

Figure 19. Lake Oroville trails. (Source: DWR, 2005a) Page 3 of 3

Table 44. Trails and trailheads at and near the Oroville Facilities. (Source: DWR, 2005a, appendix I, as modified by staff)

Name of Trailhead or Trail	Use		Access	Health & Safety	
	Miles of Trail	Allowable Uses	Vehicle and Vehicle/Trailer Parking Spaces	Restrooms	Trash Receptacles
Trailhead Access Sites					
East Hamilton Road trailhead access	--	--	About 5 vehicles	0	0
Toland Road trailhead access	--	--	Undesignated; about 10 vehicles	0	0
Tres Vias Road trailhead access	--	--	Undesignated; about 10 vehicles	0	0
Lakeland Boulevard trailhead access	--	--	Undesignated; about 30 vehicles, about 10 vehicle/trailers	1 (portable)	0
Saddle dam trailhead access	--	--	Undesignated; about 40 vehicles, about 15 vehicle/trailers	1	1
Trails					
Bidwell Canyon trail ^h	4.9	Bicycles, hiking	477 ^a	2 ^a	3 ^a
Brad B. Freeman trail	44.7	Bicycles, hiking ^b	Various	--	--
Chaparral Interpretive trail	0.3	Pedestrian	107 ^c	2 ^c	6 ^c
Dan Beebe trail	14.6	Equestrian, hiking	Various	--	--
Loafer Creek day-use/campground trail	1.6	Hiking only	251 ^d	2 ^d	2 ^d
Loafer Creek loop trail	7.1	Equestrian, hiking ^e	251 ^f	1 ^f	11 ^f
Sewim Bo trail	0.5	Multiple-use	25 (2 accessible)	0 ⁱ	0 ⁱ
OWA trails	Unknown	Multiple-use	Various	0	0
Potter's Ravine trail	10.0	Multiple-use	468 ^g	2 ^g	1 ^g

Name of Trailhead or Trail	Use		Access	Health & Safety	
	Miles of Trail	Allowable Uses	Vehicle and Vehicle/Trailer Parking Spaces	Restrooms	Trash Receptacles
Roy Rogers trail	5.7	Equestrian, hiking ^e	251 ^d	2 ^d	2 ^d
Wyk Island trail	0.7	Hiking only	477 ^a	4 ^a	3 ^a

Note: -- — there is no facility or that the category does not apply.

^a In the Bidwell Canyon area.

^b Horses currently allowed on some segments, proposed for others.

^c At the Lake Oroville Visitor Center.

^d In the Loafer Creek day-use area.

^e Portions proposed to be multiple-use.

^f In the northern Loafer Creek area.

^g At the Spillway area (upper parking area).

^h Proposed to be multiple use (including equestrians).

ⁱ Facilities are provided at the Feather River Nature Center, which is outside of the project boundary.

Equestrians using the Dan Beebe trail may access the trail from the west at the Lakeland Boulevard trailhead, travel east along the south bank of the Thermalito diversion pool to the south of the Oroville dam, and then travel to Kelly Ridge point and south to the west side of Saddle dam. The Roy Rogers trail, originating to the east of Saddle dam, provides equestrians with a flat loop trail that passes by the Loafer Creek day-use area, the Loafer Creek group camping area, and many historical sites, including an old settler's cabin and the remains of an old water flume. Equestrians may also use the Loafer Creek Loop trail, which circumnavigates the Loafer Creek area passing the group campsites and the horse camp.

Recreational Use at the Oroville Facilities

Historical Use Levels

Official DPR estimates of visitation at the Lake Oroville State Recreation Area are available on a fiscal year basis (July through June) for the period 1974–1975 to 2000–2001. Lake Oroville State Recreation Area is 1 of 13 widely separated units in DPR's Northern Buttes District. The estimates represent a compilation of daily use data from various park units into monthly and fiscal year totals, and therefore are comparable to recreation day (which represents participation in recreation at a site during a single calendar day by one person for any length of time) estimates of current use. Lake Oroville State Recreation Area encompasses the majority of the land and waters within the project boundary and includes all of the Lake Oroville, Thermalito diversion pool, and Thermalito forebay recreation sites and surrounding lands and waters. The visitor use data also includes visitation at the Clay Pit State Vehicular Recreation Area since fiscal year 1996 to 1997. Historical visitation data are not available for Thermalito afterbay and the OWA because these data were not regularly collected by the two managing agencies, DWR and DFG, until about 1997.

