, relocate gaging station and cableway, extend boat barriers, rehab existing boat ramp, relocate security fence, relocate miscellaneous signage, relocate early warning system, and increase height of the existing left and right concrete training walls. The Engineering Summary Appendix, Chapter 3, "Design Considerations for Dam and Appurtenances of Dam Enlargement," has been updated to include additional analysis performed on PG&E facilities using additional information provided to Reclamation. See also response to PGE5-1.

PGE5-10: Reclamation coordinated with PG&E on December 5, 2013 to review PG&E's comments including Attachment 3 referred to in the above comment. Based on additional information provided by PG&E following the DEIS comment period, Reclamation has performed additional analysis on PG&E facilities within the primary study area. Based on additional analysis and coordination with PG&E, the Final EIS has been updated to reflect the refinements to the Pit 7 Powerhouse Mechanical Modifications, additional dewatering pumping capacity at gallery, extend dam erosion protection, stabilize flooded roadway section with concrete paving, relocate gaging station and cableway, extend boat barriers, rehab existing boat ramp, relocate security fence, relocate miscellaneous signage, relocate early warning system, and increase height of the existing left and right concrete training walls.

Per PG&E's email from John Klobas dated April 8, 2014, PG&E requested that specific information included in their comment letters not be released to the public for security reasons:

> *The documents PG&E provided to Reclamation during the comment period for the SLWRI do indeed contain FERC designated Critical Energy Infrastructure Information (CEII) and other sensitive and confidential information that should <u>not</u> be released to the public for security reasons. Below is a listing of additional instructions for these documents:*

- *Do not release the CEII drawing in Attachment 1. It is okay to release the remainder of Attachment 1.*
- *It is okay to release the entire Attachment 2.*
- *Do not release Attachment 3. (CEII is included throughout the Pit 7 B&V Report)*
- *Do not release Attachment 4. (Sensitive information about the distribution and communication lines w/maps)*
- *Do not release Attachment 5. (Sensitive information about the transmission lines)*

PGE5-11: During development of the DEIS Reclamation developed estimates of the lengths of affected power distribution lines, as described in the Engineering Summary Appendix.

Based on the best available information for newly inundated areas and required reservoir area structure relocations, up to 30,000 linear feet of low voltage power linear feet were identified for replacement. As identified in Chapter 2, "Alternatives," Section 2.3.8, "Comprehensive Plan Construction Activities," Reclamation commits to relocate all facilities affected by inundation or other relocations, and will perform further analysis after congressional authorization.

PGE5-12: Based on additional information provided by PG&E following the DEIS comment period, Reclamation has performed additional analysis on PG&E facilities within the primary study area. The Engineering Summary Appendix Chapter 4 "Design Considerations for Reservoir Area Infrastructure Modifications and/or Relocations," has been updated to include additional analysis performed on PG&E's transmission lines in the primary study area to accommodate a change in clearance standards. Please see response to PGE5-1.

PGE5-13: Based on additional information provided by PG&E following the DEIS comment period, Reclamation has performed additional analysis on PG&E facilities within the primary study area. The Engineering Summary Appendix Chapter 4 "Design Considerations for Reservoir Area Infrastructure Modifications and/or Relocations," has been updated to include additional analysis performed on PG&E's transmission lines in the primary study area to accommodate a change in clearance standards. Please see response to PGE5-1.

PGE5-14: Please refer to Master Comment Response EI-1, "Intent of NEPA Process is to Provide Fair and Full Discussion of Significant Environmental Impacts."

PGE5-15: Please refer to Master Comment Response P&N-1, "Purpose and Need and Objectives," Master Comment Response ALTR-1, "Range of Alternatives – General," and Master Comment Response ALTS-1, "Alternative Selection."

PGE5-16: Based on additional information provided by PG&E following the DEIS comment period, Reclamation has performed additional analysis on PG&E facilities within the primary study area. Based on additional analysis and coordination with PG&E, the Final EIS has been updated to reflect the refinements to the Pit 7 Powerhouse Mechanical Modifications, additional dewatering pumping capacity at gallery, extend dam erosion protection, stabilize flooded roadway section with concrete paving, relocate gaging station and cableway, extend boat barriers, rehab existing boat ramp, relocate security fence, relocate miscellaneous signage, relocate early warning system, and increase height of the existing left and right concrete training walls. The Engineering Summary Appendix, Chapter 3, "Design Considerations for Dam and Appurtenances of Dam Enlargement," has been updated to include additional analysis performed on PG&E facilities using additional information provided to Reclamation. See also response to PGE5-1.

PGE5-17: Reclamation coordinated with PG&E on December 5, 2013 to review PG&E's comments including multiple attachments referred to in the above comment. Based on additional information provided by PG&E following the DEIS comment period, Reclamation has performed additional analysis on PG&E facilities within the primary study area. Based on additional analysis and coordination with PG&E, the Final EIS has been updated to reflect the refinements to the Pit 7 Powerhouse Mechanical Modifications, additional dewatering pumping capacity at gallery, extend dam erosion protection, stabilize flooded roadway section with concrete paving, relocate gaging station and cableway, extend boat barriers, rehab existing boat ramp, relocate security fence, relocate miscellaneous signage, relocate early warning system, and increase height of the existing left and right concrete training walls.

Per PG&E's email from John Klobas dated April 8, 2014, PG&E requested that specific information included in their comment letters not be released to the public for security reasons:

> *The documents PG&E provided to Reclamation during the comment period for the SLWRI do indeed contain FERC designated Critical Energy Infrastructure Information*

(CEII) and other sensitive and confidential information that should not be released to the public for security reasons. Below is a listing of additional instructions for these documents:

- *Do not release the CEII drawing in Attachment 1. It is okay to release the remainder of Attachment 1.*
- *It is okay to release the entire Attachment 2.*
- *Do not release Attachment 3. (CEII is included throughout the Pit 7 B&V Report)*
- *Do not release Attachment 4. (Sensitive information about the distribution and communication lines w/maps)*
- *Do not release Attachment 5. (Sensitive information about the transmission lines)*

PGE5-18: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

PGE5-19: This comment appears to referencing scoping meetings performed for the SLWRI, and not the DEIS which is the subject of these responses. However, following receipt of PG&E's November 30, 2005 letter, Reclamation coordinated with PG&E to obtain information on PG&E facilities. This information, although limited, was the basis for the analysis and evaluations presented in the DEIS. Following the DEIS Reclamation has coordinated with PG&E to obtain additional facility information. See also response to PGE5-1.

PGE5-20: This comment appears to referencing the Draft Feasibility Report for the SLWRI, and not the DEIS which is the subject of these responses. Please also see response to PGE5-1.

33.10.36 Pacific Gas & Electric Company

PGE6

From: **Diamond, Elizabeth** <EJDd@pge.com>
Date: Thu, Sep 26, 2013 at 5:06 PM
Subject: Typo Error in PG&E's Comments to re BOR's DEIS on Shasta Lake Water Resources Investigation . . .
To: "kchow@usbr.gov" <kchow@usbr.gov>
Cc: "Faraglia, Annette (Law)" <ARF3@pge.com>

Sept. 26, 2013

Ms. Chow:

I made a typographical error in PG&E's September 25, 2013 Comments. On **page 3**, in the **third paragraph**, the **3 & 4th lines down**, "fifty-nine distribution transformers" should read "**fifty-nine distribution poles**. It should read as follows:

PGE6-1

As noted above, PG&E has electric distribution facilities located within the BOR SLWRI study area. Preliminary review of the new water mark based on the model produced by PG&E's Geographic Information Systems Group indicates that PG&E will need to relocate fifty-nine distribution poles ~~transformers~~ and upgrade twenty-nine distribution transformers at an estimated cost of $914,000. These poles are part of the Antler 1101, Stillwater 1101, and Stillwater 1102 12 kV circuits serving small communities such as parts of Lakehead and Mountain Gate. (See Attachment 4 for more detail.)

I have attached a corrected page 3 to PG&E's Comments.

Would BOR like an electronic copy of the complete copy of the Comments with the corrected page or would BOR prefer to insert the page?

I apologize for my inadvertent error.

Thank you!
Betsie Diamond
PG&E Law Dept.
77 Beale St., B30A-2482
San Francisco, CA 94105-1814
Telephone: (415) 973-6644
Facsimile: (415) 972-5952
E-Mail: ejdd@pge.com

The overall DEIS analysis of potential impacts at the Pit 7 Development is woefully insufficient. BOR did not address the majority of concerns PG&E raised in its November 30, 2005 and January 28, 2013 letters. Accordingly, a more comprehensive assessment of all potential impacts is still required.

In an effort to help the BOR, PG&E contracted with Black & Veatch to prepare a Technical Memorandum entitled *Shasta Dam Raise Impacts on PG&E's Pit 7 Development*. A copy of this Technical Memorandum is attached as Attachment 3. It is PG&E's intention that this document will form the foundation for future dialog between BOR and PG&E seeking resolution to the impacts at the Pit 7 Development.

As noted above, PG&E has electric distribution facilities located within the BOR SLWRI study area. Preliminary review of the new water mark based on the model produced by PG&E's Geographic Information Systems Group indicates that PG&E will need to relocate fifty-nine distribution poles and upgrade twenty-nine distribution transformers at an estimated cost of $914,000. These poles are part of the Antler 1101, Stillwater 1101, and Stillwater 1102 12 kV circuits serving small communities such as parts of Lakehead and Mountain Gate. (See Attachment 4 for more detail.)

PG&E also has two high voltage power line facilities located within the SLWRI study area, the Crag View-Cascade 115 kV line, and the Delta-Mountain Gate Junction 60kV line. The two lines roughly parallel each other within the study area with the 115 kV line the more westerly of the two circuits. In addition, the 115 kV line supports a fiber optic communication cable.

Approximately twenty-four PG&E structures will be affected by BOR's proposed project and may require replacement. The replacement of the structures that support electrical conductors that span large bodies of water will require significantly taller structures (approximately 40 to 50 feet taller). The taller structures are needed for the following reasons:

1. The increase in span lengths between structures;
2. The raise in the water level; and
3. Since the original construction of the power lines, the State of California clearance requirements over water has increased by an additional 20 feet.

The projected cost to modify the high voltage power lines, due to BOR's proposed project, is approximately $15 million but costs could be significantly higher. PG&E would

Responses to Comments from Pacific Gas & Electric Company

PGE6-1: Reclamation recognizes the changes made to PG&E's comment letter sent on September 25, 2013. Please see response PGE5-11.

33.10.37 Porgans & Associates

PORG

Fwd: Brief Statement in Support of Comments

KATRINA CHOW <kchow@usbr.gov> Wed, Oct 23, 2013 at 1:14 PM
To: KATHLEEN DUNCAN <kduncan@usbr.gov>

Sent from my iPhone

Begin forwarded message:

From: Pedro Lucero <plucero@usbr.gov>
Date: September 30, 2013, 11:45:06 PM PDT
To: KATRINA CHOW <kchow@usbr.gov>
Subject: Fwd: Brief Statement in Support of Comments

Pete Lucero
PAO

Sent from my iPhone.

Begin forwarded message:

From: Patrick Porgans <porgansinc@sbcglobal.net>
Date: September 30, 2013, 11:23:56 PM PDT
To: <plucero@usbr.gov>
Cc: <pp@planetarysolutionries.org>
Subject: Brief Statement in Support of Comments

To: Pete Lucero, PIO, BOR Sacramento

As stated previously, Porgans & Associates (P/A) made several attempts before 5:00 p.m. to email comments to the PIO, expressing support of the Winnemen Wintu Tribal concerns for their "Sacred Sites", and, for that reason alone, P/A has reservations about the proposal to raise Shasta Dam.

PORG-1 P/A respectfully suggest that the Bureau, via the Department of Interior restore, develop a plan to restore :Sacred sites"; not destroy them. I distinctly recall having had the "raise the dam experience" on one or two other occasions in the past 30 years.

PORG-2 P/A intimate knowledge of the adverse impacts attributable to the "operation" of the federal Central Valley Project (CVP), primarily to salmonid and other threatened and/or endangered species, is a real threat that has yet to be mitigated.

PORG-3 P/A would not object to a water project that could pay-for-itself; identify the availability of water to be developed; demonstrate a legitimate need for the proposed project, and fully mitigate the impacts associated with the action.

PORG-4 Lastly, P/A represents Planetary Solutionaries and its policy and position are to stop CVP water contract renewal until the Bureau makes good for the protections that have yet to be forthcoming. Before the Bureau does any additional water development it should complete the following tasks:

PORG-5 1). Fully comply with the terms and conditions of their water right permits and licenses, issued by and under the jurisdiction of the California State Water Resources Control Board;

PORG-6 2). Adhere to Board Adopted Water Quality Control Plans

PORG-7 3). Provide cost-effective and proven solutions to CVP drainage problem and cease water deliveries to lands that are discharging toxic drainage into the Delta.

PORG-8 4).Too be compliant with the provision contained in Board D-1631 dealing with drainage and water rights;

PORG-9 5). Achieve mandated fish-doubling populations;

PORG-10 6). Retire all lands within the San Luis Unit that have known toxic drainage problems, and

PORG-11 7). Permanently reduce water deliveries to those lands and

PORG-11 CONTD

dedicated it for the protection of Delta water users and uses.

PORG-12

Time and my pre-occupation with other matters of state, limit P/As ability to give the "dam" proposal the time and attention it deserves; albeit, for the record, please confirm receipt of P/As comments.

Respectully,

Patrick Porgans, Solutionist

Responses to Comments from Porgans & Associates

PORG-1: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," Master Comment Response CR-3, "Current Effects to Cultural Resources," and Master Comment Response CR-15, "National Historic Preservation Act Section 106 Consultations."

PORG-2: Please refer to Master Comment Response DSFISH-6, "Historic Dam Effects on Fisheries."

PORG-3: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

PORG-4: Comment noted.

PORG-5: Reclamation operates the Central Valley Project in compliance with all applicable state and federal statutes and regulations.

Please refer to Master Comment Response WR-1, "Water Rights."

PORG-6: Reclamation operates the Central Valley Project in compliance with all applicable state and federal statutes and regulations.

PORG-7: Central Valley agricultural drainage problems are outside the scope of the SLWRI and are being addressed by Reclamation and other stakeholders under separate programs from the SLWRI. Examples of these programs/initiatives include the San Luis Drainage Reevaluation Program, Grassland Bypass Project, and the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS).

Please refer to Master Comment Response GEN-7, "Rules and Regulations for Water Operations under Action Alternatives."

PORG-8: It is unclear what connection the commenter is making between D-1631 and Reclamation or its water systems. Water Rights Decision D-1631 is related to diversion of water from the Mono Basin by the City of Los Angeles under the City's water right. Diversions referenced in D-1631 from Mono County's Lee Vining, Walker, Parker, and Rush creeks are not through CVP and SWP facilities, or any other facilities owned or operated by Reclamation, and the CVP and SWP do not divert water from the Mono Basin.

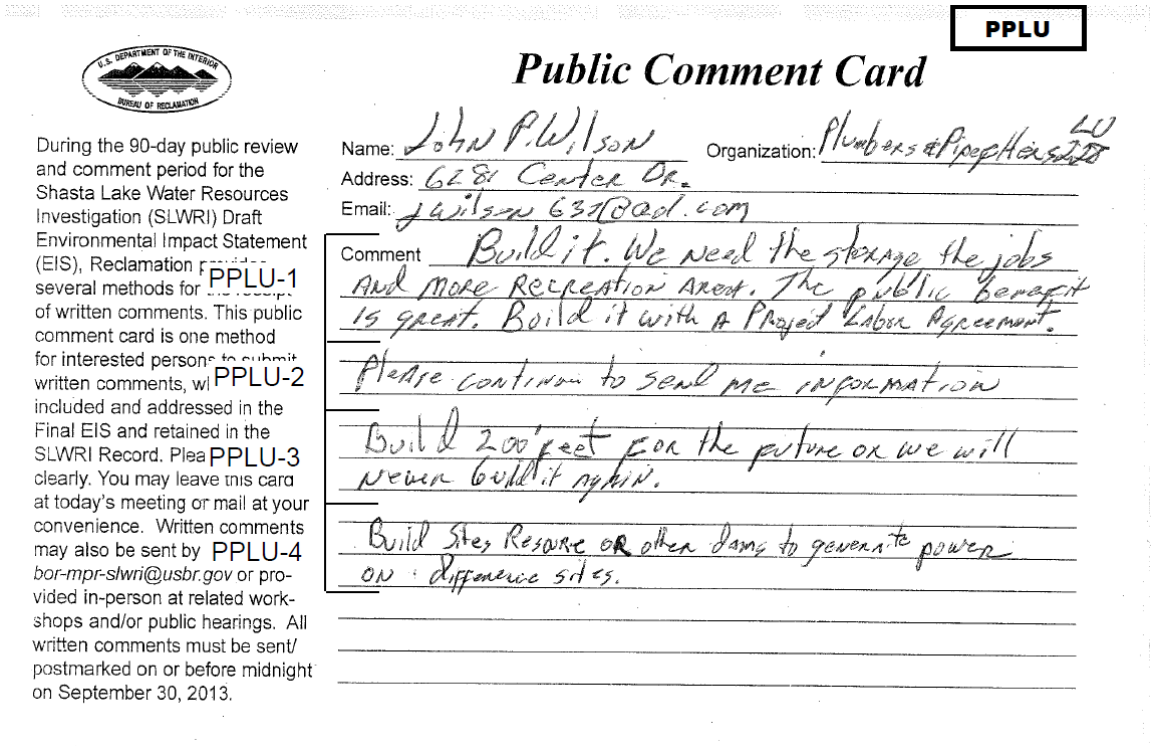
PORG-9: Please refer to Master Comment Response DSFISH-8, "National Marine Fisheries Service Recovery Plan, Anadromous Fish Restoration Program Doubling Goals and Biological Opinions."

PORG-10: Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability."

PORG-11: Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability."

PORG-12: Comment noted.

33.10.38 Plumbers and Pipefitters Local Union #228



PPLU

Public Comment Card

During the 90-day public review and comment period for the Shasta Lake Water Resources Investigation (SLWRI) Draft Environmental Impact Statement (EIS), Reclamation p... several methods for ... of written comments. This public comment card is one method for interested persons to submit written comments, wh... included and addressed in the Final EIS and retained in the SLWRI Record. Plea... clearly. You may leave this card at today's meeting or mail at your convenience. Written comments may also be sent by *bor-mpr-slwri@usbr.gov* or provided in-person at related workshops and/or public hearings. All written comments must be sent/postmarked on or before midnight on September 30, 2013.

Name: John P. Wilson Organization: Plumbers & Pipefitters 228 LU

Address: 628 Center Dr.

Email: jwilson631@aol.com

Comment: Build it. We need the storage the jobs And more Recreation Area. The public benefit is great. Build it with a Project Labor Agreement.

Please continue to send me information

Build 200 feet for the future or we will never build it again.

Build Site, Resave or other dams to generate power on different sites.

PPLU-1

PPLU-2

PPLU-3

PPLU-4

Responses to Comments from Plumbers and Pipefitters Local Union #228

PPLU-1: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

PPLU-2: Please refer to Master Comment Response MAILINGLIST-1, "Addition to the Mailing List."

PPLU-3: Please refer to Master Comment Response GEN-2, "Unsubstantiated Information."

PPLU-4: Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability."

33.10.39 Rotary Club of Redding

7/23/13 DEPARTMENT OF THE INTERIOR Mail - Comment Draft EIR

RCOR

SLWRI, BOR MPR <sha-mpr-slwri@usbr.gov>

Comment Draft EIR

1 message

Randall Smith <randall_smith@charter.net> Sun, Jun 30, 2013 at 2:06 PM
To: BOR-MPR-SLWRI@usbr.gov

Dear BOR,

RCOR-1

Unable to review the Draft document leaves some disadvantage making comment upon it. The document may contain information sent to Katrina Chow previously, or it may not. In any event, the Final EIR prepared for raising Shasta Dam should include study, evaluation, written report (at least comment) explaining why the number one recommendation of the federal 1940 " Special Scientific Report #10, An Investigation of Fish-Salvage Problems in Relation to Shasta Dam" was never implemented, why such is not being considered now. Stillwater Creek has all of the nearly perfect salmonid spawning potential Stanford Professor Hanson and his team knew over seventy years ago. The necessary infrastructure to convey cold Sacramento River water has been built with federal money and is called the Bella Vista Water District. This sound idea needs to be visited again and now with minimal funding for pumping coming from those to whom this non consumptive water will be delivered.