The annual average total visitation across the 27 years for which data are available was about 650,000 recreation days. Although considerable variation is seen in the data, for most years, total visitation to the Lake Oroville State Recreation Area was between 500,000 and 700,000 recreation days. Attendance peaked during fiscal year 1980 to 1981 at over 950,000 recreation days and was over 700,000 recreation days for several years around that time. The lowest attendance was recorded for fiscal year 1983 to 1984 with just over 320,000 recreation days. However, investigation of the very low attendance estimate for fiscal year 1983 to 1984, for the purpose of relicensing studies, yielded the conclusion that the estimate may not be accurate and is most likely a result of counting problems. The next lowest attendance estimate was about 472,000 visits for fiscal year 1997 to 1998, and attendance was only slightly higher for fiscal year 1991 to 1992 with about 477,000 visits. Fiscal year 1991 to 1992 fell in the midst of a multi-year drought, which had severely reduced the water levels in Lake Oroville. Statistical modeling performed for the Projected Recreation Use Study established that pool level in Lake Oroville was positively related to attendance at Lake Oroville recreation sites. Attendance appears to be on an upward trend since the low in fiscal year 1997 to 1998.

2002–2003 Estimated Annual Use

The existing recreational use study estimated recreational use at the Oroville Facilities by site and divided use at each site by activity (DWR, 2004u). The following describes the total amount of use by each activity at each major geographic area within the project boundary according to the popularity of each activity. Estimates of use by activity were made based mainly on observational data;⁷³ professional

⁷³ Traffic counter data from 24 recreational sites, trail counter data from 10 locations and 651 spot counts were conducted at developed recreational facilities over the 1 year period on holidays, weekend, and weekdays during the recreational season and in the off-season.

judgment and informal observations were used where necessary. Estimates of use are for the period from May 15, 2002 to May 14, 2003. Activities included in estimates were bank fishing, boating access, camping, sightseeing, hunting, picnicking, swimming, and trail use. The term “boating access” is used because boating activities do not literally occur at the site; the site provides access for boaters to the body of water where boating activities actually take place. Sightseeing includes activities such as driving for pleasure, touring sites, or looking around. Picnicking also includes the activities of resting and relaxing.

Boating—Boating was the most popular activity in the project boundary. At Lake Oroville, 45 percent or about 411,011 recreation days were reported as boating. Boating was also popular at the Thermalito afterbay, where 52,557 recreation days, or about 56 percent of use at the afterbay, was boating access. Boating was not as popular at the Thermalito forebay (10 percent of use/14,234 recreation days), at the Feather River or ponds within the OWA (8 percent of use/25,021 recreation days), or at the Thermalito diversion pool (4 percent of use/729 recreation days) as it was at Lake Oroville or the Thermalito afterbay.

Angling—Angling by boat was included in the estimate for boating; however, the amount of bank angling was estimated separately. Bank fishing was the third most popular activity overall within the Oroville Facilities. Bank angling was extremely popular in the OWA compared to the rest of the geographic areas within the project boundary. About 67 percent of the use within the OWA was estimated to be bank angling, equivalent to 213,709 recreation days. Almost one-quarter (24 percent) of use at the Thermalito forebay was estimated to be bank angling, equaling about 32,110 recreation days. About one-fifth of the use, or 4,371 recreation days, at the Thermalito diversion pool was estimated to be from bank angling. Bank angling accounted for less than 10 percent of total use at Lake Oroville (5 percent/48,145 recreation days) and at the Thermalito afterbay (4 percent/3,992 recreation days).

Trail Use—Use of specific trail segments by number of people and trail use at trailheads were estimated by DWR. Data were collected using infrared trail counters and DWR, in some cases, used professional judgment to adjust these data. The report states there was not enough data to determine the proportional use attributed to different types of trail use (e.g., bicycling, equestrian, hiking). DWR reports some data collection methods and equipment provided incomplete or inaccurate data, resulting in compromised accuracy and reliability. Some of the circumstances DWR encountered included: (1) August 2002 data included only 8 days of data; (2) trail counters were relocated because of vandalism and theft; (3) some of the recorded use could have been attributed to animals where specific conditions required installing instruments close to the ground; and (4) some recorded use could have been attributed to shoreline campers and boaters rather than trail users. DWR also reports that they assumed all trailhead use was attributable to trail use even though some visitors also engaged in other activities such as fishing or picnicking.