Very truly yours,

Randall R. Smith, Chair
Environment Committee
Rotary Club of Redding
955 Sierra Vista Drive
Redding, CA 96001
30 Jun 2013

https://mail.google.com/mail/b/313/u/0/?ui=2&ik=c2ba651c16&view=pt&search=inbox&th=13f96e8df831aaf0 1/1

Responses to Comments from Rotary Club of Redding

RCOR-1: Please refer to Master Comment Response ALTR-1, "Range of Alternatives – General."

33.10.40 Rivers for Change

RFC

DEIS comments regarding Proposed

John Dye <john@riversforchange.org> Mon, Sep 30, 2013 at 10:19 PM
To: BOR-MPR-SLWRI@usbr.gov
Cc: Danielle Katz <danielle@riversforchange.org>

To: Katrina Chow, Project Manager,

Reclamation, Planning Division,

2800 Cottage Way

Sacramento, CA 95825-1893

From: John Dye

Board Vice President

Rivers for Change

634 Galerita Way

San Rafael, Ca. 94903

Re: Shasta Lake Water Resources Investigation, California

Draft Environmental Impact Statement

With regard to the DEIS for Shasta Reservoir:

RFC-1 I respectfully object to the proposed enlargement of the dam on the following grounds:

RFC-1 CONTD

The DEIS states the purpose of the proposed dam expansion is to respond to "increasing demands for water supplies and growing concerns over declines in ecosystem resources in the Central Valley of California…". This is an unnecessary expenditure of tax payer dollars and strain on the treasury. If we do not first begin with more economically feasible and fiscally responsible efforts which benefit Sacramento River water users both private and public, expansion projects will fail in their objectives. The areas to address prior to any dam or infrastructure expansion are:

RFC-2

AG Efficiency: Many Central Valley growers who receive Sacramento River water practice flood irrigation, a most exhaustive and inefficient method of growing crops. Flood irrigation also contributes to rapid salinity increase in farmlands, rendering them unfit for crop production.

RFC-3

Residential Efficiency: Many Central Valley communities do not meter residential use. (Example Fresno enjoys some of the lowest priced subsidized water in the state, they also have some of the highest use in the state, and none of it is regulated. They need a cohesive conservation program and incentive to conserve). Without a cohesive plan for responsible residential consumption, future water development is a wasted effort.

RFC-4

California has no statewide regulation of ground water pumping. As pumping is used in combination with irrigation, a conservative approach with both resources is needed for a successful outcome

The report does not clearly state where the following are taken into affect:

RFC-5

- The value of the rivers proposed to be flooded: Areas of the Sacramento, the McCloud and the Pitt. What value does the Bureau assign to these rivers and how will they compensate Californians for their loss?

RFC-6

- What is the increased evaporation rate for the expanded reservoir and how was this included in the theoretical increase of deliverable flows?

RFC-7

- What is the level of silt build up in the existing reservoir?

RFC-8

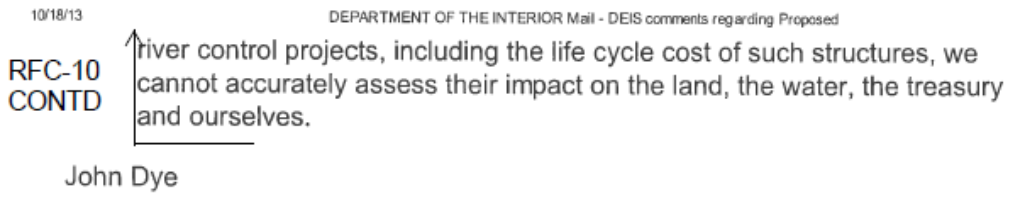
- How much would dredging the existing reservoir increase capacity without increasing evaporation rates or flooding natural areas, flowing rivers and sensitive tribal lands?

RFC-9

- What is the annual loss of revenue due to severely compromised fish stock in the Sacramento River. How much of this revenue loss, since the completion of the dam can be attributed to Shasta Dam?

RFC-10

Until we the voters, the Bureau and all stakeholders look at the true cost of


10/18/13 DEPARTMENT OF THE INTERIOR Mail - DEIS comments regarding Proposed

RFC-10 CONTD

river control projects, including the life cycle cost of such structures, we cannot accurately assess their impact on the land, the water, the treasury and ourselves.

John Dye

https://mail.google.com/mail/b/313/u/0/?ui=2&ik=c2ba851c18&view=pt&search=inbox&th=141727498d992cbe 3/3

Responses to Comments from Rivers for Change

RFC-1: Please refer to Master Comment Response ALTR-1, "Range of Alternatives – General," and Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

RFC-2: Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability," Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest," and Master Comment Response COST/BEN-2, "Comments Related to the SLWRI Feasibility Report."

RFC-3: Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability," and Master Comment Response ALTR-1, "Range of Alternatives – General."

RFC-4: The state regulatory framework for groundwater resources as it pertains to the SLWRI is described in the EIS in Chapter 6, "Hydrology, Hydraulics, and Water Management," Section 6.2.2, "State."

Chapter 2 of the DEIS, "Alternatives," Section 2.3.1, "Management Measures Common to All Action Alternatives," describes the management measures retained during the alternatives development process that are included, to some degree, in all of the action alternatives. For the SLWRI, all action alternatives include a water conservation program for new water supplies that would be created by the project to augment current water use efficiency practices. The proposed program would consist of a 10-year initial program to which Reclamation would allocate approximately $1.6 million to $3.8 million to fund water conservation efforts. Funding would be proportional to additional water supplies delivered and would focus on assisting project beneficiaries (agencies receiving increased water supplies because of the project), with developing new or expanded urban water conservation, agricultural water conservation, and water recycling programs. Program actions would be a combination of technical assistance, grants, and loans to support a variety of water conservation projects, such as recycled wastewater projects, irrigation system retrofits, and urban utilities retrofit and replacement programs. The program could be established as an extension of existing Reclamation programs, or as a new program through teaming with cost-sharing partners. Combinations and types of water use efficiency actions funded would be tailored to meet the needs of identified cost-sharing partners, including consideration of cost-effectiveness at a regional scale for agencies receiving funding.

Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability."

RFC-5: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

RFC-6: Please refer to Master Comment Response RE-1, "Reservoir Evaporation."

RFC-7: Please refer to Chapter 4, "Geology, Geomorphology, Minerals, and Soils," of the EIS and Chapter 7, "Water Quality," Section 7.1.2, "Sediment," for a description of sediment and erosion potential at the current Lake Shasta.

RFC-8: Please refer to Master Comment Response ALTD-1, "Alternative Development – Water Supply Reliability."

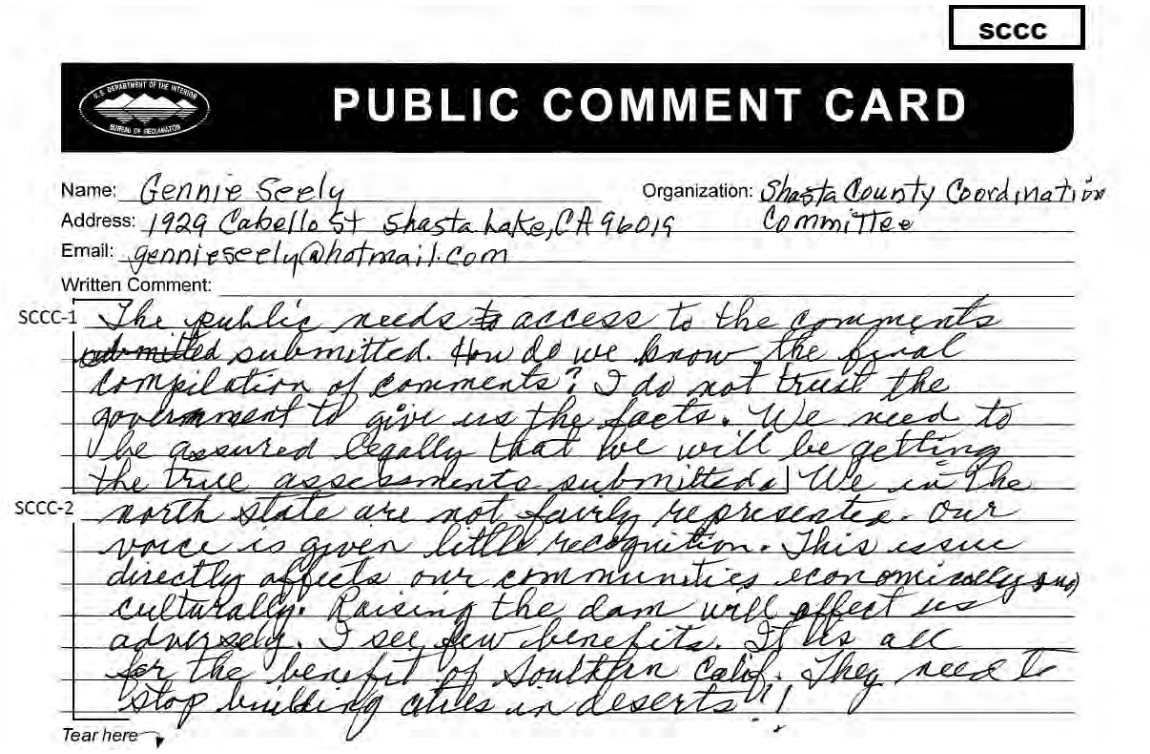
RFC-9: This DEIS does not assess the annual loss of revenue due to compromised fish stock in the Sacramento River since the completion of Shasta Dam. This project only evaluates the potential effects to Chinook salmon and other Sacramento River fisheries from raising Shasta Dam and the No-Action Alternative.

Please refer to Master Comment Response DSFISH-6, "Historic Dam Effects on Fisheries."

RFC-10: Operations and maintenance life cycle costs are included in cost estimates for SLWRI action alternatives. Total annual costs for action alternatives are included in Attachment 1, "Cost Estimates for Comprehensive Plans," to the DEIS Engineering Appendix. Updated total annual costs for action alternatives were included in the SLWRI Final Feasibility Report.

Please refer to Master Comment Response COST/BEN-1, "Intent of EIS and Process to Determine Federal Interest."

33.10.41 Shasta County Coordination Committee



SCCC

PUBLIC COMMENT CARD

Name: Gennie Seely
Organization: Shasta County Coordination Committee
Address: 1929 Cabello St Shasta Lake, CA 96019
Email: gennieseely@hotmail.com
Written Comment:

SCCC-1 The public needs access to the comments ~~submitted~~ submitted. How do we know the final compilation of comments? I do not trust the government to give us the facts. We need to be assured legally that we will be getting the true assessments submitted. We in the

SCCC-2 north state are not fairly represented. Our voice is given little recognition. This issue directly affects our communities economically and culturally. Raising the dam will affect us adversely. I see few benefits. It is all for the benefit of Southern Calif. They need to stop building cities in deserts!!

Tear here

Responses to Comments from Shasta County Coordination Committee

SCCC-1: The Final EIS will include all the comments submitted on the DEIS. Please refer to Master Comment Response NEPA-1, "Sufficiency of EIS."

SCCC-2: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

33.10.42 Salt Creek Summer Homesites Association

SCSHA

Public Comment on SLWRI Draft EIS on behalf of Salt Creek Summer Homesites Association

Desiree La Maggiore <desiree.lamaggiore@gmail.com> Mon, Sep 30, 2013 at 3:29 PM
To: bor-mpr-slwri@usbr.gov
Cc: "Rezeau, Nathan L -FS" <nrezeau@fs.fed.us>, kchow@usbr.gov, Gene & Gail Barrett <genorafts@yahoo.com>, Jim Toney <jet0@scintechassociates.com>, "Linda M. Toney" <lmt0@scintech4i.com>, Bob & Linda McCrea <rmccrea@westernemulsions.com>, SaltCreekSummerHomes@yahoogroups.com

Bureau of Reclamation
Planning Division
2800 Cottage Way, MP – 700
Sacramento, CA 95825-1893

Attn: Ms. Katrina Chow, Project Manager, Bureau of Reclamation, SLWRI

CC: Mr. Nathan Rezeau, Deputy District Ranger, Shasta-Trinity National Forest

Subject: Response to the SLWRI Draft EIS

To whom it may concern,

SCSHA-1

We are a tract association of 47 recreational residences located on Lower Salt Creek Road, Lakehead, California. Our tract is part of the larger recreational residence program administered by the United States Forest Service.

The program allows private citizens, via special use permits, the opportunity to own a single-family cabin in designated areas on National Forest lands. As individuals, we own the cabins, sometimes referred to as "summer homes," but not the land. We pay an annual permit fee to the Forest Service for the use of the land. The cabins are private and taxable property.

We are commenting on the Draft EIS for several reasons:

SCSHA-2 1. **Establishing the eligibility of our tract to comment on future draft decisions related to the SLWRI Project** - By commenting on the Draft EIS, it is our understanding we are establishing the

SCSHA-2 CONTD.

eligibility of our tract association and members to comment/object to the Forest Service's draft decisions relating to this project (to be made available later in the process).

SCSHA-3

2. **Lack of clarity on how recreational residence cabins will specifically be impacted** - the SLWRI Draft EIS lacks clarity around how and when Recreation Residence Tract Cabin Owners will be notified of specific impacts to their individual private property (the cabin structures).

SCSHA-4

a. Tract association representatives attended public meetings held in February 2012 and reviewed the Preliminary Draft EIS report. At that time, there were no listed impacts to the Salt Creek Recreational Residence Tract. In late June/early July, cabin owners received a packet of information from the U.S. Department of Interior (DOI) containing a cover letter and a CD of the Draft EIS report. Additionally, there was information regarding public commenting process for USFS attached to the DOI cover letter. Nowhere in the cover letter was there an indication that cabin owners were receiving this packet of information because the update of the Draft EIS now contained specific impact to the Salt Creek Recreation Residence Tract. This is the first effort of any public outreach to our recreational residence tract in the last decade of SLWRI project investigation, even though tract owners have repeatedly asked for updates and if there would be any impact to our cabins. *Why was it not made clear in the DOI cover letter that recipients were receiving this update to documentation made available at community meetings in February 2012 because the June 2013 update now contained "potential impact" specific to their private property?*

SCSHA-5

b. In the June 2013 release of the Draft EIS, impacts to our tract (Salt Creek Recreation Residence Tract) are noted in Comprehensive Plans (CP) 2-5; characterized as "At least one cabin affected, possibly others also affected"[1] . No further detail is provided.

SCSHA-6

c. In the Real Estate Appendix, Table 1. Range of Impacted Cabins on U.S. Forest Service Lands[2], the table outlines Water Surface Elevations for 3 scenarios: 1,082 feet, 1,088 feet, and 1,093 feet. Under Background and Approach (page 1, line 24) these water surface elevations are positioned as including a buffer area that corresponds with the "Full pool" water surface elevations for CPs 1 through 5, which are 1,075 feet, 1,081.5 feet, and 1,87.5 feet respectively. Do these buffered numbers also reflect the "selected freeboard" referenced under Acquisition Criteria (page 2, line 9)? Additionally, in public meetings, SLWRI representatives have given 1,090 feet as an elevation number for property owners to use, but no datum specified.

SCSHA-7

d. All elevations throughout the SLWRI Draft EIS have been given in the North American Vertical Datum (NAVD) and the site elevation tool on the SLWRI site (http://www.usbr.gov/mp/slwri/elevation/index.html) is given in NAVD, however, most affordable consumer handheld GPS units work in horizontal datum sets (e.g. NAD83 or WGS84) and do not offer the NAVD vertical datum as a setting. This makes the SLWRI web-based site tool confusing to use for the average property owner. It would be useful to private property owners

SCSHA-7 CONTD.

who "may be affected" if a conversion tool /option were available in widely available format to the average impacted party.

SCSHA-8

How and when will cabin owners and tracts be notified of the specific impacts on their private property? At the SLWRI Public Workshop held on July 16, in Redding, CA, when queried on this issue, Ms. Mary Paasch recommended we make the above request for a land survey through this process. Additionally, we contacted with Mr. Nathan Rezeau, deputy district ranger, Shasta-Trinity National Forest, who concurred with Ms. Paasch's recommendation and added, "If the BOR completed additional surveys, the Forest Service would work with the BOR to determine which recreation residences may be impacted."

The cabins are private property and as such, we respectfully request the owners should be afforded the opportunity, if they consent, to have a ". . ground survey for structures on parcels potentially impacted because of inundation ..." performed as outlined in Appendix – Real Estate, page 7 Draft – June 2013, lines 4-9. It is unclear why this offer was not made in 2012 when the rest of the Lakehead private property owners of structures potentially impacted we invited to have these surveys completed. Additionally, can SLWRI provide a site elevation tool on the site that provides data in a format readily available to the public?

SCSHA-9

3. **Lack of clarity on overall project costs –** It's unclear what the total forecasted cost for each comprehensive plan is once other Federal, State, and Local agency expenses forecasts are factored in. For example, in the case of the recreational residence program, an estimated value of cabins is provided (Real Estate Appendix, page 5 , line 14); however, the report goes on to state that the "Costs for relocation or demolition of the cabins are not included in this analysis of the SLWRI real estate costs." If this is correct, where is the $4.8 to 5.6 million USFS is responsible for, per the terms of the recreation residence special use permits, accounted for in the overall return on investment for CPs 1-5? Another question is how has public safety and related expenses been factored into this report.

SCSHA-10

Reducing/relocating marinas while increasing the area of the lake commensurate with a full pool creates a longer distance between public services (e.g., availability of marine gas). A larger pool equates to more square footage for the Sheriff and USFS to patrol.

SCSHA-11

How are these types of related impacts being addressed in both the planning and forecasted costs? *How can a true return on investment for each proposal be considered when only the construction and construction-related costs are used?*

SCSHA-12

4. **Impact on Lakehead Community –** This area relies heavily on revenues associated with recreation on the lake. Seasonality is hard enough to survive for a recreation-dependent community of this size. Aside from relocating some businesses, it seems none of the comprehensive plans put forth an adequate level of compensation and/or support to assist business owners in "weathering" through any loss of business during the dam construction. Throughout this process and, hopefully into potential

SCSHA-12 CONTD.

implementation, the SLWRI team and project can either approach the community of Lakehead as a casualty for the greater good or take the approach of engaging a community, helping it weather the storm and leaving it a better place than when the project started.

SCSHA-13

As the lead agency for this project, can the Bureau of Reclamation include a goal of leaving communities not only intact at the completion of project implementation, but in a stronger position to successfully maintain and/or increase recreation on Lake Shasta? We recognize this is a complex project and the planning and, if approved, implementation will span multiple mandated processes and decades. Many of our comments are a result of lack of communications with impacted and potentially impacted community members and other public agencies. We'd suggest a task force be established and include representation from community members (business owners and private citizens) and other public agencies (e.g., USFS, CalFire, Shasta County, etc.) to ensure that a thriving Lakehead community be an outcome of the proposed SLWRI project.

SCSHA-14

Thank you for your consideration of these comments. Our tract association looks forward to the response portion of the public comment period process. Additionally, we would like to be notified and included in future Lakehead community meetings with the Bureau of Reclamation and in the pending USFS process for formulating the draft decisions resulting from the SLWRI Draft EIS.