In addition, during the study period 2002 to 2003, some trails were designated for uses that were not consistent with the approved project recreation plan. DPR changed some of the trail designations from hiking and equestrian-use only or hiking and bicycle-use only to multiple-use on March 1, 2002. Consequently, the trail use data was collected under different conditions than what is allowed under the project recreation plan and what currently exists on the ground. In 2003, DWR filed a request to amend its approved project recreation plan to reflect the modified trail use designations. The Commission received hundreds of letters from recreational trail users, some opposed to and other supportive of the trail use modifications. In an order issued August 17, 2004, the Commission denied DWR’s request and this action returned the trails to their original designations. Generally, DWR characterized the trail use in the study area as relatively low. Use data show that the highest trail use occurred in October, with about 50–60 people using specific trails within the FERC project boundary on peak days. This is an average of 5 people per hour, a relatively low level of use as compared to other activities. The lowest trail use occurred from mid-December through mid-March, with no use recorded on many days and peak daily use of 10 or fewer people on representative trail segments. As for use at trailhead sites, this accounted for only 1 percent of total use at Lake Oroville (4,690 recreation days) and the Thermalito afterbay (891

recreation days). However at the Thermalito diversion pool, half of the use was estimated to be from trail use (10,403 recreation days). Trail use accounted for about 3 percent of total recreation days within the Oroville Facilities.

General Day Use—DWR estimated the levels of use attributed to three general day-use activities including picnicking, sightseeing, and swimming. Sightseeing was the second-most popular activity within the Oroville Facilities, picnicking was fourth, and swimming was fifth. Combined, these activities were most popular at the Feather River Fish Hatchery, where 100 percent of use was attributed to general day-use activities (160,395 recreation days). General day-use activities were also very popular at the Thermalito forebay, where 62 percent of total use, or 85,034 recreation days, accounted for these activities, owing in part to the very popular swimming lagoon at the North Thermalito Forebay day-use area. This lagoon is one of the only two formally designated swimming areas within the FERC project boundary. Over one-third of the use at Lake Oroville (36 percent/ 328,109 recreation days) and the Thermalito afterbay (38 percent/35,928 recreation days) was attributed to picnicking, sightseeing, and swimming. One-quarter of total use, or 5,100 recreation days, at the Thermalito diversion pool consisted of these three activities. At the OWA, 22 percent of total use was estimated to be from these general day-use activities, equivalent to 70,866 recreation days.

Camping and Other Overnight Use—Camping primarily occurs at Lake Oroville, where all of the developed campgrounds are located. Only 7 percent of the total use at Lake Oroville was estimated to be from camping, equivalent to about 62,300 recreation days. There was also low use of the en-route RV camping at the North Thermalito Forebay day-use area (39 recreation days) and the Spillway day-use area (91 recreation days, included in Lake Oroville total). Overall, camping was the sixth most popular activity at the Oroville Facilities, accounting for about 4 percent of total use.

Other Recreational Uses—There are four other main activities for which use estimates were generated, including hunting, walking, target shooting, and OHV use.

Most of the hunting at the Oroville Facilities occurs in the OWA, including the Thermalito afterbay portion of the OWA. Hunting access at these areas occurs at three main locations: the west and east levee roads in the south portion of the OWA, and at the three trailheads near the Thermalito afterbay, including the South Wilbur Road trailhead, the Toland Road trailhead, and the Tres Vias Road trailhead. Hunting accounted for 27 percent, or 4,995 recreation days, of total use at these trailheads. Within the OWA, hunting only accounted for 3 percent of total use, or 8,866 recreation days. The percentage of total use is low in part because hunting is seasonal with most hunting occurring between October and January. Hunting is also allowed in the more remote parts of the Lake Oroville State Recreation Area away from developed recreational areas. However, DWR reports that the level of hunting activity is low there because not much land is available for hunting within the generally narrow band of the Lake Oroville State Recreation Area surrounding the lake. Most hunting likely occurs on adjacent public and private land.