Sincerely,

Salt Creek Summer Homesites Association
Post: PO Box 993023, Redding, CA 96099 **and** c/o Desiree LaGrone- La Maggiore - 299 S. 16th Street, San Jose CA 95112

Gene Barrett
Association President and Cabin Owner
Post: 2259 Spring Lake Drive, Martinez, CA 94553
Email: genorafts@yahoo.com

Jim Toney & Linda Toney
Association Vice President & Treasurer and Cabin Owners
Post: 5530 Scenic Avenue, Livermore, CA 94551
Email: jet0@scintech4i.com and lmt0@scintech4i.com

Desiree LaGrone - La Maggiore
Association Secretary and Cabin Owner

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Email: desiree.lamaggiore@gmail.com

Robert McCrea
Association Officer and Cabin Owner
Post: 18905 Lower Salt Creek Road, Lakehead, CA 96051
Email: rmccrea@westernemulsions.com

[1] Table 18-6. Effects of CP2 on Developed Recreation Facilities at Shasta Lake, page 18-51; Table 18-8. Effects of CP3 on Developed Recreation Facilities at Shasta Lake, page 18-63

[2] Table 1. Range of Impacted Cabins on U.S. Forest Service Lands, page 5 Draft – June 2013, Appendix Real Estate, line 14

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112K

Bureau of Reclamation
Planning Division
2800 Cottage Way, MP – 700
Sacramento, CA 95825-1893

Attn: Ms. Katrina Chow, Project Manager, Bureau of Reclamation, SLWRI

CC: Mr. Nathan Rezeau, Deputy District Ranger, Shasta-Trinity National Forest

Subject: Response to the SLWRI Draft EIS

To whom it may concern,

We are a tract association of 47 recreational residences located on Lower Salt Creek Road, Lakehead, California. Our tract is part of the larger recreational residence program administered by the United States Forest Service.

The program allows private citizens, via special use permits, the opportunity to own a single-family cabin in designated areas on National Forest lands. As individuals, we own the cabins, sometimes referred to as "summer homes," but not the land. We pay an annual permit fee to the Forest Service for the use of the land. The cabins are private and taxable property.

We are commenting on the Draft EIS for several reasons:

1. **Establishing the eligibility of our tract to comment on future draft decisions related to the SLWRI Project -** By commenting on the Draft EIS, it is our understanding we are establishing the eligibility of our tract association and members to comment/object to the Forest Service's draft decisions relating to this project (to be made available later in the process).

2. **Lack of clarity on how recreational residence cabins will specifically be impacted -** the SLWRI Draft EIS lacks clarity around how and when Recreation Residence Tract Cabin Owners will be notified of specific impacts to their individual private property (the cabin structures).
    a. Tract association representatives attended public meetings held in February 2012 and reviewed the Preliminary Draft EIS report. At that time, there were no listed impacts to the Salt Creek Recreational Residence Tract. In late June/early July, cabin owners received a packet of information from the U.S. Department of Interior (DOI) containing a cover letter and a CD of the Draft EIS report. Additionally, there was information regarding public commenting process for USFS attached to the DOI cover letter. Nowhere in the cover letter was there an indication that cabin owners were receiving this packet of information because the update of the Draft EIS now contained specific impact to the Salt Creek Recreation Residence Tract. This is the first effort of any public outreach to our recreational residence tract in the last decade of SLWRI project investigation, even though tract owners have repeatedly asked for updates and if there would be any impact to our cabins. *Why was it not made clear in the DOI cover letter that recipients were receiving this update to documentation made available at community meetings in February 2012 because the June 2013 update now contained "potential impact" specific to their private property?*
    b. In the June 2013 release of the Draft EIS, impacts to our tract (Salt Creek Recreation Residence Tract) are noted in Comprehensive Plans (CP) 2-5; characterized as "At least one cabin affected, possibly others also affected"[1] . No further detail is provided.
    c. In the Real Estate Appendix, Table 1. Range of Impacted Cabins on U.S. Forest Service Lands[2], the table outlines Water Surface Elevations for 3 scenarios: 1,082 feet, 1,088 feet, and 1,093 feet. Under Background and Approach

[1] Table 18-6. Effects of CP2 on Developed Recreation Facilities at Shasta Lake, page 18-51; Table 18-8. Effects of CP3 on Developed Recreation Facilities at Shasta Lake, page 18-63
[2] Table 1. Range of Impacted Cabins on U.S. Forest Service Lands, page 5 Draft – June 2013, Appendix Real Estate, line 14

(page 1, line 24) these water surface elevations are positioned as including a buffer area that corresponds with the "Full pool" water surface elevations for CPs 1 through 5, which are 1,075 feet, 1,081.5 feet, and 1,87.5 feet respectively. Do these buffered numbers also reflect the "selected freeboard" referenced under Acquisition Criteria (page 2, line 9)? Additionally, in public meetings, SLWRI representatives have given 1,090 feet as an elevation number for property owners to use, but no datum specified.

d. All elevations throughout the SLWRI Draft EIS have been given in the North American Vertical Datum (NAVD) and the site elevation tool on the SLWRI site (http://www.usbr.gov/mp/slwri/elevation/index.html) is given in NAVD, however, most affordable consumer handheld GPS units work in horizontal datum sets (e.g. NAD83 or WGS84) and do not offer the NAVD vertical datum as a setting. This makes the SLWRI web-based site tool confusing to use for the average property owner. It would be useful to private property owners who "may be affected" if a conversion tool /option were available in widely available format to the average impacted party.

How and when will cabin owners and tracts be notified of the specific impacts on their private property? At the SLWRI Public Workshop held on July 16, in Redding, CA, when queried on this issue, Ms. Mary Paasch recommended we make the above request for a land survey through this process. Additionally, we contacted with Mr. Nathan Rezeau, deputy district ranger, Shasta-Trinity National Forest, who concurred with Ms. Paasch's recommendation and added, "If the BOR completed additional surveys, the Forest Service would work with the BOR to determine which recreation residences may be impacted."

The cabins are private property and as such, we respectfully request the owners should be afforded the opportunity, if they consent, to have a "... ground survey for structures on parcels potentially impacted because of inundation ..." performed as outlined in Appendix – Real Estate, page 7 Draft – June 2013, lines 4-9. It is unclear why this offer was not made in 2012 when the rest of the Lakehead private property owners of structures potentially impacted we invited to have these surveys completed. Additionally, can SLWRI provide a site elevation tool on the site that provides data in a format readily available to the public?

3. **Lack of clarity on overall project costs –** It's unclear what the total forecasted cost for each comprehensive plan is once other Federal, State, and Local agency expenses forecasts are factored in. For example, in the case of the recreational residence program, an estimated value of cabins is provided (Real Estate Appendix, page 5 , line 14); however, the report goes on to state that the "Costs for relocation or demolition of the cabins are not included in this analysis of the SLWRI real estate costs." If this is correct, where is the $4.8 to 5.6 million USFS is responsible for, per the terms of the recreation residence special use permits, accounted for in the overall return on investment for CPs 1-5? Another question is how has public safety and related expenses been factored into this report. Reducing/relocating marinas while increasing the area of the lake commensurate with a full pool creates a longer distance between public services (e.g., availability of marine gas). A larger pool equates to more square footage for the Sheriff and USFS to patrol.

How are these types of related impacts being addressed in both the planning and forecasted costs? *How can a true return on investment for each proposal be considered when only the construction and construction-related costs are used?*

4. **Impact on Lakehead Community –** This area relies heavily on revenues associated with recreation on the lake. Seasonality is hard enough to survive for a recreation-dependent community of this size. Aside from relocating some businesses, it seems none of the comprehensive plans put forth an adequate level of compensation and/or support to assist business owners in "weathering" through any loss of business during the dam construction. Throughout this process and, hopefully into potential implementation, the SLWRI team and project can either approach the community of Lakehead as a casualty for the greater good or take the approach of engaging a community, helping it weather the storm and leaving it a better place than when the project started.

As the lead agency for this project, can the Bureau of Reclamation include a goal of leaving communities not only intact at the completion of project implementation, but in a stronger position to successfully maintain and/or increase recreation on Lake Shasta? We recognize this is a complex project and the planning and, if approved, implementation will span multiple mandated processes and decades. Many of our comments are a result of lack of communications with impacted and potentially impacted community members and other public agencies. We'd suggest a task force be established and include representation from community members (business owners and private citizens) and other public agencies (e.g., USFS, CalFire, Shasta County, etc.) to ensure that a thriving Lakehead community be an outcome of the proposed SLWRI project.

Thank you for your consideration of these comments. Our tract association looks forward to the response portion of the public comment period process. Additionally, we would like to be notified and included in future Lakehead community meetings with the Bureau of Reclamation and in the pending USFS process for formulating the draft decisions resulting from the SLWRI Draft EIS.

Sincerely,

Salt Creek Summer Homesites Association
Post: PO Box 993023, Redding, CA 96099 **and** c/o Desiree LaGrone- La Maggiore - 299 S. 16th Street, San Jose CA 95112

Gene Barrett
Association President and Cabin Owner
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Association Vice President & Treasurer and Cabin Owners
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Robert McCrea
Association Officer and Cabin Owner
Post: 18905 Lower Salt Creek Road, Lakehead, CA 96051
Email: rmccrea@westernemulsions.com

Responses to Comments from Salt Creek Summer Homesites Association

SCSHA-1: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

SCSHA-2: Please refer to Master Comment Response FSCABINS-5, "Comment and Objection Process for Draft USFS Decisions."

SCSHA-3: Please refer to Master Comment Response FSCABINS-1, "USFS Recreational Residence Tract Cabins in Preliminary Draft EIS and Draft EIS."

SCSHA-4: As part the June 25, 2013, release of the DEIS for the Project, Reclamation included a cover letter and addendum from the USFS titled "Comment and Objection Process for Draft Forest Service Decisions." This attachment described the USFS's requirements for a predecisional comment and objection process, and supports USFS actions identified in the DEIS Chapter 1, "Introduction," Section 1.5.3, "USFS Use of EIS," beginning on Page 1-28. The purpose of Reclamation cover letter was to notify all project stakeholders of the DEIS availability, not segment and notify any specific stakeholder or stakeholder group. The USFS addendum was incorporated to broadly inform Recreational Residential Tract Cabin owners and other interested parties of processes unique to USFS as they relate to the DEIS, and were identified and determined through planning activities subsequent to the November 2011 release of the Preliminary Draft EIS.

Please refer to Master Comment Response FSCABINS-1, "USFS Recreational Residence Tract Cabins in Preliminary Draft EIS and Draft EIS."

SCSHA-5: Please refer to Master Comment Response FSCABINS-8, "Inundation Zone/Reservoir Buffer."

SCSHA-6: Two vertical datum are commonly used in Reclamation projects North Geodetic Vertical Datum of 1929 (NGVD 29) and North American Vertical Datum of 1988 (NAVD 88). Table 2.2 Vertical Datum Comparison located in the DEIS Appendices Engineering Summary Appendix Chapter 2 can help clarify any confusion on the topic of datum. The table lists the top of the full pool as 1,078.2 feet, 1,084.2 feet, and 1090.2 feet NAVD 88 for the 6.5 foot, 12.5 foot, 18.5 foot raise respectively. These values do not include a buffer. Table 1 that you referred to in the Real Estate Appendix does include the 3 foot buffer. This comment will be included as part of the record and made available to decision makers before a final decision on the proposed project.

SCSHA-7: Please refer to Master Comment Response GEN-1, "Comment Included as Part of the Record."

SCSHA-8: During the public comment period, several comments were received regarding the ground surveys that were performed in 2012 for

privately owned structures that were potentially affected by the project. Commenters expressed their desire to have this same opportunity afforded to recreation structures located around Lake Shasta that may be affected.

As described in the DEIS appendices Real Estate Appendix (Page 7), the surveys were only performed on 170 parcels for willing owners. Comments received included requests to extrapolate surveys from completed parcels to adjoining and/or nearby parcels, to conduct additional ground surveys to structures on private property and land leased by permit issued by the USFS, and to provide clarity to why USFS permit holders were not included in the original surveys. Reclamation performed the surveys to reevaluated and compare sensitivities of partial and full acquisitions to the estimated real estate impacts included in the Real Estate Appendix. This sensitivity analysis served to determine if the real estate impacts applied for the purposes of the DEIS are consistent among all structures. Survey results show that original determinations were generally within ± 5 percent.

Please refer to Master Comment Response REC-2, "Ground Surveys for Recreation Facilities," and Master Comment Response FSCABINS-9, "Structure Surveys for USFS Cabins."

SCSHA-9: Please refer to Master Comment Response COSTEST-1, "Development of Cost Estimates."

SCSHA-10: Please refer to Master Comment Response COSTEST-1, "Development of Cost Estimates," and Master Comment Response REC-3, "Effects to Tourism at Shasta Lake."

SCSHA-11: Please refer to Master Comment Response COSTEST-1, "Development of Cost Estimates."

SCSHA-12: Please refer to Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity," and Master Comment Response REC-4, "Relocation of Recreation Facilities."

SCSHA-13: As stated in the DEIS Chapter 2, "Alternatives," Section 2.1.2, "Project Objectives," primary and secondary objectives were formulated with direction from CALFED Programmatic ROD and federal statutes and guidance. Primary objectives are considered to have equal priority, and each is pursued to the maximum extent without adversely affecting the other. Secondary objectives are considered to the extent possible in pursuit of the primary objectives. Authorization for the SLWRI as described in the DEIS Executive Summary Section S.2, "Study Authorization," includes looking at enlarging Shasta Dam for water storage, ecosystem restoration, water supply reliability, water

quality, and increasing the cold water pool to maintain Sacramento River temperatures. Recreation is not a goal as outlined in the CALFED Programmatic ROD nor was it a purpose of establishing the CVP, and therefore cannot be considered a primary objective of the SLWRI. Please refer also to Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity."

SCSHA-14: Thank you for your comment on the DEIS for the SLWRI, we appreciate your time in responding to the document. The contact information for your organization was added to the mailing list for public notices related to the SLWRI.

33.10.43 Shasta Lake Business Owners Association

SLBOA

SHASTA LAKE BUSINESS OWNERS ASSOCIATION

20359 SHASTA CAVERNS ROAD, LAKEHEAD, CA 96051

Shasta Lake

OCT 23 2013

For: K.Duncan
23 Oct 13
To: K.Chow

September 26, 2013

Katrina Chow, Project Manager
Bureau of Reclamation
2800 Cottage Way, MP-720
Sacramento, CA 95825-1893

Katrina Chow,

SLBOA-1 I am writing you in regards to concerns about the Shasta Lake Water Resource Investigation (SLWRI), or more commonly known as the raising of Shasta Dam. There are several main concerns that pertain to recreation and the businesses that support it on and near the lake.

As of July 1st the Draft Environmental Impact Study for this project has been released and already the BOR has public comment periods and workshops scheduled. It is the alarming expedience of this project that causes my concern to grow. Growing to a point that many are believing that the decision is already made and that business is not regarded as important, nor recreation.

SLBOA-2 Although recreation is mentioned numerous times in the feasibility reports, there is an absence of any legislation thus making recreation a primary purpose of the lake. Recreation should be a primary purpose of the SLWRI yet subordinate to all other primary purposes, including but not limited to, flood control, water storage, hydroelectric power and environmental issues. Currently recreation is simply being recognized only as a secondary planning objective. This is not effective enough.

SLBOA-3 The businesses owners and landowners of the local area will be adversely affected by current laws, regulations and management practices.

SLBOA-4 Although the Bureau of Reclamation is the lead agency, the Forest Service is the entity that will be controlling business and recreation on the lake. On August 23rd, the Forest Service had its first meeting with the permit holders on Shasta Lake regarding the SLWRI (See attached letter). This invitation, which some permit holders did not receive, indicated that this was an "optional" meeting that the Forest Service was conducting. This letter had given the permit holders only 10 days' notice, during one of the busiest months of the year for this industry.

SLBOA-5 Set aside that the business owners had very little or no time to read the 20,000 plus page document, which is also extremely hard to navigate, to find out how recreation and business would be affected.

SLBOA-6 In that meeting, a map (Plate 39, Recreation Site Status) located under the Engineering Summary Appendix, Plates Part 3) shows a number of marinas that will not be relocated and will be considered as abandoned. Two of the marinas had no inclination that this was the intent. No representatives from the Forest Service had contacted them about this decision to have their sites abandoned. How can the lake support more recreation with less facilities? During the peak of the recreation season, the existing marinas are already pushed to their limits. As it states in the DEIS (Chapter 18, page 35)

SLBOA-7 *"As described in Section 2.3.8 in Chapter 2, "Alternatives," affected recreation facilities would be relocated as part of the construction activities for all action alternatives. This*

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SLBOA-7 CONTD

could include relocation of affected portions of facilities within existing use areas, in adjacent undeveloped areas, or at new sites in the general vicinity of the lake. Because of the possible consolidation of facilities, the total number of facilities of specific types may be reduced. However, all affected recreation capacity would be replaced. Replacement facilities would be of equivalent overall capacity and quality to affected facilities and would provide comparable shoreline access, where applicable. With the relocation of affected facilities, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed."

The quality destination of Shasta Lake is dependent on the variety of services of the different marinas. Consolidation is not a feasible option to a continued success of an industry relying on customer satisfaction and dependability.

SLBOA-8

When questions were asked by the permit holders at this meeting we were given two responses, "That would be a good point to bring up during this comment period," and "The Bureau of Reclamation is the lead agency." These are not answers, they are deferrals to answers in which we need to make an informed decision.

SLBOA-9

Another main concern is that these businesses, abandoned or relocated, will not be made whole after the enlargement of the lake. Although the DEIS does cover payment for land and certain assets, it does not state specifically of any inventory to be purchased. Which if sold will only be a fraction of what the cost may be. The most ominous statement was produced during the July 16th work shop in Redding by a contractor of the BOR who said, "There is no current legislation to compensate for any lost business due to this project." The businesses that remain would struggle to maintain their business while relocating as well as regaining business once they reopen, that is if they survive the suspension of any income. The several businesses that are to be abandoned will see decades of hard work come to an abrupt end with absolutely no compensation. These instances are a missing piece, and will ensure that the businesses will not be fully compensated for what they will be deprived of.

SLBOA-10

This economic impact will not affect just those who work on Shasta Lake, but will have a ripple effect that will intrude into the surrounding cities and counties. Shasta County experiences the economic downturn after every low level lake summer. What will happen when marinas are actually closed for several months, or longer than a year?

What is proposed through the recent DEIS, will devastate the economy that thrives from Shasta Lake.

SLBOA-11

Although the DEIS is lengthy, it is ambiguous. The questions that I have posed in this letter are of major concern and should have been answered through the DEIS. It is the lack of clarity and transparency of governing agencies that have many concerned. With that being stated, the Shasta Lake Business Owner's Association will remain in opposition of this project until these concerns are acknowledged.

Respectfully,

Matthew W. Doyle
President
Shasta Lake Business Owners Association

CC: Governor Edmund G Brown
Congressman Doug LaMalfa
Senator Jim Nielsen
Senator Dianne Feinstein
Assemblyman Brian Dahle
Shasta County Board of Supervisors
Patrick Minturn, Shasta County Public Works
Brian Person, Area Manager/Bureau of Reclamation
Redding City Council
Redding Chamber of Commerce
City of Shasta Lake City Council
City of Shasta Lake Chamber of Commerce
Shasta Cascade Wonderland Association
Redding Convention and Visitors Bureau
Harold Jones, Sugarloaf Resorts
David Grey, Tsasdi Resorts
Rich Howe, Jones Valley Resorts
Ross Marshall, Lakeshore Inn & RV

USDA United States Department of Agriculture
Forest Service
Shasta-Trinity National Recreation Area
Shasta Lake Unit
14225 Holiday Road
Redding, CA 96003
(530) 275-1587
(530) 242-5526 – TDD
http://www.fs.usda.gov/stnf

File Code: 2720
Date: August 13, 2013

Matt Doyle
Lake Shasta Caverns
P.O. Box 801
O'Brien, CA 96070

Dear Matt,

The Bureau of Reclamation (BOR) released the Shasta Lake Water Resources Investigation (SLWRI) Draft Environmental Impact Statement (DEIS) for public review and comment on June 28, 2013. I am inviting you to an information sharing meeting regarding the DEIS that the Forest Service is hosting on Friday, August 23, 2013, from 10:00 A.M. to noon at the Shasta Lake Ranger Station. This is an optional meeting and attendance is limited to permit holders with facilities on the water. Other permit holders may contact the Forest Service regarding their land-based facilities.