Walking use tends mostly to occur at the Oroville dam overlook day-use area and North Thermalito Forebay day-use area. Because of its proximity to the Kelly Ridge residential area, its views of the reservoir and Sacramento Valley, and the mile-long crest with pedestrian walkway, the Oroville dam is a popular place to walk, jog, and bicycle. There were an estimated 56,930 recreation days associated with walking, jogging, and bicycling across the dam. At the North Thermalito Forebay day-use area, walking generally occurs on the path around the swimming cove. The north forebay is located fairly close to residential areas and therefore receives many local visitors who enjoy walking there. There were an estimated 4,303 recreation days from walkers at the North Thermalito Forebay day-use area.

Oroville Facilities Visitor and Visit Characteristics

Most visitors to the Oroville Facilities are regular visitors to the area (three or more visits per year) and most visit during the spring and fall, as well as summer. Greater than 60 percent of visitors

surveyed were from Butte County or an adjacent county, and nearly all of the remaining visitors were from elsewhere in northern California.

Visitors to Lake Oroville, where most camping facilities are located, were fairly evenly divided between day and overnight users. In contrast, 60 to 90 percent of visitors to other parts of the Oroville Facilities were day users. Most overnight visitors stayed 2 or 3 days, and most stayed in campgrounds or with family and/or friends. Nearly 90 percent of visitors from Butte County and the adjacent counties were day users, with visits averaging 4 to 6 hours in length, while most visitors from more distant locations were overnight visitors. About one-quarter of visitors surveyed at Lake Oroville also planned to visit other portions of the Oroville Facilities, and about 30 to 45 percent of visitors to most downstream areas planned to visit Lake Oroville sites.

Group sizes at most areas averaged 2 to 4 people. Large groups were more common at the Thermalito forebay, where the median group size was 7 people. Proximity to their homes and desirable natural resource features such as high water quality were the predominant reasons for visitors to come to most of the Oroville Facilities, while fishing opportunities were the predominant reason among OWA visitors. Oroville Facilities visitors participated in a wide range of activities, but water-based recreation, such as motorboating, water-skiing, swimming, and angling, were the predominant activities in most areas. Other important activities, in particular at the Thermalito diversion pool and the Feather River, were trail walking/hiking, biking, and horseback riding. Sightseeing, picnicking, and general relaxing were also important at many areas.

Existing Recreation Capacity

Boating—Results of the Reservoir Boating Study indicated that boat traffic is moderately dense on Lake Oroville during peak season holidays, and many additional boats spend time moored on or near shore, where there may be competition for mooring sites (DWR, 2004v). Study results also determined that the typical length of time boaters wait to use the ramps is not excessive, although waits of 20 to 30 minutes may occasionally occur at peak use times. Observation of peak holiday weekend launching at the spillway boat ramp, the largest such facility on the reservoir, indicated that back-ups at the ramp were minimal and waits were short, averaging about 9 minutes in length. Corresponding with these conditions, boaters' perceptions of crowding and conflict problems on the project reservoirs were low, and these problems appear to be short-term and localized where they do occur, typically only during holiday peak use conditions.

Facility capacity limits affect recreational access at Bidwell Canyon, where boaters frequently cannot gain access to the boat ramp during high-water summer weekends and holidays due to lack of parking. This is in part due to insufficient marina parking at Bidwell Canyon Marina, where marina boaters park their vehicles in parking spaces for vehicles with boat trailers in the boat ramp parking lot. This problem is particularly acute when reservoir pool levels are high as additional marina parking becomes available in the fluctuation zone as the pool level falls. The boat ramp and marina parking is commonly full to capacity by mid-morning on some weekends, causing arriving visitors to be turned away. Boaters wishing to launch a boat can instead drive three miles to the spillway boat ramp, where ample parking is available. Marina boaters may park in the adjacent residential area and walk to the marina.

Parking capacity for boaters wanting to launch their boats at Lime Saddle is also an issue during some peak use periods. The parking areas are shared by boat ramp users and those with boats moored at the marina. As observed at Bidwell Canyon, parking spaces for vehicles with trailers are often used by marina boaters due to an insufficient number of spaces for single vehicles. Additional parking is available at a gravel overflow lot before the entrance kiosk.