The goal of this meeting is to share information about the Forest Service's role in the project, answer any questions about the analysis, and discuss the comment process. Your ideas and perspective about how the proposed changes could be accomplished (should the project be authorized by Congress) while still meeting the Forest Service's objective of maintaining recreational capacity on the lake are very important to the Forest Service and I hope this meeting will facilitate your participation in the process.

I encourage you to read the sections of the DEIS pertaining to the proposed recreation infrastructure changes prior to this meeting. Much of this information can be found in Chapter 1- Introduction, Chapter 2- Alternatives, Chapter 17- Land Use and Planning, Chapter 18- Recreation, Chapter 22- Public Services and the Engineering Appendix (Plate 39).

As a reminder, BOR's 90-day review and comment period will end on September 26, 2013. Your comments must be submitted to Karina Chow, Project Manager, Bureau of Reclamation, Planning Division, 2800 Cottage Way, Sacramento, CA 95825-1893, called to 916-978-5067 (TTY 916-978-5608), or emailed to BOR-MPR-SLWRI@usbr.gov to be included in the project record.

I hope that you are available and interested in attending the meeting on August 23rd. My staff and I value our relationship with you and hope that we can mutually promote a strategy that is successful for your business and positive for our visitors to the Shasta-Trinity National Forest.

If you have any questions about the meeting please contact Nathan Rezeau, Deputy District Ranger at (503) 242-5560 or nrezeau@fs.fed.us. Thank you.

Sincerely,

/s/ KRISTY COTTINI
District Ranger

Caring for the Land and Serving People

Printed on Recycled Paper

Responses to Comments from Shasta Lake Business Owners Association

SLBOA-1: Thank you for your comments on the DEIS for the SLWRI, we appreciate your time in responding to the document. In accordance with NEPA review requirements, the DEIS was circulated for public and agency review and comment for a 90-day period, from July 1, 2013 to

September 30, 2013, after the EPA published the notice of availability in the Federal Register. The 90-day review period was twice the required 45 day review period. Written comments from the public, reviewing agencies, and stakeholders were accepted during the public comment period. Similar to the approach to public scoping, public hearings were held in various locations statewide to solicit and receive public input on the DEIS. These hearings were held during the public comment period so that any comments received at the hearings were addressed in the Final EIS. All written comments received on the DEIS, and all verbal comments received during the public meetings and by September 30, 2013 are fully considered and addressed. The DEIS was available on-line through the Reclamation website, as well as available at 6 local public libraries, and Reclamation's office in Sacramento and Washington, D.C. The next steps for the SLWRI can be found in the DEIS Executive Summary S.10, "Public Involvement and Next Steps."

SLBOA-2: As stated in the DEIS Chapter 2, "Alternatives," Section 2.1.2, "Project Objectives," primary and secondary objectives were formulated with direction from CALFED Programmatic ROD and federal statutes and guidance. Primary objectives are considered to have equal priority, and each is pursued to the maximum extent without adversely affecting the other. Secondary objectives are considered to the extent possible in pursuit of the primary objectives. Authorization for the SLWRI as described in the DEIS Executive Summary Section S.2, "Study Authorization," includes looking at enlarging Shasta Dam for water storage, ecosystem restoration, water supply reliability, water quality, and increasing the cold water pool to maintain Sacramento River temperatures. Recreation is not a goal as outlined in the CALFED Programmatic ROD or other federal statutes nor was it a purpose of establishing the CVP, and therefore cannot be considered a primary objective of the SLWRI.

SLBOA-3: Please refer to Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity."

SLBOA-4: Comment noted.

SLBOA-5: In accordance with NEPA review requirements, the DEIS was circulated for public and agency review and comment for a 90-day period, from July 1, 2013 to September 30, 2013, after the EPA published the notice of availability in the Federal Register. Written comments from the public, reviewing agencies, and stakeholders were accepted during the public comment period.

SLBOA-6: Please refer to Master Comment Response REC-1, "Effects to Recreation at Shasta Lake."

SLBOA-7: Please refer to Master Comment Response REC-1, "Effects to Recreation at Shasta Lake."

SLBOA-8: Comment noted.

SLBOA-9: Please refer to Master Comment Response PLAR-1, "Effects to Private Residences and Businesses."

SLBOA-10: Please refer to Master Comment Response SOCIOECON-1, "Socioeconomic Effects to Shasta Lake Vicinity."

SLBOA-11: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

33.10.44 Sacred Land Film Project

SLFP

Shasta Dam Raise - Public Comments

Toby McLeod <tm@sacredland.org> Mon, Sep 30, 2013 at 4:47 PM
To: BOR-MPR-SLWRI@usbr.gov, "Chow, Katrina C" <KChow@usbr.gov>

Katrina Chow, Project Manager, US Bureau of Reclamation, Planning Division, 2800 Cottage Way, Sacramento, CA 95825-1893 - See more at: http://www.sacredland.org/please-comment-on-shasta-dam-raise-deis/#sthash.ebNlxy6n.dpuf
Katrina Chow, Project Manager, US Bureau of Reclamation, Planning Division, 2800 Cottage Way, Sacramento, CA 95825-1893 - See more at: http://www.sacredland.org/please-comment-on-shasta-dam-raise-deis/#sthash.ebNlxy6n.dpuf
Katrina Chow
Project Manager
U.S. Bureau of Reclamation, Planning Division
2800 Cottage Way, Sacramento, CA 95825-1893
Katrina Chow, Project Manager, US Bureau of Reclamation, Planning Division, 2800 Cottage Way, Sacramento, CA 95825-1893 - See more at: http://www.sacredland.org/please-comment-on-shasta-dam-raise-deis/#sthash.ebNlxy6n.dpuf

Dear Ms. Chow,

SLFP-1

Please accept 1,903 signatures in opposition to the proposal to raise the height of Shasta Dam and please add this document to the DEIR comment section. We will mail a copy of this petition as well. The petition was posted online on the CREDO Mobilize site at:
http://www.credomobilize.com/petitions/stop-the-raise-of-shasta-dam-support-the-winnemem-wintu

Thank you,
Christopher McLeod

--

Toby McLeod
Sacred Land Film Project
David Brower Center
2150 Allston Way, Suite 440
Berkeley, CA 94704

tel: 510-859-9190
http://www.sacredland.org

Connect with us online:

Shasta Dam Raise - Public Comment Petition.pdf
228K

To: Bureau of Reclamation

SLFP-2 Abandon the proposal to raise the height of the Shasta Dam by 18.5 feet, and prevent cultural harm to the Winnemem Wintu's sacred lands and ecological damage to the McCloud and other rivers of northern California.

Signed by 1,903 people:

Name	Postcode	Address
Christopher McLeod	94708	980 Grizzly Peak Blvd
Helene Sisk	96003	7480 Dry Creek Rd, Redding, CA
Barbara A gill	96002	4343 Agnes May
Alex Hughes	94933	PO Box 805
Danita Herrera	97401	1489 Cal Young Rd, Eugene, Or
Richard Torres	95758	6801 Kilconnell Drive
caitlin mezgersieg	97520	ashland
Misa Joo	97405	2327 Jefferson Street
Chloe Say	97601	1215 Adams st
Nancy Willis	94662	PO Box 99684, Emeryville, CA
David Martinez	96096	Po Box 219 Whitmore Ca
Laura Ferrando	44124	lyndhurst, ohio
Lisa Guide	94608	1025 56th St
Teresa S	95826	Sacramento
Rebecca Guzman	95835	2124 Catherwood Way
adriana martinez	90201	5519 watcher street
Leslie F	96001	Redding
kristen brandt	97403	250 N Brooklyn Ave
gail lichtsinn	45231	9377 jericho dr.
Natasha Joseph	97477	496 1/2 West D Street
Donna Crispin	97401	780 Waverly St.
Ken Neubeck	97405	4915 W. Hillside Drive
Stefanie Messina	06612	170 bibbins rd easton ct
Jeanne France	96096	PO Box 219
Noah Schlager	94920-2602	116 Barn Road
Christine Hood	95928	1850 Humboldt Rd #68
Kathleen Kimberling	95670	2208 Wood Cliff Way

Name	Postcode	Address
Dianne Brennan	94110	1020 Florida Street
Robert Hughes	94571	147 N. 4th St
Rafael Rolon	95207	6112 glenbrook ln
Ric Rudgers	95662	5484 plantain circle
Joanna Holmes	97031	4145 Dee Hwy
James Goetsch	33711	5201 41st Street South
Ara Johnson	95018	859 Brookside Way
David Bartz	94020	La Honda, CA
Tess H	97322	Albany Or
Susan Alexander	94114	319 Hill St.
Crystal Cameron	88007	Las Cruces
Bonnie Fontana	94521	5173 Sutherland Dr
Florence Unger	95267	PO Box 7864
Judy Blaisdell	81122	1013 CR 525
peggy carberry	01603	156 apricot st
Steve Lawler	94505	5315 willow lake ct
Leslie Story	95242	16 River Bend Dr., Lodi, CA
Eden Shlomi	33711	4200 54th ave south
Stina Va	95205-2649	3245 Belvedere Ave.
kathleen stark	95642	14 smalley ave
Debra Gaylord	12154	PO Box 314
Nordyn Anderson	94509	1219 C Street. Antioch Ca
Natalie Beaver	95641	P.o. Box 258
Michael Frost	94070	2223 Carmelita Drive, San Carlos, CA
Dawn Dyer	86001	2478 Katchina Tr.
Colleen Fay	95948	1746 Kofford Road, Gridley
Maria Lucia Pacheco	20005	1409 15th st nw #18
lucy pacheco	20008	2640 garfield st
Claire Cummings	94903	2000 Bayhills Drive
Susan Wyckoff	12866	10 Knollwood Drive
Allison Toomey	95521	670 9th St. Apt A
Frances Kieschnick	94301	1467 Hamilton Avenue, Palo Alto

Name	Postcode	Address
Ellen Grab	12866	183 Louden Rd
betsy fields	81433	1867 Greene st.
Andrea Cwynar	94117-1323	1660 grove street
Geoff Thompson	81328	POB 486, Mancos, CO
Will Doolittle	97405	po box 5265
Donna Zick	95822	1126 Sherburn Avenue, Sacramento CA
Annita Lucchesi	95524	4771 Jacoby Creek Rd
Raven Stevens	96067	724 Butte Ave, Mt. Shasta, CA
Whitney Youngman	66044	1740 Ohio St #27, Lawrence, KS
Reid YALOM	94960	713 SIR FRANCIS DRAKE BLVD, SAN ANSELMO
Lucy Geever-Conroy	95112	520 S 12th St
Anna Marie Stenberg	95437	254 Wall St
Sarada Tangirala	94605	2480 82nd Avenue
Erik Roper	95817	2940 39th Street Sacramento
Krista Eiber	95410	p.o. box 366
Laura Pearson	95819	231 San Miguel Way
Stephanie Velednitsky	94024	1273 Carmel Terrace
Kerin Gould PhD	95626	Artesia Rd
Marie Isenberg	63011	1239 De Noailles Dr
Britt Magadini	97520	518 Maple Way
Ilana Maletz	86341	PO Box 21300
Buck Ellingson	95825	518 pine garden lane apt h
David Wright	95819	Sacramento, CA
Greta Montagne	95524	2506 jacoby creek road
jennifer Schellack	95819	86 43rd Street
Marlin Kirby	95841	5415 College Oak Drive
Jessica Abbé	94708	980 Grizzly Peak Blvd
Mike Hudson	94702	1204 Cedar
Robert Leigh	94577	2228 Buena Vista Ave, San Leandro, CA
Carol Courtney	95519	1650 blackhawk lane #79

Name	Postcode	Address
Jenny Gonyer	99362	280 Boyer Ave
Mollie Brown	94122	1341 20th ave
William Herrold	95736	21060 Pineridge Ln:
Elizabeth Haapanen	95460	Box 77 Mendocino
Elisabeth Middleton	95618	1320 Nutmeg Ln., Davis, CA
Lorraine Kerwood	97405	2575 Friendly St
Kathleen Hansen	96067	514 Mill ST
jeannemarie coulter	95437	31251 hwy 20
Seabrook Leaf	96011	P.O. Box 161
Jennifer Lupton-Wood	96067	906 woodland park dr mt Shasta, Ca
Leila Sadeghi	95630	240 Natoma Station Dr.
Kile Ozier	94114	2261 market street, #404-a
Mary Drew	97071	1596 Thompson Road
India Bowers	94110	3425 23rd Street #24
John Bachellor	95126	1038 liebelt
Ellen Albright	94505	1130 discovery bay Bl
mf schroyer	94110	1499 potrero
Donna Fairchild	95624	9478 Ranch Park Way, Elk Grove, CA
rene alvarez	94608	2340 Powell st
C G	94110	2425 24th st.
Angela Berry	94549	3739 highland rd
david brendel	11201	287 henry street
gabriela rasberry	95207	2737 birch ave
Joan Hansen	95690	14019 Islandview Way
Kayla Carpenter	95546	P.O. Box 878 Hoopa CA
Julie Larson	94577	958 Helen Avenue, San Leandro CA
Belinda Ramirez	91101	327 E Del Mar Blvd Apt 5
Jeff Mallory	93920	45955 Pfeiffer Ridge Road
Cara Lee-Shuff	94109	1855 Pacific Ave. #103 San Francisco, CA
Molly Brown	96067	722 Meadow Ave
Riikka Poulsen	00700	Tullirinne 2 i

Name	Postcode	Address
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Mia Brown	95546	hwy 96 #160
Jenny Lor	97405	651 E 32nd Avenue
Scott Petty	95621	6987 Brayton Ave
Bonnie Johnson	96025	449 MicanSt., Dunsmuir, CA
Roxanne Moger	95817	2340 42nd St., Sacramento, CA
Ryan neily	81007	441 W. Lookout dr. Pueblo West
Elena Gardella	94702	1256 Russell St.
steve messina	11375	110-45 queens blvd #910 forest hills, ny
Karen Rogers	96067	po Box
Diane Pizza	94949	224 montego key Novato ca
Suzanne Nathans	94901	424 Woodland Ave
Ariel Gimble	87048	1432 Camino Hermosa
Gary Hughes	95521	145 G St., Suite A
Darci D'Anna	93924	34 Paso Hondo
Thomas Cahill	94559	1439 E Street, Napa, CA
Connor Yiamkis	96087	2125 Shasta CA
Barbara Pannullo	11772	15 Sharon Drive, Patchogue NY
Diane Tenerelli-June	07086	588 Gregory Avenue, Weehawken, NJ
Shannon Brawley	02875	201A Shannock Village Road
Jacqueline Castillo	87455	PO Box 7914
Alex Fidelibus	07302	280 Marin Blvd, Apt 21E
Mark Lakeman	97202	8512 SE 8th, Portland, OR
Janet Cavallo	19018	1276 Providence Rd
Scott Mendelson	27705	922 Hale St, Durham NC
Barbi j Leach	95546	Po box361 Hoopa,cal
chris skyhawk	95410	PO Box 127
Giuseppe Laneve	94901	557 east Francisco blvd
Lisa Lopez	95833	301 West El Camino #3
Joseph Pettit	52246	441 Hawkeye Drive, Iowa City, IA
Catherine Cadden	27516	1601 Eco Drive
Lani Phillips	96097	551 N Main Street

Name	Postcode	Address
Bruce Greene	97214	1906 SE Elliott Ave.
Heidi Bourne	95518	P. O. box 4313
Elaine Hudson	95621	7641 poplar ave
Kristin Allen	96094	4942 Lake Shastina Dr
Cairn Rodrigues	95691	1616 Portsmouth St
cerridwen bunten	96067	smith st
Mari Shanta	96025	6418 Dunsmuir Av
SHAWNA BROWN	94571-1619	520 main st
Kathryn Jessup	96067	1234 Nixon
Carol Bloom	95444-9306	2705 S. Brush St.
steven tucker	95519	1289 azalea ave
Wenda Vander Werf	95692	PO Box 154
Joshua Chambers	96011	PO Box 33
David Donnenfield	94960	113 Madrone Ave. San Anselmo, CA
nathan Shwartz	98027	405 W Minster Ave
Luan Marks	49120	122 Silsbee Street
ELSIE JOHNSON	96089	shasta lake ca
Barry LeBeau	02909	84 Marshall St.,Apt#1A
Morgan Stuart	12008	19 1st. Street, Alplaus, NY
Debie Rasmussen	95966	Oroville
Marlies Jansen	59757	Bosschekampstraat 71
Joan Kleban	97402	966 Jackson
Lydia Scott	97405	30764 Koinonia rd.
Matt Denner	50310	2819 Holcomb Ave
Erin Rowe	95521	1984 Leslie Ct
Kimberly Landis	43119	5463 Bentonhurst Ct.
Matthew Bueno	96003	13839 Creek Trail
Ted Sison	94597	31 San Luis court
michelle blackburn	90042	5672 1/2 york blvd
john cole meeker	94572	708 Gravenstein hwy N
Jim Brown	96067	722 Meadow Ave.
Amy Bumpus	43082	6316 Charmar dr
Katherine Falk	94611	62 Entrada Avenue

Name	Postcode	Address
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Leslie McCoy	94619	4261 35th Ave
Alicia Siu	95616	406 Scripps Dr, Davis, CA
Jane Hamby	96094	PO Box 651 Weed, CA
Justine Devoe	96002	1100 Echo Road
Lucy Elphick	95627	25944 Craig street
Tyler Gibson	97520	Hwy 66, Ashland, or
Ramon Montano	92105	4161 37st apt#8 San Diego California
Christina West	95454	Bix 1663
Kara Brinkman	97402	1300 Quaker St
George Cammarota	95129	4646 Corrida Circle, San Jose, CA
JOHN BRENNAN	96094	3715 Dale Creek Rd,
Nicole Woodruff	02809	23 Dolly Drive, Bristol, R.I.
Harmony Lambert	96087	PO box 403
Jennifer Wilks-Christian	96067	502 Berry Street
Vanity Willette	85637	12 Pinto Trail
Martha Perkins	91107	1443 Edgecliff Ln
Margret Wrennstad	41666	Borgaregatan 14
willie mitchell	07198	13 bunholvil
mary villa	94115	1040 Divisadero
resa sawyer	87712	box 59 buena vista nm
Tanja Lehmann	81245	Kaspar-Kerll-Str. 19
Jerry Gilreath	30223	ll05 Lake Avenue
Dan Kegebein	98582	P.O.Box448
Gisela Pook	78467	Bismarcksteig 10
harry bishop	95213	po box 32022
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terri vandehey	97048	68370 Meisner Road

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Ban the Dam - Unethical Raising and Dam No More	60001	*
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Angela Rex	95563	Po BOX 501
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Mariamma Jones	97405	1971 garfield st
Christine Frisco RN	94301	649 University Avenue
Carol Luther	94960	21 Oak Ave.
Pat Shirley	87529	## Mirlo Dr
Brenda Andresen	97330	1705 NW Taylor St
belinda gould	33815	520 mathew rd.,lakeland,fl.
Darlene Lee	97633	135 N Elm Street, P.O.Box 532
MARY ODOM	39466	194ICHARDSON OZONA RD
george koch	95051-5604	2808 rebeiro
Kouslaa Kessler-Mata	93953	2807 Forest Lodge Road
Larry Rhodes	60041	26041 Marshall Avenue
fred rinne	94112	642 cayuga ave san francisco ca
Nancy W Gin	94109	923 Eddy St #107, San Francisco, CA
susan fanter	62024	502 Harper Court East Alton,IL.
Ashley Hall	95959	15169 Lewis Rd.
Claire Coupez	98070	P.O. Box 2176
Nicole Letscher-Bartholomay	96067	4115 Hummingbird Way
springwater ocoee	47112	1341 hillview dr,corydon,in
Peter Tennigkeit	95472	216 florence ave
Byron Roberts	95207	5234 Grouse Run Dr
Daniela Koromzay	94930	17 Redwood Rd, Fairfax, CA
laura beebe	95570	Po box 2057
roberta wagner	08051	731 Garrison Ct
deanna arnall	65256	7505 w stidham rd
Rose Madrone	95560	box 193
Allan Reaves	96067	General Delivery

Name	Postcode	Address
kristen witkowski	11789	8 stewart rd
Elora Young	30276	437 McIntosh trail
Frank Putnam	97209	Portland, OR
kellie st. james	95519	1817 holly dr
Allie Coleman	96067	627 Everitt Memorial Hwy
Melinda Perlman	96037	Box117
Nichole Albright	97404	1201 Maxwell Road
E. Rodriguez	10963	Mountain RD
Marilee Bittner-Fawcett	98524	1541 E Treasure Is Dr
Deneen Peckinpah	97520	569 Clay St.
Holly Ducharme	34113	5697 Rattlesnake hammock rd Apt.C101
Thomas Lester	74434	PO Box 264 Ft. Gibson,Ok.
Robert Shearer	95521	Diamond Drive
Gaylord Hughes	95549	1980 Greenwood Hgts. Dr.
Samantha Langley	95503	3328 G Eureka, CA
Cynthia Russell	96067	1612 Holiday Lane Mount Shasta Ca
Rebecca Manion	95501	1336 A Street
Karen Hill	32667	PO Box 445
Christina Ahlstrand	94618	5816 Ocean View Drive
lynn duncan	47012	28734 maune rd
Stacie Meredith	95687	1084 Ruby dr
Clifford Delmar Leach Jr.	95316	4601 Swanson Rd.
John Brennan	97212	822 NE Hancock ST
Lisa Rowe	95960	26798 Wampum Way
Lynda Fullerton	98584	Shelton, WA
Ann Altstatt	95060	203 Cedar Street
Mark Motyka	96039	3334 Indian Creek Road
ginger cloud	97405	2930 Charnelton
Jennifer Parrish	95125	593 Dorothy Ave
maureen roche	95558	petrolia
Lynn Jenkinson	48198	2910 Stommel Rd

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Kris Farquhar-Naeyaert	95677	6055 Placer West Dr. Rockin, CA
Lloyd Hauskins	95560	POB 665
Sebastian Vido	94547	133 Manzanita place
julie l. solarski	95821	3545 Edison ave #3 Sacramento ca
lynne nourse	94931	p.o. box 7643
Bob Williams	76272	2271 W FM 922
caroline downie	96025	306 riverwood lane, dunsmuir, ca
Melanie Clement	96003	705 Country Oak Dr.
Lucy Rodriguez	27514	145 Erwin rd
Rosemary Clement	96003	705 Country Oak Dr.
Jaya Clement	96003	705 Country Oak Dr.
Jim Lockhart	97266	4528 se 99th
Angela Parrinello	94118	318 12th Ave
susan wesley	86004	2024 n 2nd st
Rogene Reynolds	95206	4444 W. Undine Road
Lorraine Hersey	97801	4223 SW Broadlane Ave
Frank Riehemann	82467	Hauptstraße 48, Garmisch-Partenkirchen, Germany
Michelle Steinberg	94609	693 33rd Street
Cameron Baxter	94118	2325 Cabrillo
Michael Kavanaugh	95545	P.O.box 104
debra daniel	19335	35 kennedy drive
Tara Russo	87507	3740 Academy rd. St. D
Mitch Collins	18914	219 Cambridge Place
Rosemarie D'Ostilio	96067	206 E Hinckely St Mt. Shasta, CA
Karen Ratzlaff	95404	645 Carr Ave.
Kristy McCurry	95926	1315 Palm Avenue
James Baker	36804	2225 Lee Road 117
Donna Boyd	96067	314 Sheldon Ave
Kathaleen Reed	95812	PO Box 2144
Sara Pawulak	95519	1400 Underwood rd
Anthony Leach Sr	95603	141 Boardman Street

Name	Postcode	Address
Allan Gehman	96001-0933	540 South Street #58
Jeanine Ertl	95589	11000 Briceland Road
Leslie Craig	95503	4701 Crane Street Eureka CA
Jennifer Ayo	95521	2575, alliance rd 13-c
Paul Eggers	95942	PO Box 445, Forest Ranch, CA
L Shaw	96007	millville
Gordon Anderson	95521	1560 Peninsula Arcata, CA
Robert Billstrom	95521	988 9th st, Arcata, CA
Sean Sampanes	96092	1013 Layton rd
J P	95521	355 Granite Ave
Joanna Welch	95501	2925 Lowell
Paul Cavanaugh	95971	345 Main Ranch Rd
Daniel Dempsey	95503	5087 Meyers Ave.
Sara Trechter	95926	736 Oaklawn Chico, CA
mason mckibben	95519	742 gross st
Courtney Scott	97232	2106 NE Flanders, Portland, OR
Joaquin estrada	95521	145 12th st
Adela Myers	95956	PO BOX 261
Julianna Elias	96080	16145 Red Bank Road
David Hurst	95926	1311 Fairway Alley
Darcia Slape	96002	20020 falcon drive redding, ca
Lisa Butterfield	95501	2440 Wood Street
karyn parker	83686	2903 laurel way
Bob Atwood	96003	248 Boulder Cr Dr #8
timothy may	96022	22366 river view dr, cottonwood, ca
Ron Kuhnel	95501	1604 G ST
Penny Garrett	96003	851 Mission De Oro Drive
Mary Able	96056	535-000 Little Valley Rd.
Juniper Hobson	95928	4722 Cable Bridge
Robert McCombs	95518	PO Box 4175
Michael Terry	96007	PO BOX 1019
Peggy Loe	95954	13516 Tufts Court
Steven Wadas	96067	416 N. Washington Drive

Name	Postcode	Address
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Jessica Black	93265	40831 Balch Park Rd
Mary Thomas	96094	5018 Solus Place
Elaine Kane	95540	1751 Home Ave
michele stainback	96926	1628 spruce avenue
Orle Jackson	96080	19873 Hwy 36 W, Red Bluff CA
Karen Anderson	96058	P. O. Box 373, Macdoel, CA
Jeanne Ertlr	95926	1552 Citrus Avenue
Jane Merkel	95503	833 Everding Street
April Wagner	96093	box 1336
Sue Lindgard	96050	P.O. Box 57
raymond eliggi	96080	1155 jefferson st.
Claire Robbins	95501	2542 Hubbard Lane, Apt B
Judith Benbrook	95490	2745 Coyote Road
Shilo Quetchenbach	95521	1351 H st #5
Lyssette Rodriguez	95521	335 Laurel dr.
Forrest Lamb	96025	5404 Shasta Avenjue
Ron Smith	95928	5332 Finnicum Rd
Lyn Walters	95956	P.O. Box 157
Juliet LaFleur	95928	955 Madison St
David Page	96003	4282 Baywood dr redding ca
Bayla Greenspoon	96067	724 Butte Ave, Mt. Shasta
Audrey Kapitan	95409	4 Quixote Court
Davin Peterson	95501	2846 Lowell Street, Eureka CA
Whitney Allen	96002	19731 Valley Lane
Jeff Gemutliche	96003	4470 Swallow Tail Ct.
Marilyn Shepherd	95570	PO Box 715
William Peace	95969	5228 Squire Ln Paradise Ca
Daniel Steward	95973	4 Elverta Circle, Chico CA
Virginia Jaquez	95947	P.O. Box 172
diana Nielsen	94525	419 vallejo st
Gura Lashlee	95519	2580 Central Av. #38
Lorenzo Durham	95969	1417 Andrea Ln, Paradise, CA

Name	Postcode	Address
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Noel Phares	95969	1374 McCullough Dr
David Tamori	95966	111 Putman Dr
Terri Mattson	96086-0513	PO Box 513
Gerda Lydon	95973	2948 San Verbena Way
Carol Mone	95570	Box 223
Mark McCandlish	96002-0511	2205 Hilltop Dr. #158, Redding, CA
Samala Ray	95501	217 D st #310 Eureka Ca
Patricia Purcell	95969	5436 Clark Rd #44
Marietta Sheffield	96001	3705 Riverview Drive, Redding,
James Kirks	95973	11 Hemming Lane
carolyn galindo	95502-0488	p.o. box 488, eureka CA
Alan Sund	95926	1675 Manzanita Ave #82
Jody Bond	48864	Jody Bond
Carolyn Doty	96002	662 Estate St
Phil Reser	95926	1301 Sheridan Ave. #27, Chico, CA
Suzanne Simpson	95518	POB 309 Arcata, CA
Judy Haggard	95519	1237 Gross St.
Nat Childs	95553	PO Box 511
Karen Raskin	95549	970 greenwood heights drive kneeland, ca
Brien Brennan	96080	7200 South Fork Drive
Darrah Hopper	96020	PO Box 186
GeneAnna McMillan	95926	2040 Vallombrosa Ave.
matthew mckibben	95926	2311 holly ave
Mirislav Liska	95519	1240 Ian ln
Lynette C	92128	1526 Esperanza Way
Ricky Pisanu	95602	5275 Morningside Ave, Auburn Ca
DANIEL MCELHERAN	96093	200 BUTTONS RD
Margaret Grossman	95521	2778 Buttermilk Lane
Marilyn Sanborn	96069-9506	27445 Lookout Mountain Lane, Oak Run, CA
Sandra Lee Childs	95553	Miranda, CA

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Wilma Dibelka	96094	5238 High Meadow, Weed, CA
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David Lee	95928	983 E 7TH ST
larry glass	95552	PO Box F
Kathleen Kelcey	95519	1090 Murray Rd space 45
jacek ernestowicz	78-100	walki mlodych
Luana Mauer	97426	84820 Cloverdale Road
Deborah Kvaka	95454	POB 1324, Laytonville, Ca
George Wilton	95965	1326 Grand Ave.
harriette searle	95983	5518 fir fork
Lynn Miller	95954	6277 Brevard Circle, Magalia, CA
Cynthia Husten	96001	2106 Butte Street
Robert White	95521	2750 Terrace Ave
Debbie Harrison	95519	2423 Bolier Ave.
Craig Olson	96003-3539	800 CHRISTINE AVE
Rick Boutin	96080	1364 Walbridge Street
Carol Lawrence	95519-3448	1090 Murray Rd #66
laurey morris	95501	1417nigellane
Mark Bailey	95549	7636 Kneeland Road
Jessie Ayani	96067	1431 Pine Grove Drive
Jon Behnke	95454	P.O. Box 631
Katherine Maxey	95503	6828 eggert rd
Ronald Goff	95954	6312 Shelton Ct.
Clarence Hagmeier	95558	POB 9
Anne Nicksic	95540	1104 Stewart Street
Elaine Nichols	59301	405 MISSISSIPPI AVE
Sandra John	95928	1420 Half Dome Way, Chico
Angela Gerard	47401	3259 East Will Sowders Road
Gale Swearinger	95939	3600-09 Phils Way
Susan Coffi	96137-1223	P.o. 1223
Rosa Rashall	95589	PO box 153

Name	Postcode	Address
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Joan Martien	95521	1029 11th street
john crandell	95519	401 wagle lane
Timothy Hafner	95503	3800 Mitchell Rd
Michael Tonetti	95973	470 Chestnut Rose Ln
Virginia De Vries	95490	4260 Blackhawk Drive, Willits CA
Sherrie Gadreault	96002	2650 Bunker St. #1
Frank Letton	95589	POB 294
clare fisher	95926	477 e sacramento ave
cynthia olen	95501	2214 Fairfield St., Apt. 3
Sandra Bacon	95503-7608	4343 Walnut Dr
Wendy Crist	96025	5914 Mountain Ave
Ashalyn Ashalyn	96067	416B Alder St, Mt. Shasta, CA
pat pearson	96027	4320 shell gulch
John Scott	95965	4370 Tao Way, Butte Valley, CA
Alan Sanborn	95521	1491 H St
Sally Cooper	96067	304 S Mt Shadta Blvd
Larry Bailey	96099	P. O. Box 992480, Redding, CA
Tandra Froehlich	96022	3465 Brush St Cottonwood CA
Sandy Mitchell	96067	1020 Kingston Rd., Apt. 7B
Karen Mayer	95503	4552 Mitchell Rd. Eureka
Kathleen Faith	95928	2188 Honey Run Rd
Makere Aroha Chapman	98460	Whitecliffs, New Zealand
mike Evans	96007	2777 flagstone ct
Carrie Smith	95928	1660 Humboldt
Sandra O'Neill	95928	1232 B Oakdale St
donna espsoito	95528	box 288
Shereen Smith	95542	11815 Alderpoint Rd.
Marcia Fiamengo	95691	1969 Linden Road
Melissa Birch	95502	PO Box 6770
James Robinson	95560	pobox2382
Casey O'Neill	95546	p o box 20

Name	Postcode	Address
Deirdre Santaniello	95490	26590 Daphne Way
Shirley Fannin	95973	2601 Nord Ave.
JENNY ORCHID	95560	PO BOX 302
Valerie Fannin	95973	2601 Nord Ave.
Rick Underhill	30513	678 Ash Loop Road, Blue Ridge, GA
N Courtemanche	95536	1335 Rose Av.
Philip Lee	96059	31695 Forward Rd Manton CA
Cheryl Gravitt	30303	321 Lee Rd.
Dana Wullenwaber	96001	2442 California Street
David Grau	95926	773 Sierra View Way Chico CA
Jorge Arguello	96003	1550 Barbara Rd., Redding, CA
Terry Crary	96019	3304 Shasta Dam Blvd
Joyce Ballard	39567	922 Quail Meadow Drive
Barbara Small	95514	29191 Alderpoint Road,Blocksburg,California
Andra Stringer	95540	1668 Justice Ct
Delbert ONeill	95546	po box 20
Mary Benson	95973-0729	701 E Lassen Ave 116
Jennifer Marx	96014	424 Sugar Creek Road
Gary Pelton	96002	2040 Hilltop Drive Redding CA
Lydia Plaster	95965	22 Bob Way
Piers Strailey	95971	P O Box 3012
Philip Winkels	95454	46641 woodman cyn rd
Mikal Baker	95521	986 C St
Mary Stone	96064	11800 Hart Rd.
kimberly smalley	95502	po box 146 eureka ca
Mary Davis	27712	5301 Falkirk Drive
Cary Frazee	95503	499 Redmond Road
Kay Schaser	95501	2701 Erie Street, Eureka, Ca
Al Pantalone	96003	2173 Hope Ln.
Dr. Robert Bowman	95926	1220 Glenn Haven Dr
Karen Delangelo	95540	821 14th Street
victoria schanzle	95553	408 Thomas Rd

Name	Postcode	Address
William Skupowski	95966	105 Pinedale Ave
Ralph Privette	96088	30567 Thumper Dr
Betty Rowland	96013	20420 Poplar St
linda robinson	63114	9410 ridge overland mo.
christopher kirkland	60098	2563 Linden
Laura Rhoades	95476	Sonoma creek
sharon porter	95969	4827 Round Valley Ranch Rd.
Janice Stout	96055	24826 Taft St
Julie Haynes	96091	HC 1 Box 613
Sarah Morris	95926	518 W. 6th Ave.
Michael Celayeta	96039	P.O. Box 425 Happy Camp,Ca
Richard Hand	96035	7815 State Hwy 99 W
Kyle Drennen	96067	035 Davis Place Road
hugh liles	95519	2595 kelly
Jill Gardner	96067	POBox 473
Penny Schafer	96067	825 Aiello Road
Loren Madsen	95454	PO Box 1824, Laytonville
Karen Scarborough	96003	3546 Old Lantern Drive
carol rogan	96093	po box 1126
Ariel Graham	95521	1959 Ernest Way
J SpottedEagle	87413	80 Rd. 4992
Sandy Sweitzer	95521	2066 Mustang
Claudia Weber	95926	22 Williamsburg Lane, suite G Chico ca
Lloyd Downs	95954	14766 Pine Cone Way
Carolyn Grill	28411	1004 Potomac Dr., Wilmington, NC
Susan Cliff	96067	PO Box 1332, Mount Shasta, CA
Yvonne Redd	96130	479-395 Tako Nee St
Taylor Branson	95949	11810 lodestar dr grass valley ca
JuLeah Willson	98052	15920 NE 101st court
Peggy McGuire	96035	2351 Stone Ave. Gerber, CA
Donna Clark	96130	708 Plumas St., Susanville, CA
Sylvia De Rooy	95503	210 Pomeroy Hollow

Name	Postcode	Address
Frank Wilkens	96002	4050 Aspen Springs Ct
Beth Shipley	95521	1579 13th St., Arcata, CA
christine schlumpf	96003	19900 sunbeam circle
william malinowski	95589	1261 toth rd.
ROBERTA REPASZ	48822	P.O. Box 53,Eagle, Mi
Peter Norris	95490	27660 Poppy Drive
leo schlumpf	96003	19900 sunbeam circle
Justin Zakoren	95503	3220 Pine St.
Mickey Fernandez	95490	1448 Daphne Drive, Willits, CA
Coleen Marks	95555	PO Box 295
robin keehn	95926	273 e 3rd ave
Ja Miller	95973	146 Sleepy Valley road
Nancy Olson	96067	Mount Shasta
toni casto	95965	471 grand ave
Ken Miller	95519	1658 Ocean Drive
George Bates	96052	321 Clark Creek rd
Frank Toriello	96064	6635 Willow Creek Road, Montague, CA
Julie Cook	95490	28300 Skyview Rd
George Thorward	96039	4919 Indian Creek Rd
Jennifer Ferrini	95926	1890 Hooker Oak ave
karinajoy McAbee	95490	1517 casteel dr
Brian Humble	96003	1396 Minder Dr.
Monica Coyne	95560	p.o.box 1178
kendra guimaraes	95540	1955 scenic dr fortuna ca
Tom Patton	95928	11 Skymountain Circle
Chad Oliver	96067	705 Caroline ave
Cheryl Corcoran	96003	1290 Deodar Way
Joni Stellar	95965	2965 Madre De Oro Pl
Vivian Garcia	78231	2935 Green Run Lane
Martha Walden	95524	po box 325, Bayside
William Cortez	96091	111 N. Lakeview Dr. Trinity Center
Gina Lindow	97540	113 N 3rd st. #2

Name	Postcode	Address
windwolf woods	97477	73 v street
Sue Mendez	95954	6475 Loyola Ct
Jerry Peavy	95926	2111 Algonkin Ave. Chico Ca.
shelley o'neil	96092	po box 259, vina, ca
michael mclaughlin	95967	po box 1232 paradise ca
Karin Anderson	96041	P.O Box 1183 Highway 3
joyce tierney	19904	8 freedom pl.
melinda willey	96067	517 Shasta Way, Mount Shasta, Ca.
kathleen McCovey	96039	PO Box 53 Happy Camp, Ca.
Gene Latimer	97214-4848	1704 SE 22nd Ave
Mark Vargas	96003	11912 Best Ln.
Steven Westbrook	95926	1321 palm ave
Agleska Cohen-Rencountre	97438	39701 Little Fall Creek Road
Allan Stellar	95965	2965 Madre de oro place
David Menefee	96041	PO Box 1183
Ada Ball	97457	P.O. Box 1916
DAWN FAZENDE	96067	POB 443
Serena Seidner	96067	3724 Summit Dr.
Tammy Robertson	96067	1339 Stellar
Glen Yonemura	95632	620-Third St.
TOM BRANSON	95949	11810 Lodestar Drive
Anita Brady	96003	12076 Fawn Dr.
Sean Payne	95501	601 W. Wabash Ave unit B
Susan Whitney	95570-0793	P.O. Box 793
Susie Foot	95519	1873 Cliff Ave
Jennifer Krause	96067	1934 Deetz road
Terri bradley	96002	1244 Heavenly Oak Ln # 1
Christina volanos	83642	132 w. broadway ave meridian id
ted lindsay	95501	2141 Tydd St #223
jerry batcheler	95965	703 Oro Dam Blvd W #205
Don Swall	95501	1140 E. St. Eureka
viola long	95546	p.o. box 1096