Camping—Average of campgrounds during summer recreational season weekends, the peak use period,⁷⁴ generally was not high during the relicensing study period, averaging about 50 to 60 percent at most sites. An exception was the Loafer Creek group campground, with an average occupancy rate of over 80 percent, and near 100 percent occupancy during July and August. The floating campsites also had high occupancy rates, ranging between 84 and 94 percent on both weekdays and weekends through the summer months. The Lime Saddle Group Campground and Loafer Creek Equestrian Campground had low occupancy rates below 35 percent during the summer recreational season. Equestrian campground occupancy was higher during the spring and fall, when trail riding conditions were more favorable. Occupancy at all campgrounds may be higher during years with more consistent high reservoir pool levels than existed during the relicensing study period.

Day Use—Use of the developed day-use facilities at the Oroville Facilities was generally moderate, and crowding problems were not found. However, use of the largest day-use area on Lake Oroville, the Loafer Creek day-use area, was greatly reduced during the study period by low reservoir water levels. Use of the North Thermalito Forebay day-use area, the largest such facility at the Oroville Facilities, exceeded parking capacity only occasionally during peak holiday periods, which included Memorial Day, Independence Day, and Labor Day weekends.

Angling—Boating activity on Lake Oroville is generally low during the off-season,⁷⁵ which is the period when most angling occurs. Anglers on the project reservoirs had few complaints about crowding; however, bank and boat anglers in the OWA and on the low flow channel expressed concern about crowding. The high concentration of both boat and bank anglers at the Thermalito afterbay outlet can sometimes cause conflicts between anglers (in particular between bank and boat anglers). The majority of anglers contacted in the OWA (including at the Thermalito afterbay outlet) considered the areas where they fished to be moderately to extremely crowded.

Trail Use—DWR reports that most of the trail use appears to be low or moderate, with the highest use occurring during the spring and fall. A high percentage of trail users (generally over 90 percent) expressed satisfaction with the condition of the trails (poor trail conditions are one indicator of overuse), and their perceptions of crowding were very low.

Visitors' Experience, Perceptions, and Preferences

Lake Oroville State Recreation Area

DWR conducted visitor surveys for a 1-year period (2002–2003) to investigate visitor experiences, perceptions, and preferences by collecting 2,583 onsite surveys and 1,071 mail-back surveys. Lake Oroville State Recreation Area visitors indicated they were satisfied with their overall recreational experience and relatively few felt crowded. From 70 to over 93 percent of visitors to these areas indicated they were satisfied, very satisfied, or extremely satisfied with their trip to the area. Regarding crowding at recreational sites, about 67 percent of the visitors to the Thermalito forebay, 70 percent of the visitors to Lake Oroville, and over 90 percent of the visitors to the Thermalito diversion pool rated their perception of crowding between “not at all crowded” to “slightly crowded.”

Boating—In general, the recreational surveys indicated that boaters enjoy a high level of satisfaction with their boating experiences in the Lake Oroville State Recreation Area, with about 74 percent stating that they were satisfied to extremely satisfied. Large majorities felt the number of boat ramps, marinas, boat-in gas stations, and boat-in campsites were adequate. Relatively few boaters felt the number of watercraft on the water or interactions and/or conflicts between boaters was more than a slight

⁷⁴ The peak use period is on Friday and Saturday nights from May 15 until September 15.

⁷⁵ The off-season is from September 16 until May 14.

problem and large majorities felt most of these issues were not a problem at all. Boaters' greatest concerns related to exposed land and shallow areas during low water levels, which are unavoidable effects of reservoir drawdown and which are most prevalent during the late summer and during drought periods.

Boaters' use of several of the boat ramps may be hampered by the lack of boarding docks for some of the launch lanes. A majority of boaters felt the number of docks or temporary moorage sites was too few. Also, excessive floating debris, mud and debris on the boat ramps, and partially grounded boarding docks during low water periods were observed at some locations. Some boaters expressed concern about the amount of floating woody debris that remains on the surface of Lake Oroville during the spring and early summer, in spite of DWR's and DPR's collection efforts.

Camping—Overall, Lake Oroville State Recreation Area campers expressed high satisfaction with their experience at the campgrounds and 74 percent of campers said they were satisfied, very satisfied, or extremely satisfied with their trip. Large majorities of Lake Oroville visitors felt the number of campgrounds, campsites with RV hookups, group campsites, and number of shower facilities were adequate. Nearly half of those visitors felt that the number of floating campsites was too few. The floating campsites are a unique and popular type of facility, but the limited number of suitable sites and high maintenance requirements are likely to limit further expansion.