Name	Postcode	Address
Dylan Fuentes	92627	1124 Victoria St
Bonnie Daut	98030	10914 SE 240th Pl D202, Kent, WA
Mark Trechter	20152	25483 Feltre Terrace
Bruce McKinley	96094	8936 Blue Jay Lane, Weed, CA
Ruth Lown	96021	6401 Santa Clara rd.
Joan Barrymore	96088	PO Box 227
Suzanne Guerra	95503	4771 West Wing Lane
T Beaulieu	96003	12171 Cinder
William Huber	96046	P. O. Box 1
Liam Humble	95405	2627 Lago Oaks Dr.
ann Souter	95519	1101 Silverado Ave
Wendy Harden	95542	P.O. Box 446
Troika Saint Germain	96067	PO Box 733
Carol Hanrahan	97470	812 Shadow Ranch, Roseburg
Mark Goodwin	95969	6217 Forgotten Way, Paradise, CA
pascal hudon	95959	10580 rimrock ln
Christine Martin	95973	13 Discovery Way
Jenna yonemura	95660	3710 Bainbridge drive
Jean Nels	96067	240 Smith Street
Lisa McEntire	73401	3120 Carter
Vincent Kessinger	96001	1735 Wisconsin Avenue
Tom Handman	96035	7371McClure Ave
Jill Kane	96001	3620 ALTURA AVE, REDDING CA 96001
Marzanna Pietrowska	95524	3420 Old Arcata Rd Bayside Ca
Lawrence Williams	95570	P.O. Box 793, Trinidad, CA
Gregory Byers	95490	15000 Hearst Road
Sylvia Cardella	95547	4570 Bluff Top
Jacintha Stanley	86033	PO Box1906
Donna Bringenberg	96067	POB 669
Sunny Hawk	95521	2255 Alliance Road, Apt.26
Jean Cannon	96073	PO Box 426

Name	Postcode	Address
Manuel Mora	96067	PO Box 862
Patricia Beardsley	94118	566 Third Avenue, San Francisco
Jessica Shieman	95503	3223 E Street
Ladis Yrazusta	96097	15538 Valley View
Martaa Hutz	96067	1541 Frederick St.
Jon Spitz	95454	Laytonville, CA
Ralf Hahn	95966	Oroville
Jeffrey Stone	96097-9030	909 Bennett Dr
Samuel Lundeen	95570	597 Old Wagon Rd.
Pearl Brady	11217	444 Bergen St #2R
Vicki Brenner	96067	P.O. Box 1145
bob h0SKing	95988	426 4th st wiiows ca
susan Alexander	95560	P>O>Box 61
dorothea joyce	96067	404 N. Mt. Shasta Blvd. 131
Sam King	95519	2626 Elizabeth Road, McKinleyville, CA
Lorna Bartlett	95928	500 E 12th St
Greg Movsesyan	95519	282 Old Quarry Lane
Rena weiss	96067	pobox 671
Kate Yorke	96067	.O. Box 1383
Marc Williams	96027	POB 481 Etna, CA
Sylvie Matalon	97405	Eugene
Jerry Pruce	95560	P.O.Box 2349
Rev. Jisho Perry	96067	3724 Summit Dr.
stacy gilbert	97525	1538 rogue river hwy
Ethan Rogers	95926	838 Morninghome Ct
Suzanne Cook	95519	2584 Knox Cove Dr
Michael Deshler	95973	1456 Saratoga dr
Helen Young	95404	1073 Fulkerson St. Santa Rosa. Ca
Jeanne Thatcher	95926	P.O. Box 3204
Stephanie Hillman	95518	PO Box 4166
disa boracci	96003	21273 albatross way
ankush vimawala	97477	213 W D St

Name	Postcode	Address
KaNi Kido	94930	9 Pacheco Ave
margaret mehring	78006	9142 aqua dr
Ken Lawson	95973-9048	61 Mud Creek Road, Cohasset, CA
marianne williams	95549	greenwood hts. dr.
Gary Mantei	96002	2855 Henderson Rd, Redding
Lisa Brown	96058	13717 Tennant rd.
Mary Jean Watson	95531	1205 Dundas Rd. Crescent City, CA
Peter Childs	95553	CA
Kim Merlino	96067	1109 S Mt Shasta Bld
Cris Smyrnos	96067	330 Pony Trail
Alan Ernesto Phillips	96003	1111 Macs
Debbi Freeze	96067	525 Pine Street #8
Jere Bob Bowden	95536	Ferndale CA
Arthur F. Bravo	94559-1156	1439 " E " St. Napa
johnica love	95927	po box 266
Alba Miranda	95928	Lassen
Glen Sharp	96080	2040 Pebblestone Dr. Red Bluff, CA
Wendy Carney	95570	1030 Westhaven Dr S
Weston Ball	90210	1234 etmibalz ct
Ineke Wild	90210	Nonneveld 138
Mary Zellachild	95490	39 Mill Creek Dr.
George Wheeler	95519	1807 cliff ave
Robert Davis	95503	California Street, Eureka
Theresa Story	96003	821 St Marks Spc 33
Mary White	14850	114 Sears
John Hale	95969-4236	5921 Debbie Ln., Paradise, CA.
Kathryn Black	93265	40831 Balch Park Rd
Lanai Winter	95928	2050 Springfield Drive
Michelle Burris	95519	1336 Winchester Ave
Samad Najjar	95954	14188 Sherwood Circle
Eileen Brownell	95928	153 Picholine Way
Margaret Hollenbach	98382	Sequim, WA

Name	Postcode	Address
sophie cooper	94607	1933 Filbert St
chris dawes	95973	782 Lindo Lane
Michelle Strozier	74804	200 East Georgia
Sherry Watts	95558	36332 Mattole rd
Robert Astrue	95570	PO Box 1188 Trinidad, CA
James Paquin	95518	PO Box 573
Jeremy Jensen	95501	Po box 877 eureka, ca
Mercedes Koehly	95973	1588 Arch Way
M English	95969	Paradise
Peggy Elliott	97530	410 S. Oregon St.
Liz Zanze	96001	2726 Dawnridge Drive
Cameron James	96022	19643 Indian Creek Dr
Julie Nelson	96003	12825 Encanto Way, Redding CA
Hayley Peter-Contesse	95521	1875 Iverson Ave A
Abigail Den	96067	1571 Village Way
Evelyn McCahon	96019	2115 Montana Avenue
Yvonne Hatch	95490	23 Creekside drive
Lorena Cedergreen	95521	1395 Glendale Drive
Michael McLaughlin	95502	337 West Clark
Joel Hawthorne	95966	148 Spruce Parkway
Jeffrey Stewart	96047	PO BOX 294
Beth Bennion	95519	1594 Railroad Drive
Cyn Van Fleet	95527	PO Box 98
Barbara Orme	95973	139 Cohasset Loop
Wayne Swan	96049	PO Box 493159
James Ritchey	37920	4209 Coffey Street #5
Geneva Omann	96094	Weed, CA
Roger Osborne	96003	1095 Hilltop Drive
Susan Stauffer	95490	487b East Valley Street, Willits, CA.
Soren Nelson	96003	12825 Encanto Way
Sara Lyon	95490	PO Box 2077
Dawn Wells	96094	5116 Spear Pt

Name	Postcode	Address
Sean Corfield	94546	5124 Ray Ave
Robert Ward	95965	555 High Street
Loretta Adcox	44102	1887 W52nd street
Dennis Wickes	95969	295 keffer lane, paradise ca
Nicole Caputo	95503	295 Bacchetti Ct
Sara Crayne	96067-2715	214 Merritt Ave. Mt. Shasta
Jaime Yarbrough	95567	PO Box 556
Leland Whitlock	95938	9197 Goodspeed St Apt 6
Ornella Addonizio	96080	70 lindauer lane red bluff
Jourdyn Bossio	95476	192 Sierra Pl
rochanah weissinger	95973	2910 morseman #A
Pat Andrews	95546	pro box 640
elisa conte	02835	126 hamiltona ve
Claire Perricelli	95501	2259 16th
Natalie Blasco	96007	19075 River Crest Dr
Shirley Ramstrom	96002	2451castlewood dr.
Albert Wedworth	95926	2384 Tiffany Way Chico, Ca.
Pat and Bruce von Alten	96097	921 Campbell Ave, Yreka
Donna May	96097	625 Butte St
Barbara Brumley	95969	6908 Sesame Street
Susan Bradley	95454	PO Box 52
Leslie Marconi	96068	207 Gaudenzio
Marguerite McDonald	93546	51 Pinon Dr. #b
Karen Duncanwood	95969	6656 Pentz Rd. #56
Shannon Robertson	94040	191 e el Camino Real 236
shara jay	95503	eureka
Bob Wagner	96027	Etna, CA
Ann Thompson	54880	2017 Ogden Ave
Brenda Sherman	95973	3143 Hidden Creek Dr
Pamela Cundy	96067	P o box 1692
Miguel Insignares	33331	Opal Creek

Name	Postcode	Address
George and Ruth Blitz	96003	1206 Grouse Dr.
Tacey Hatfield	96003	21684 Elk Trail West Redding, CA
Kimberly Tays	95570	P.O. Box 75
Phil Seymour	96003	4500 Alder St Redding, CA
Ronalee Phares	95969	1374 Mccullough Dr.
Faith Boyarin	96094	2331 Lakewood Ranch Rd.
Eva Adams	95003	112 El Camino del Mar, Aptos
jeff pruden	95501	ca
michael macdonald	95454	p,o, box 882
Lionel Ortiz	95524	2820 Graham Rd
Lewis Elbinger	96067	712 Om Shasta Path
JUDITH BENOIT	49345	1383 Meadow Park Dr
Michael Adams	96097	919 North Street
Peter Westfall	95503	3235 H St
Pat McCutcheon	95521	1630 Buttermilk Lane
Carla Resnick	95973	3010 Alamo Ave
alita angell-murray	96019	3876 wellington place
Norman Carpadus	96054	PO BOX 226
Tom Stover	97322	2186 geary #1
Roderic Stephens	96001	1787 Lakeside Dr.
Anne-Marie Heupink	68410	Enschede
Helen Winfrey	95540	525 Garland Ave.
RALPH RING	95969	1749 EDEN ROC DR. PARADISE,CA
Ted Hoffman	96032	8433 N. State Hwy 3
Stephen Jessen	95560	P.O. Box 2371, Redway, CA
Edmund Light	95501	3824 Jacobs Ave. #32
Mauro Oliveira	96065	Box 225 Montgomery creek
melinda groom	95525	po box81
Yolanda Guerra	94544	25053 Joyce St
Tania Borras	95490	25630 Fairbanks Place
Jerry Sullivan	96067	1909 Eddy Cir

Name	Postcode	Address
Ronald Lunder	96137-1174	P.O. Box 1174 Westwood, CA
Zoe Chapman	95589	P>O. Box 23
Tom Pava	96025	4212 Branstetter St.
Rick Kincade	96044	15634 Klamathon Rd, Hornbrook CA
Doug Blackwell	96067	PO Box 511 Mount Shasta, CA
Ravell Moss	95519	1453 Harden Dr
Pat Weaver	95560	5719 Briceland thorn Rd.
Thomas Peters	95501	221 Dollison St., Eureka, CA
kelly keen	95521	4513 valley west Blvd. C
Bernadette Webster	95589	76501 Usal Road
Nancy Martin	05927	P.o. Box 1244. Chico, Ca
Virginia Eagan	95927	2412 Guynn Ave. , P.O. Box 6316
Jean Baker-Stapleton	95973	2668 Waverly Court
Helen Joseph	96001	7599 placer rd,
Lilo Ducommun	95454	Laytonville
Judy Pfandler	95969	149 Sutter Rd
Kim Chamberlain	95540	1751 Newburg Rd.
Mona Gutierrez	96067	1037 Lassen Lane
john alexander	95926	543 mission santa fe circle
stephen lyon	96011	po box 114
Molly Knappen	95969	136 Roe Road
Susan King	80228	2312 S. Braun Way, Lakewood, CO
Gene Slade	95966	20 Linda Loma Dr
Meaghan Simpson	95540	2401 Newburg Road
pat wolfe	96013	burney california
Sheila Dillon	56201	1701 5th St SW
Louis kimzey	33905	13231 Idylwild farm rd. fort myers
Karyn Smoot	97401	1790 Alder St.
Karen Scheuermann	96022	17455 Big Bear Lane
Mary Rogers	95966-6524	2595 C St.
Lynette Coffey	96019	4059 La Mesa Ave.
Kay Scovill	96067	Deer Creek Rd.

Name	Postcode	Address
Arthur Scharf	96067	307Or Street Mt Shasta
Deanna Knickerbocker	94040	1846 Limetree Ln
Patricia Woods	97477	3033 Gateway St. Apt. #59
BARBARA Trumbull	96064	10812 Hart Rd
Mirabai Applegate	96067	1224 Davis place
juliana duncan	95519	985 Gross Rd.
William Mark Casebier	97386	1351 Poplar St.
Joseph Tonan	91764	207 E. J Street
Trisha Lee	95501	2425 C Street
Carol Wilson	95519	2004 St Maru Ln
Noelle Adams	95969	9289 Skyway # 30
fred lewis	96067	1409 highland dr.
Karen Feridun	19530	260 East Main St.
Karynn Merkel	95503	833 Everding Street
Chelsea Swick	95524	440 Solaris Lane
Valerie Romero	95971	1962 E. Main ST.Quincy, CA.
Lisa Zure	94960	221 The Alameda
Bob Stewart	95521	221 G Street
Michael King	97401	1390 Mill
Melanie Schneiter	67213	1941 S.Hiram Wichita Ks.
Rose Armin-Hoiland	95524	2364 Graham Rd
leah childs sumerlin	97470	1115 s.e. roberts ave.
Eva Suhr	95928	1417 Ridgebrook Way, Chico, CA
Hannah Hawkins	30083	603 Tahoe Circle
Talia Fradin	94611	233 Capricorn Ave
Ethan Retherford	95501	1435 Dean St 7
harriet miller	96049	pob 493953
Haley Simas	95529	1805 Henry Ln. Mckinleyville CA
Carolee Tamori	95966	111 Putnam Dr
Katherine O'Neill	96094	4824 Rainbow Drive, Weed, CA
alexandra bacca	94621	851 81st ave

Name	Postcode	Address
Dan Bacher	95821-3713	3201 Eastwood Road
alison helton	97220	244 NE 92nd Pl
Leonard Incristo	96073	22086 WESLEY DR
Calvin Godfrey	51103	411 George St. Apt-1
claudia anderson	95662	9323 elm ave
Michael Wittman	91360	1332 Mill Creek Court
Alan Covey	95928	1747 Salem St.
Francine Fischl	95556	6955 IshiPishi road or leans CA
Robert Michael	95926	13 Glenoak Ct.
Mitchell Enfield	95501	2215 Tydd Street Apartment 7D
Phil Corcoran	96003	1290 Deodar Way
karine josso	41370	48 route de cravant
AniMaeChi drabic	93023	405 N Arnaz St
Jessica Stahle	84054	480 North Cloverdale Road
Stephen Lewis	95562	325 Center St., Rio Dell, CA
Jason Marrone	96067	1037 Lassen Lane
Loreen Silvarahawk	37354	499 Crowder Rd.
Cécile Simon	44000	Nantes
Robert Tait	95536	PO Box 247
Helena Pisani	94020	PO Box 224
beverly pyle	97402	835 tyler st Eugene OR
Asa Mittman	95926	5 Begonia Lane
Eileen Morris	95973	782 Lindo Lane
Ann Radwell-Newberg	95947	6260 N. Arm Rd.
Dale Thomas	95927	PO box 9191 chico, CA
Laurie Roy	95503	3401 Union St
Kenneth Kirby	96003-7912	2172 Sophy Place, Redding, CA
Michael Logue	95945	13149 Ridge Road
Scott Thayer	96003	14850 Lamoine Dr.
scott Love	95927	POB 5555 Chico, CA
Ralph Wadsworth	95973	13600 Gaarner Lane
Laurence Burdick	95521	1124 A St

Name	Postcode	Address
Harvey Raider	95521	1383 Anvick Road, Arcata, CA
maia peter	05971	po box 324
William Gaylord	98112	2244 38th place east Seattle WA
Shannon Campbell	95926	970 Mathews Drive
Will Fulton	96059	PO Box 546
John Jeavons	95490	5798 Ridgewood Road
Jessica Hueter	95954	37 Mallard Ct, Magalia, CA
carl christenson	96097	709 Jackson
Ross Stuart	96067	528 Redwood Road
Kirsten Vinyeta	97402	1261 Tyler St.
Margaret Rooker	96003	215 Lake Blvd
Thomas Lyon	92056	2174 Palmer Drive Oceanside,CA
Julie Bacon	97401	491 w12th
Mary Stanleigh	95503	3360 E St
christa lowe	97402	2425 W 18th ave
Jane Rittenhouse	97405	2485 Tyler st
Chuck Acridge	95540	3378 Creekside Ct.
Chloe Adams	95973	315 Sycamore Dr
galen thompson	95927-4185	Box 4185
John Stewart	95560	P.O. Box 185
Tennielle Hughes	95963	4527 Co. Rd. FF 1/2
Uma Bingham	95501	2161 Fairfield
jessica jordan	95524	2182 old arcata rd
valerie donner	94596	20 Sutters Mill Ct.
JASON THOMAS	96019	3710 LAUREL ST
janet cook	95589	p.o box 535
Heather Chan	60615	5110 S Kenwood Ave. Apt. 606
judith porter	94619	3824 [- suter street
Amy Lin	91006	100 west orange grove ave., Arcadia
Laureen Oliveira	96065	PO box 225
Jan West	95570	PO Box 30
adene katzenmeyer	96094	5016 solus pl
Sarah Salisbury	95928	1262 Broadway. Chico, CA

Name	Postcode	Address
rosa rodriguez	94404	catamaran
Melissa Crawford	95960	p.o. box 915
William Nelson	96067	P.O. Box 3
Dickie Magidoff	96013	20388 Hudson Street
Kathleen Caruso	95661	2020 Elk Rd.
Thomas Walker	95926	1670 Hooker Oak Avenue
Robert Van Fleet	95527	PO Box 98
Kevin Anderson	96003	11037 Erickson Way
Joanna Stewart	97401	336 Clark St.
Phaedra Kossow-Quinn	95521	343 G Street Apt D
Lilia Letsch	97403	E 16th Ave Eugene
Clifford Minor	95926-4522	336 Mansion Avenue, Chico, CA
Steven Hammond	95926	751 Brookwood Way, Chico, CA
Kristi Wrigley	95503	Eureka,CA.
Bill Allison	95519-8112	1340 filedbrook rd. mckinleyville,ca.
Kathleen Hurley	95928	2 Valley Lake Commons, Chico, CA
Paul Wilson	97401	1489 Cal Young Rd
Danny Hansen	96130	chestnut st
Ariel Wills	97402	930 W 17 st.
Sheila Barnes	96007	5850 Oak St Anderson CA
Stacy York	96019	4474 Arrow Rock Ave
Joy Hoover	93436	3395 Via Barba
Joy Hoover	93436	3395 Via Barba
natasha salgado	21122	5 maynard ave
David Zupan	97405	870 W 23rd Ave.
Janet Lambert	96067	211 Pine Ridge Ave.
Gillian Black	95521	1440 UnionStreet
Emily Meigs	95926	952 Karen dr
Megan Ireson-Janke	96044	18923 Cottonwood Creek Rd
Chip Elliott	96076	P.O. Box 51
Dennis Hanson	95540	577 berry ck ave
Ligia Giovannoni	95501	2145 C St.

Name	Postcode	Address
Sandra Goulart	95926	824 Brookwood Way
Janic3 Burton	14817	3058 Slaterville Rd
Lee Dedini	95524	1539 Irene St, Bayside, CA
mary carlisle	95969	12 olive branch lane, paradise, ca
Wick Humble	95973	3191 Coronado RD
Carol Kraus	96067	1020 Kingston Rd, # 2 B
Cindy Martel	96025	5809 Castle Ave.
Katherine Johnson	96067	209 Terry Lynn Ave
John Sanguinetti	96067	416 E Ivy St.
Diane Daily	97424	PO Box 1611
Mirranda Willette	97402	355 North Polk
Trudy Duisenberg	95928	4515 Ord Ferry Road
Joy O'Connell	96001	Chaparral Dr
Margaret Johnson	95501	1505 D St. Eureka, Ca.
Carol Callaway	94568	7512 Oxford Circle
G L LeBlanc	97405	2022 S Shasta Loop, Eugene, OR
Dawn Hill	95519	1629 Henry
Carmen Lemon	96052	PO Box 662, Lewiston, Ca
Corrie Galvan	95843	7916 Ivy Hill Way
Thelda Eli	95928	1985 Wild OakLn. Chico, CA.
alicia garcia	95570	po box 871
kathy gulledge	96019	po box 73
Margaret Andrews	95454	Laytonville
Julie Starita	97405	2195 Cleveland Street
Lori Vest	93546	P.O.Box 213
Michelle Berditschevsky	96067	1936 West Hill Road
s sawyer	95427	POB 189
Tina Bowhannan	37091	200 Tiger blvd apt 1-e
Susan Penn	95502	PO Box 1036, Eureka, CA
John Petersen	95573	POBox 3
geraldine teitelbaum	95542	363 Flintrock rd
Amy Lefevre	13413	27 Leard Rd

Name	Postcode	Address
linda roberts	95608	3720 kimberly way
Lea Betty	96130	720 Cameron Way
William HONSA	95501	3144 Broad
Zachary Medeiros	90807	3814 Pacific Avenue
Deborah Barney	94040	718 Cuesta Drive
Diane Beck	95549	3657 Greenwood Heights Drive
Carrie Sachs	96025	POB 771
Beverly Harlan	96067	1020 Kingston Road, Apt 3K
Gina Covina	95454	320 Mulligan
Pandora Kane	96067	510 Glen Mar Drive
Shana Fajardo	95825	2511 northrope ave. #4 sacramento ca. 95825
Denise Willey	96025	4412 Holly Ave
Eileen Banghart	96001	2956 Pawnee ct Redding, Ca
Mike Sheirel	96003	570 Viewpoint Dr.
Beth Brenneman	95454	PO Box 781
peter reinheimer	96067	p.o. box 471
Vicki Gold	96067	2102 Tanager Lane
Maressa Simmons	32304	1339 Airport Drive Unit H-7
Ambrosia Krinsky	95928	36 New Dawn Cir
Helen Pitre	95570	PO Box 919
David Hazen	97405	4349 Shadow Wood Drive
Paolo Nugent	98382	120 Sunland Drive
James Connolly	95926	1286 Glenn Haven Dr, Chico, CA
Marci Goulart	95928	435 Cypress St
Josie Cosentino	96099	Post Office Box 991077
Mary A Miller	97404	501 Division Avenue sp 58
Larry Levinm	95928	19 Comstock Road, Chico, CA
Beatrice Cox	95472	5219 Wendell Lane
Talitha Derksen	96051	19691 Statton Rd
Sandra Taylor	95969	625 Scott Dr.,
Jennifer Yun	22202	815 18th Street South
Foster Boone	96027-9414	25200 Sawyers Bar Road

Name	Postcode	Address
Joyce Plath	95521-5504	955 12th St
Lisa Mckee	32615	14901 NW 125 street Alachua fl
Jennifer Peterson	95573	po box 1392
matt beckham	95501	1134 third st
Jessica Huntzinger	95503	479 Howard Heights
shirlee Hall	60565	40 Harbor Cove
R Mulvey	95338	Indian Peak Rc
RICHARD JACKSON	95521	230 WARREN CREEK RD.
Mollie Wood	98006	15724 SE 46th Way
Kelly Dawn	95966	8145 Reservoir Road
James Theimer	96001	2065 Pine Street
sheila keene	60017	111 Spring Rd
Sarah Greene	97405	3050 Charnelton Street, Eugene, Oregon
Sunnie Noellert	95519	2822 Sandpointe Drive
Hilary Arakaki	96816	4268 Huanui St.
Leilani Sabzalian	97477	1166 Water St
Cali Dorsch	95521	355 Granite Ave. #4917
Norma Wilcox	95928	1998 Wild Oak Lane, Chico, CA
hazel holby	95988	610 e walnut street
Heidi Ramsey	96114	462-905 Jace Drive
Am Stenberg	95445	32500 S Hwy One
Sachi Kaneko	97401	532 Lincoln St. Apt C
Shaina Lerner	95501	1353 hoover st
Dominique Sirgy	94704	2833 Bancroft Steps
martha singer	96093	PO Box 3308
Lynn Hohenstein	30033	2975 Rosebrook Dr
Isabel Ayala	93263	590 Escalante Ave
E.V. Perez	78229	.
Cailin Riggs	95540	8th Street
Marcie Ligammari	95969	6100 N. Libby Rd.
Arvin Byington	93722-6344	3581 N. Sonora Ave. Fresno, Ca
Dianna Hunt	96003	20807 Lonita Trail

Name	Postcode	Address
Terry Lawhon	96067	1604 Everitt Memorial Hwy
Pat Lind	96019	4215 Fort Peck st
K Sloane	95542	320 Road L
Harriet Behm	97405	3189 Lincoln St
gaile carr	96067	1821 eddy dr
richard wilson	95521	1972 zehndner ave.
Doug Busch	95926	1332 Sheridan Ave., Apt. 2
Sarah Heaston	95928	1724 Beech Street
Sarah Ross	97405	1804 grantst
Cynthia Marconi	96067	214 Eugene Ave. Mt Shasta, CA
kevin connelly	94117	465 Scott Street, #3
Greg Taylor	95969	685 Van Fossen
John Roshek	96067	PO Box 1739
Charles Rauch	96001	791 Lakeview Drive
Dylan Cooke	94609	3911 clarke st
Laurel Heath	95926	645 Victorian Pk Dr Chico CA
darro grieco	95965	8 rocky drive, oroville
Dori Mondon	96067	1172b South Mount Shasta Blvd
James Nageotte	94707	1541 Portland Ave.
Martin Rivera	10456	Bronx, NY
Loraine Webb	95959	11110 White Oak Way
marion malcolm	97404	110 Mayfair Lane
Gayle Van De Koolwyk	96073	10715 Deschutes Rd
Sandra Hansen	96067	1010 Mc Cloud Ave.
Brian Paine	96094	2530 Dale Creek Road, Weed
Lana Fredrickson	95658	355 Lehi Ln
EUGENE SKWEIR	95519-9732	2902 McKINLEYVILLE AVE
karen reddin	96001	2611 sacramento dr.
Karli Nabours	96067	104 Siskiyou Ave
Mara Topazio	98227	4426 n haight ave
Kristina Groh	95971	P.O. Box 1147 Quinc. CA
Mary daniell	95928	9 Forest Creek Circle Chico,Ca

Name	Postcode	Address
Elizabeth Daniels	95926	305 W Lindo Avenue, Unit C
HD Sumner	96064	4033 Upland Rd. Montague, CA
Paul Hurschmann	95926	922 Karen Dr.
Gaylene Bartlett	95726	5656 Daisy Circle
Linda McVarish	95454	P.O. Box 575
Ruthie Maloney	95548	190 Klamath Blvd
Ellen Manchester	94114	870 Noe st
stephen lorenz	95954	14786 northwood dr magalia ca
Lori Crockett	96067	PO Box 768, Mt Shasta CA
kathleen gain parker	96001	1705 Garden Ave
Coral R.	98110	1400 Camosun
Emily Kandagawa	96717	53-658 Kamehameha Hwy, Hauula, HI
Carol Eberling	95926	555 Vallombrosa Ave. #63
Tony Silvaggio	95519	1741 Waters Ave
Reba Holt	32405	2802 Stanford Rd
Kathleen Klatt	95536	PO Box 583, Ferndale, CA,
Allison Ofanansky	13401	POB 134 Tzfat Israel
John V Thorn Hart	95928	235 W 22nd St.
John Saunders	95204	2151 N Yosemite St,
patricia daniels	95521	453 bayside court
Richard Zoah-Henderson	95503	3904 Cedar #B
Robin Singler	96057	610 Wetzel
Lisa Vandertuin	95521	5018 Valley East Blvd. #E
Janice Morrell	96003	1860 Del Mar Avenue
Victoria Vance	95524	582 indianola rd bayside
Melanie Lyon	94602	3386 Guido St, Oakland CA
Marilyn Traugott	96001	Redding, CA
geoff fricker	95928	11922 Castle Rock Court
River Stone	97214	11130 NE Knott Street
Rachel Duryee	96019	3046 Sioux dr
elvon douglas	96064	7005 sterchi lane
ray perkins	97211	po box 11895

Name	Postcode	Address
Christine Barto	96067	PO Box 1451
Linda Miilu	95928	2060 Amanda Way, Chico, CA
Sabine Engelhardt	72108	Neckarhalde 38/1
Catherine Siskron	97403	2446 Onyx Alley
Rhythm Mohab	94002	506 crest view ave #358,Belmont, Ca
Nina Kramerova	96001	F. Hecku 5
Pamela Check	95926-1475	2237-1/2 Ceres Avenue
Elizabeth Kuiper	95926	1126 Bidwell Ave
Will Parrinello	94965	31 East Pier
John Lynch	95501	1131 Hayes St.
Mark Stedman	95993	2846 art drive
Catherine Campaigne	94707	835 Peralta Ave.
CA Lonergan	94602	4370 Whittle
Javier Dura	95926	9 Savannah ln
Matthew Swisher	95603	1180 auburn ravine rd
Chief Jefferson Greywolf-Kelley	97351	P.O. Box 506 Independence, OR
Sourixay Vilalay	97236	13153 SE Duke St, Portland OR
Harriet Dooley	96726	Post office box 434 , honaunau
Rainer Neumann	94102	627 Taylor 16
Natasa Muntean	97218	Portland
Megan Corpus	04702	Australia
Kevin Coyne	95503	3426 N Street
Anke Zimny	10963	Schöneberger Str.19
hollis blume	60044	430 w. sheridan place
Richard Klein	96046	POB 180
kristin younr	97202	2827 se Colt dr. 455
TinaMarie King	95967	po box 3325
Connor White	94020	P.O. Box 474
Olive Franklin	95490	27860 Poppy Drive
Lisle Merriman	44122	Van Aken Boulevard
Voelm Jeanette	95608	3524 Dutch Way
David Hammond	95490	4205 Blackhawk Dr.

Name	Postcode	Address
dedree Drees	21228	800 S.Rolling RD
Joanna Kozanecka	05-200	Krolowej Jadwigi 13
Sherri Mitchell	30268	7250 Tiderace Court
Patty Hill	96025	box 334
Darlene Kirby	95954	POB 1427
Sondra m	96027	2408 Eastside Road. Etna, CA
Colleen Darling	93463	950 Ballard cyn
Michelle Fairchild	96001	5386 Rosswood Lane
michelle beaman	95971	pob 1473
john wieland	95490	3571 williams ranch road, willits, ca
Steve Gilmartin	94702	Berkeley, CA
Nan Siringer	95503	4794 Patricia Dr
Cory Andreatta	97504	830 Lawnsdale Rd
Stan Easley Wintu	97415	99379 North Bank Chetco River RD Brookings OR
Bunny Firebaugh	95223	P.O. Box 3544, Arnold
cecelia gates	96067	1020 Kingston Rd
Molly Waterbury	95973	10 Jillian Ln #1
Elizabeth McLeod	94037	Po box 370972, Montara ca
Jessica Spain	96088	33620 Short Rainbow Ln
Russ Greenlaw	96137	1116 Clifford Drive
Marily Woodhouse	96059	Rock Creek
Lillian Feierabend	96022	PO Box 1540
Joyce Smith	60108	66 Country Club Drive, Bloomingdale, Il 60108
Eric Stary	95519	2049 Sutter Rd.
Fiona McLeod	94708	980 Grizzly Peak Blvd
Forest Harpham	95521	1855 Margaret Ln
Aeun Toke	97405	Eugene
Anoma Vilalay	97266	5694 se tranquil ct. Milwaukie, or
Dianna Thrasher	96003	3497 Old Lantern Dr., Redding
Tina Ball	95519	1772 A ave
Jan Ivanoff	96080	PO Box 8053
Dawn L	60172	214Catalpa

Name	Postcode	Address
Paul Andrews	95407	17 Milicent w
Kevin and Kathy Casey	96067-2049	317 Shasta Ave
Prudence Ratliff	95503	3225 G Street
Johnnie Jones-Arant	32501	1507 E DeSoto St
Kim McCracken	95917	P.O. Box 907 Biggs, Ca.
Alan Blankenship	96094	16725 Friar Pl. Weed, CA
Herb Everett	97405	2155 Monroe St.
Victoria Howe	96041	po box 584
roxie harrington	54636	po box 401
Harry Blumenthal	95501	2773 Avery Ln
Wesley R Lachman	97405	3534 High St, Eugene
Patrick Harestad	95570	655 Ferncrest , Trinidad,CA
Alex Saneski	94971	Po box 292 Tomales, ca
Angelina Torrieri	96002	1835 Hartnell Ave #141
karina hornbuckle	96002	1835 hartnell ave #141
Nancy Powers	95525	po box 724
Marc Deveraux	95926	964 ellene ave
Mary Patterson	94705	3037 Fulton St.
Laura P	96073	8858 sun valley dr
Jim Freeberg	97520	POB 938
Eric Macy	96003	5884 Sierra Dr
doug Almand	95536	12 Weymouth Bluff Rd.
Ronald Hart	96067	965 Lassen Lane, Mt. Shasta
Lora Newton	96039	Happy Camp, CA
marcia rickert	96065	po 122 montgomery creek
Jessica Bathurst	11206	888 Myrtle Avenue #3B
Jain Elliott	97402	1439 W. 4th
sergio domeyko	94025	325 sharon park drive #609
justin graham	95589	561 muskrat cir.
chris Marrone	96067	PO box 156, Mt. Shasta
Danielle Gaynor	94602	Pleasant Street
Scott Fife	97401	342 W. 8th Ave. Apt. A Eugene, OR.

Name	Postcode	Address
John Abbe	97403	1680 Walnut St
Ellen Bryant	95503	3545 M St
Sant Khalsa	92405	2815 N. Arrowhead Ave
Emily Sachs	96001	1975 10th Street, Apt. 1
Barbara Mauk	96046	591 Pelletreau Ridge Road, POB 153
Jane Waite	97402	28346 rainbow valley rd
Jen DaParma	95502	PO Box 9042, Eureka CA
Patrick Walsh	95219	7008 Tucker Bay Ct.
C. ames	94114	525 Hill Street
Jay Youngflesh	49684	4356 Carlson Drive
Hildegard Williams	95501	1120 John Hill rd.
Charlotte Massey	95136	72 Park Sharon
Timothy Hart	95062	1415#A Seabright Ave. Santa Cruz CA.
Wayne Steffes	96001	2187 Wisconsin Avenue
Carolyn Hedger	96067	POB 2
mary seppi	95642	153 frontier, jackson, ca
Amanda Piscitelli	95603	109 Lincoln Way
Gemma Hunt	94708	1305 Bay View Pl.
Jackson Crane	94020	110 Canada Vista
Janet Jordan	98506	6702 Garrett Court NE
Shanta Gabriel	96067	PO Box 730
Rachel Whalen	94702	1271 Addison St.
Marta Spangler	07405	963 tiara crt
Madeline Dills	94702	2135 Curtis
Trina Blanchette	96003	1852 Del Mar Avenue
Linda Kehoe	96002	1076 Hawthorne Ave
Rebecca Nageotte	94707	1541 Portland Ave.
Barbara Hayes	95560-2366	PO Box 2366, Po box 2366
Rick Bligh	98271	13021 58th Ave NE
Thamar Wherrit	96067	P O Box 708
Joshua Gill	96002-5305	3945 Meadow Oak
Kevin Walsh	95831	1385 Munger Way

Name	Postcode	Address
Alida Booth	98292	26910 92nd ave nw
Andy Fusso	94965	49 Liberty Dock
Orli Ziv	94707	1880 capistrano ave
Caleen Sisk	96003	14840 Bear Mtn Rd.
vlad popescu	90293	7615 w 85th str
Mitchell Barrett	96994	16231 Indian Hill Dr
Paige Corich-Kleim	97401	1648 Alder Street
Meaghan McCrane	94707	1128 Amador Ave
R Aitken	94966	PO Box 171, Sausalito CA
Anna Marsh	96027	4628 Pine Cone Drive
Karl Koessel	95525	PO Box 257
Allan Wier II	46516	1913 E Jackson Blvd, Elkhart, IN
Terry Hart	96067	Mt. Shasta, CA
Pamela Webb	32725	1440 W. Wellington Dr.
holly lindsay	87110	po box 4659
Kathleen Kruczek	18706	319 Phillips st
Liz Veazey	97402	54 N. Adams St.
Brenden Price	95926	581 E. 5th Ave. Apt. E
Amanda Leal	72701	360 S Sang Ave. #2
Jenni Garverick	95826	2516 Notre dame drive
eric hodges	95965	4759 Larkin Road
Bruce Shoemaker	96025	6006 Butterfly, Dunsmuir, CA
Arlene Pantalone	96003	2173 Hope Ln.
christine riedell	94804	2120 sand dollar drive
Anna Tindell	87574	Tesuque
Miles McLeod	94708	980 Grizzly Peak Blvd
Laurel James	90068	6926 La Presa Dr.
Molly Hastings	95060	849 Almar Ave Ste C # 523
Meighan O'Brien	95519	1862 Bird Avenue
Marcel Ramos	14853	5561 Clara Dickson Hall
Isaac Butler-Brown	94707	1027 Merced. St.
Mary Ann Loconte	92675	27052 Paseo Burladero , Unit B San Jan Capistrano, Ca

Name	Postcode	Address
Anna Flom	60614	2510 N. Burling St.
Saldivar Teresa	78520	115 w los ebanos
Will Morris	94708	1083 Keith Avenue
Carol Upton	96069	30528 Smth Logging Rd
Penny Harris	96003	3188 Harlan Dr.
Josh Karon	94703	1340 Josephine st.
Patricia White	96024	P.O. Box 148
Ryan Benz	95502	PO box 3149
Alexia Warren	08502	103 Dominicus court Belle Mead, NJ
s rivka levy	84111	339 e 600 s. #1301
jacob wright	95971	po box 477
MAUREEN MCNEY	44145	26198 WESTWOOD ROAD
Paul Kivel	94610	658 Vernon St.
Joanne Krippaehne	96044	1801 S S Bar Ranch Road
Dona Blakely	95528	573 Golden Gate Dr.
Charlene Fershin	96013	37385 Oak View St
greg d	96067	no mail
William Webster	95966-9233	36 Westwood Pl
michael rohmer	96019	4842 main st
Elizabeth Leija	78212	727Carney Apt.D
Asa Burroughs	94707	1140 sutter St.
Alyssa Pace	94702	2769 Mathews st
Lorrie Emery	95060	9865 Empire Grade
Palomita Reza	98117	Seattle
Katie Zukoski	95928	1884 Humboldt Rd
Connie Bilton	96059	21645 Graham Road
Patricia Wilson Caine	95003	3050 Marlo Ct #9, Aptos, CA
Laurence Fitzsimons	96091	1234 5th
Britta Guerrero	95823	5500 muskingham way
Terrill Maguire	95501	3326 17th st
Lisa Red bear	98506	2148 bethel st NE
Larry Sheehy	95482	124 Ford St.

Name	Postcode	Address
Eva Rodriguez-choi	94702	2742 Mabel st
John Feissel	95928	1425 Locust St., Chico, CA
Ava Miller-Lewis	06459	45 Wyllys Avenue, Wesbox 92017
Pamela Hall	95945	14981 Greenhorn Road
tim Howard	95521	2162 heather ln, apt. 1
Jenefer Israel	95642	19000 Clinton Rd.
Samone Derks	98115	7756 4th ave ne
Sue Morrow	93422	6265 Portola Rd. Atascadero, CA
Lawrence Ray	95461	19035 Deehill
Michael Routery	94121	587 34th Ave. San Francisco
cooper walton	94704	2612 Piedmont Ave
Carly F	11205	Brooklyn
Gail Pyburn	96781	po box 286, Papaikou, Hawaii
Dr Paul Small	95963	4677 County Rd O
Leslene della-Madre	95472	1205 Enos ave
John Nesheim	93923	2486 17th Avenue
elizabeth wilson	96003	7480 dry creek rd
Anne Harrigan	95983	5514 Fir Fork
Jeannine Scow	96003	123 Any St. Redding, CA
Reba N	87010	POB 62
yvette Carrie	95618	3604 Arroyo Avenue
krystal rose	54603	927 vine st
Laurel Robinson	97603	3614 Crest
Creswell Cole III	95118	1577 Calle de Stuarda
Connie Israel	95203	1317 Yale Avenue
Ricardo Uruchurtu	84118	5260s 5200w Kearnes, UT.
Suzanne Stoddard	94530	608 Lexington Ave., El Cerrito, CA, 94530
Tim Sinnhuber	96064	121 n 9 th st
Lynda G Gutierrez	93455	624 Hummel Village cT. #D
Margaret Ann McGuire	96001	1339 Almond Ave, Redding
Terry Baker	96003	1927 Wineberry Path, Redding, CA

Name	Postcode	Address
Ashley Alexander	94530	754 Pomona Ave
Christine Doyka	95560	PO BOX 2502 Redway CA
Diane Ryerson	95521	1659 I Street, Arcata, CA
Kathryn Lorenzini	33334	1286 NE 30th St
Nile Nugnez	10126	53 Woodsford
steve plummer	44221	1039 broad blvd, cuyahoga falls OH
jeremy goddard	95662	7056 almond avenue orangevale, ca
Jeff Shamansky	96057	po box 193 McCloud CA
jane wilson	95521	1972 zehndner ave. arcata,ca.
arthur taber	96007	17940 shawn dr anderson ca
Bobby and Michele Jones Family	96093	PO Box 598,Weaverville,CA,
molly mancasola	96001	10184 grand forks ct
mandy ashe	55941	522 3rd st
George Stevens	95573	Willow Creek
Kit Clements	95503	3127 P St.
nicole cruz flynn	89501	590 lake st #225
Melanie Scouten	96001-9662	11085 Iron Mountain Rd.
R. Max Creasy	95568	2117 Ti Bar Road
William Briggs	95536	,
Andrew Salenti	10126	11 St Martin's Close
Jessica Woodard	94707	2418 24th St
andrew goring	94705	40 hazel rd
Susan silverman	85717	po box 40743
Lynn Lloyd	96067	117 N. A Street, Mount Shasta, CA
B Lesley	95519	750 Gross
Annie Becker-Arnold	47274	10650 N. State Rd. 11
Olivia Seulement-Provol	97402	170 N Jefferson
Peter Josefsson	96003	11455 Ridgewood Rd.
David Bruce McCalib	96064	4500 Black Mt. Rd.
Sandra Mann	97477	306 F St., #5, Springfield, OR
Sally Toy	91744	1136 Clintwood Ave

Name	Postcode	Address
Athena Arcayan	93003	99 Redwood Cir Ventura Ca
Wolfgang Rougle	96022	16395 Ridgewood TRd
Daniel Wesley	96019	1225 mussel shoals ave
Wendy Talaro	91331	10849 Ralston Avenue
melinda parks	96009	pob 204
Eula Moffett	95973	3378 Nord Ave, Chico, ca
Liz Laury	93602	pobox 241 Auberry, CA
Susan Durosko	95758	5817 Laguna Trail Way
Cindy Winter	80816	PO Box 2
Barbara Marden	96025	6011 Sacramento av
Diane Wormood	95969	6811 Leone Wy
Eli Andersen	97227	3830 N. Borthwick
ken lengel	96073	9
Mark Mohtashem	94960	6 Angela Ave, San Anselmo
Brian Letts	95521	1041 Larry Street
Jane Waters	98569	PO Box 1554 Ocean Shores WA
Curtis Presley	98624-9088	PO Box 402
Shanthi Gordin	97720	636 S Egan Ave
Coleen Scholfield	96001	1616 Willis St #1, Redding, CA
Joe Gonzales	93455	2410 Village Green Ln.
Jack Johnson	53511	1651 Sun Valley Drive
Ruth Koenig	97405	1204 W. 28th Ave
Anna Herrera	95037	16740 Dry Creek Ct
Janet Warren	92111	3134 Old Bridgeport Way
Craig D. Glasser	95954	BOX 191
sherry kamer	31625	2578 cooper rd
ROGER CROPLEY	04457-5713	457 South Chester Road,Apt.1A
Gary Donovan	95490	Perch
leslie armknecht	95965	4189 backache road
Sioux Garnier-Stanley	47340	8416 W 300 N, Farmland, Indiana
Bonnie Shand	95524	560 Hidden Valley Rd., Bayside, CA
Glen Goodsell	92677	95 fairlane

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Anne Wallach Thomas	96073	10340 Lone Goose Lane
Beverley Bonniksen	97477	3550 Valentine Ct
Denise Ross	95819	5721 Monalee Avenue
Janet Eidsness	95524	2488 Sonnenfelt Road
Sarah Jensen	95928	10 Tilden Lane
Diana Simmons	96094	16725 Friar Place, Weed, CA
Laurie Lingemann	96048	POB 419
Harriet Edith Roberts	97403	2510 Woodland Dr.
Denise Downey	95524	2266 Jacoby Creek Rd
Sam Steuart	94705	35 Oakvale Ave Berkeley CA
D Harton	96025	6901 Dunsmuir Avenue
Kevin Lynn	94707	1622 Hopkins St
NAOMI Stout	19057	27 Valley Rd
John McCamant	94127	579 Mangels Ave. SF, CA
ryan holt	19057	27 Valley Rd
JC CALLAHAN	08057	100 E CAMDEN AVE
Nancy Keiber	95521	1523 Chester Ave Arcata, CA 95521
Grace Winters	74647	113 East third
Destiny Hornbuckle	96002	1835 Hartnell Ave 141
Stephen Meno	06905	19 Rapids Rd
Adam Marlow	97202	1124 SE Umatilla St., Portland OR
Everett Mitchell	65625	708 Wildwood Dr
Janine Keluche-Jordan	97487	25200 Irenic Ave
Daniela Rihova	95112	370 N 4 st #6
Robert Morrow	93422	6265 Portola Rd Atas.
Amy Raven	97402	1885 W. 15th Ave., Eugene OR
Phyllis Hockley	97402	220 N Adams #2
Barbara King	95616	1549 Santa Rosa St, Davis, CA
thomas rumsey	95670	2909 hunt drive rancho cordova
Kristian Boose	98103	1802 N 54th ST
Pamela Fischer	94518	924 San Miguel Rd

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Jason Balkenbush	95968	2620 Williams Ave
Molly clinehens	96067	714 Lassen Lane
Patricia Cole-Burrell	96003	833 July Way #1
Stan Taylor	97405	1905 Taylor St., Eugene, OR
Wendy Coburn	97401	265 W. 8th. St., Apt. 502
Nancy Pernell	96087	PO Box 189
Allen Baker	95521	1887 Sorrell Circle, Arcata, CA
Jennifer Rice	95501	2404 17th Street
Julie White	05536	7005 Upper Bear River Rd
Lethea Erz	97405	195 E. 38th, Eugene, OR
Faith Strailey	95971	PO Box 3012
Susan Quash-Mah	97405	Eugene
Linda Mays	95060	208 Blackburn St.
Rouanna Garden	97402	3690 wood ave
Patricia Davis	95954	13645 West Park Drive
Linda Serrato	95973	3052 Snowbird dr
Sandr Paris	95519	70 E. Ridge Lane
Mariana Quinn-Makwaia	10003	58 E 1st st apt 5D
Snake Harrington	97477	496 1/2 West D Street
Evelyn Schumacher	96021	Corning
William Gelonek	96002	4540 Bechelli Lane Redding, Ca
Kathleen Warren	94513	2178 St Michaels Ct
randy weaver	95503	3225 G Street, Eureka, CA
Kayla Godowa	97402	30063 federal lane Eugene, Oregon
Joy Hunt	96067	PO Box 1387
Kay Simenc	95928	12608 Centerville Road, Chico CA
Roscoe Caron	97405	840 W. 22nd Ave.
Marci Gordon	97403	2609 Fairmount Blvd. Eugene, OR
Jeffrey Long	94903	119 Schmidt Lane, San Rafael, Ca
jessica eden	95524	po box 533
Geoff Gordon	97403	2609 Fairmount Blvd. Eugene, OR
John Mastalski	96003	1095 Hilltop Dr # 339

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Morgan Morningstar	96094	9116 N Old Stage Rd
Ernesto Elias	85364	326 S 45 Avenue
Doug Perske	95973	156 Bull Creek Lane
bruce jones	95969	paradise ca
Dana Edwards	92058	1426 Olive Street
cherry scanlon	96086	po box 511
Charmaine Mcdarment	93257	37 chimney rd
Catherine Burns	63105	7508 Oxford
Dania Colegrove	95546	531
Jack Potter jr	96002	8115 Adra rd redding ca.
Patricia Lawrence	96073	PO Box 800
Howard Isaacson	94110	2763 23rd st San Francisco,CA
Barbara Miller	65466	Hcr. 2 Box 174 Eminence, MO
Zoe S	95630	1189 Boxelder Circle
monique authelet	86336	po box 1208 sedona az
Lisa Holcomb	97478	1033 57th Street
Dee Ko	02115	Fenwood rd
Jared Laiti	95835-2034	81 Cognac Circle
Ms. Houghton	98144	1348 14th Ave S
Lara Beaston	97477	1590 Hayden Bridge Rd
Teresa Wicks	97533	PO Box 278 Murphy, OR
Marie Morohoshi	94110	549 Andover Street
Miranda Hart	95562	80 Humboldt Ave.
Laura Duttweiler	95519	1813 ashdown ave
Andrew Borst	49348	683 132nd ave
Miakah Nix	97402	1709 Grant St
Karen Starr	05667	PO BO 294
Barbara Ulbrich	96067	110 north a st.
yerda Berger	92240	9676 Del RAy Ln
Cody Pata	96825	Honolulu
Matthew Gorsky	05143	1929 Dean Brook Rd

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India Bowers	94110	3425 23rd st.
Patricia Halleran	97520	309 Hillcrest Street
evam reed	95521	389 4th st apt C
Warren Carlson	96073	Box 1279, Palo Cedro CA
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Theresa Scroggin	97520	96 Wightman
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Dana sosa	32244	8369 homeport ct
Cynthia Arnold	75043	4501 Chaha Rd., #104, Garland, TX
Lisa Geddes	65803	2222 N. Delaware Ave
John Etter	97205	2211 SW Park Place Portland
Marsha Brown	95969	1749 Eden Roc Dr
Kathleen Young	60440	15S Fernwood Drive
Buffy McQuillen	96531	115 harborview dr
LMarie Avila	66044	1440 Prairie Avem
rianna humble	96003	655 Hilltop Drive 103
Lyla Johnston	87571	337 Linda vista lane, Taos, NM
Catherine Miller	72687	1232 MC 8083
Lori Napoli	76051	500 N Dove Apt 515
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Manuel Vargas	95018	1189 Lompico Rd
Judy Cassidy	96019	17606 Foursquare court
Melissa Leal	95821	2792 Pope Avenue
lemuel charley	97478	91070 sunderman rd
FRED R. COPE II	19104	3209
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Deborah Babcock-Abbott	95670	10685 Coloma Rd #85
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Joanna Davis	94501	523 1/2 Santa Clara Ave.
Jackie Woodall	94565	1533 Woodland Dr. Pitts. Calif.
Melissa Sherrill	35475	15240 Four Winds Loop
Stacey Ducharme	96067	514 Sarah Bell St.
lisa keller	94553	2330 west shell st
Gloria Toby Jones	98271	Tulalip Wa.
Briana Plank	95521	4786 Valley East Blvd Apt D
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Catherine Windsor	97501	345 Ogara St
Beckey Jones	30534	337 Wildwood Ct Dawsonville, GA
Andrej Sredanovic	96025	4509 Needham Ave
Elizabeth Cohen	97438	39701 Little Fall Creek Rd
Wendy Lange	55437	9901 Harrison Rd.
Melinda Thomas	97487	Bolton hill rd
Tyler Kerce	92626	2864 Inroz Dr.
alia stenback	94938	99 E CINTURA
Amy Metzger	97437	23911 Warthen Rd
Constance Newman	97402	894 W. 4th, Eugene, OR
John Foster	96064	14015 Ager Beswick rd.
Melanie Guther	94704	10 Mosswood Rd
Rebecca Hilliard	94132	306 Font Blvd
Elaine Phillips	97402	1075 W. 18th Avenue
Nichelle Garcia	94403	1309 Overland Drive
Don Hankins	95942	PO box 627
Yvonne Griffin	97402	1473 Mckinley st
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Joseph Spaulding	94117	926 Oak St.
Gregg Castro	95111	5225 Roeder Rd San Jose, CA
Tim Herman	17033	312 Clark Road
Elizabeth Hankins	95942	PO Box 627
Ilis Chavez	93615	13665 Ave. 392
Gina Fink	94509	3319 Serpentine Dr
Jadwiga Reinke	96001-1114	846 Yuba St.
Domingo Garcia	94403	1309 Overland Drive
Miguette Sanogundo	95928	1431 Mulberry st, Chico, CA
Sherrie Porter	78704	3204 Manchaca Rd #701

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Mary Almansa	95531	po 1763
Mareike Anders	96067	1441 deetz
Elizabeth Ordway	94132	306 font blvd
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Mycah Williams	92024	125 Diana Street
Michael Clemens	95969	5931 Larissa Ln.
Barbara Whitney	98133	14701 Dayton Ave N 3114
A Patricia Wright	92626	1111 South Coast Drive G104, Costa Mesa, CA
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Leau Gurevitz	97401	1648 alder st
Larry Morningstar	97520	c/o PO Box 3465
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Donna Davis	95124	1804 Lencar Way San Jose
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Paul Dix	59047	208 South K Street, Livingston, MT
Sandra Shevel	44273	160 W. Greenwich Rd.
melissa hernandez	91911	311 east palomar street
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Sue Buckley	95519	141 Kingston Rd
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karen harris	80480	407 5th
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Nancy Harmon	96067	P.O. Box 745
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Erik Johnson	49009	5823 West Jefferson Commons, Apartment #101
Christy Sherman	97408	2515 Benson Ln
Jeannine Grizzard	97520	698 Roca st
Devon Pena	98155	1840 NE 177th St Shoreline
Jane Farrell	97405	1855 W 28th Ave
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Jackie Sheggeby	95502	PO Box 874
laura winner	95966	1275 cox lane
Diana Tuggle	96002	1803 Vega St
Elizabeth Sabel	94618	5850 Birch Court #2
Kristine Wyndham	94602	1379 El Centro Ave
Jim Brobeck	95926	1605 Manzanita
martha santiago	95608	5325 el camino avenue
Anne Ryan	18847	58 Maiden lane
David Arnold	96003	2013 Hedgerow Ave

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Stephanie Turner	97206	512 Mill Street
Kevin Cheli-Colando	95521	4514 Valley West
Grace Sesma	80466	Nederland, CO
MG Hanley	96067	Brush Street
Claire Knox	95519	1915 Cliff Ave, McKinleyville CA
Andrew Royer	96019	1911 Locust Ave
Linda Allen	96003	11441 Rugby Hill
vincenza scarpaci	97401	1090 Corydon St.
Michael Pottinger	95521	320 10th st.
Susan Cashman	95524	Bayside, CA
Anna Ward	97526	1975 Sarartoga Way
Susie Miller	75106	p o box 2312
Marianne Bithell	95521	1019 Alder Grove Road
Mollie Kjenaas	95746	4120 Douglas Blvd
Tarra Neff	97501	7000 Griffin Creek Rd
Kendra Howard	97405	1959 Jefferson, Eugene, OR
Paulette Connor	44134	5620 w24th str. Parma Ohio
Daphne Martin	95410	Albion, Ca
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T Murfin	95501	2524 harrison avenue, eureka
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Rachel Caspary	95926	1421 1/2 Hobart St.
Gail Babich	95589	200 Cougar Rd
Tamar Danufsky	95521	980 Union St.
Beth Livezey	96088	Shingletown, Ca
steve crossman	95490	1644 Crawford Drive
Michelle Donaldson	94122	1727 43rd Ave SF CA
Nocolette Swan	97404	886 Tyler St
Nicki Dillenbeck	97478	205 S 54th St. Springfield Or.
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Cameron Knutson	99024	600 kelton av
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Ernesto Moreno	90005	861 Fedora Street, Los Angeles, CA
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Claudio Freixas Jr	95501	2121 Albee St
Ziaa Szymanski	94611	6114 La Salle Av , Oakland
curtis harvat	55404	2418 ogema place
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William Anderson	96094	3600 Eddy Creek Rd.
Regina Cole	97603	1421 Homedale Rd
Jay Baker-French	95521	986 C St.
rachel mckay	94960	124 Laurel Ave
Jack Neff	90049	PO Box 491272
Robert Wade	95971	PO Box 1240
Misty Johansen	96155	PO Box 550803
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eliot tigerlily	95542	906 redwood dr
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Todd Alberts	96093	50 Bartlett Lane #25
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Kelsey Watson	96067	1632 Christian Way
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Noel Wolfe	95067	306 McCloud ave
Gloria Decater	95428	25451 East Lane
corrine Lewis	89406	8728austin rd
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Michael Singsen	94708	1404 Summit Road, Berkeley
layla feghali	91326	11660 porter valley dr
Natalie Ortiz	96067	1634 North Old Stage Rd
Ben Cody	98418	3618 Tacoma
Campbell Derral	96002	7154 Robles Drive, Redding CA
Janet Johnson	95926	1384 Spruce Avenue
Lorraine Luna	95691	2860 canvasback way
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Gene Dunning	95942	POB 422, Forest Ranch CA
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nonnie welch	94956	12307 sf drake
Jennifer Gulick	94510	136 Dartmouth Pl
Aidan Dunn	94103	134 Duboce Ave., #11
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Atta Stevenson	95454	general delivery
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Michaela Herbert	96067	303 Eugene st
vugil linda	85795	3461 n flowing wells #5
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Della Martin	96003	300 Elk Drive
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cassandra compton	95448	530 fitch st
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Erin Lee	94109	640 Post Street #502 San Francisco, CA
Heather Schwarzenberg	96067	1511 Holiday Lane
Candy Petersen	89128	1517 Bellglen Dr.
Michael Gannon	97440-2324	Box 10324, Eugene, OR

Responses to Comments from Sacred Land Film Project

SLFP-1: Please refer to Master Comment Response GEN-5, "Some People Support Dam Raise and Others Oppose Dam Raise."

SLFP-2: Please refer to Master Comment Response CR-1, "Potential Effects to Cultural Resources," Master Comment Response CR-8, "Native American Connection to Salmon," and Master Comment Response EI-1, "Intent of NEPA Process to Provide Fair and Full Discussion of Significant Environmental Impacts."