A few campers at each campground made requests for a range of additional amenities, such as play areas for children, more convenient trail access to the shoreline, and more availability of food and convenience items.

Angling—About 76 percent of Lake Oroville anglers, 80 percent of Thermalito forebay anglers, and 91 percent of Thermalito diversion pool anglers stated that they were satisfied with their angling experience. Those who were not satisfied most often said their failure to catch fish was the reason, but most anglers reported catching fish and catch rates appear to be good. Anglers' perception of crowding in the areas where they fished were generally low with 74 percent of anglers at the Thermalito forebay, 76 percent of anglers at Lake Oroville, and 100 percent of anglers at the Thermalito diversion pool considering these areas to be not at all crowded to slightly crowded. The majority of Lake Oroville State Recreation Area visitors felt the number of fish cleaning stations was adequate, except at the Thermalito diversion pool.

Trail Use—About 83 percent of visitors whose primary activity was trail use indicated that they were satisfied, very satisfied, or extremely satisfied with their trip. Also, a high percentage of trail users (generally over 90 percent in each management area) expressed satisfaction with the condition of the trails. Approximately 66 percent of visitors to Lake Oroville, approximately 63 percent of visitors to Thermalito diversion pool, and approximately 74 percent of visitors to the Thermalito forebay considered the number of paved and unpaved bike trails, hiking trails, and equestrian trails to be adequate. However, at the Thermalito diversion pool, only 54 percent of trail users believed that the number of equestrian trails was adequate while 43 percent thought that there were too few. About 40 percent of trail users at Lake Oroville and the Thermalito diversion pool felt the number of signs indicating trail locations was too few.

Hiking and walking were the most popular trail use of visitors to the Lake Oroville State Recreation Area except at the Thermalito diversion pool, where the overwhelming use was equestrian. Table 45 shows the primary types of trail use by visitors to the Lake Oroville State Recreation Area.

Table 45. Primary types of trail use by visitors to the Lake Oroville State Recreation Area.

Trail Use Type	Lake Oroville (%)	Thermalito Diversion Pool (%)	Low Flow Channel (%)	Thermalito Forebay (%)
Hiking/walking	69.9	14.8	68.1	74.4
Equestrian	15.2	64.8	5.3	0.8
Bicycle	11.3	20.4	25.5	18.4
Other	1.8	0	1.1	4
Multiple types	1.8	0	0	2.4

In general, few Lake Oroville State Recreation Area trail users (6 to 9 percent) reported encounters with other trail users that they felt put them at risk. The most common types of such encounters were reported by equestrians in reference to bicycle riders; other encounters involved walkers with dogs and illegal motorized trail use. A minority of equestrian trail users surveyed expressed dissatisfaction with multiple-use trails (shared with bikes) and expressed a desire for separate trails.

Swimming and Other Day Use—The primary issues surrounding swimming opportunities and other day-use activities are related to project operations. Related to this is the finding that from one-half to two-thirds of Lake Oroville and Thermalito diversion pool visitors felt the number of swim areas and developed day use or picnic areas along the shore were too few and about one-third of Lake Oroville visitors considered access to the shoreline to be a moderate or big problem. Reservoir drawdown is the primary constraint on providing these types of shoreline developments at Lake Oroville.

An additional issue related to swimming involved water quality at the popular swim beach at the North Thermalito Forebay day-use area. Water quality testing done for environmental technical studies indicated that bacteria levels were elevated during both seasonal peak recreational activity and non-recreational periods when numerous waterfowl were present, indicating that both humans and waterfowl may be sources of contamination.

In regard to other types of day-use facilities, the majority of Lake Oroville State Recreation Area visitors felt the number of group picnic sites, equestrian facilities, and restrooms was adequate.

Oroville Wildlife Area

Most OWA visitors indicated they were satisfied with their overall recreational experience. About 64 percent of OWA visitors and 69 percent of visitors to the afterbay indicated they were satisfied, very satisfied, or extremely satisfied with their trip to the area. Regarding crowding at recreational sites, about 67 percent of Thermalito afterbay visitors rated their perception of crowding between not at all crowded and slightly crowded. However, perceptions of crowding at the OWA were higher with about 50 percent rating crowding between moderately crowded and extremely crowded. These responses are strongly associated with the Thermalito afterbay outlet site, described previously as one of the most popular salmon and trout angling locations in the region, particularly during the fall spawning run.

Areawide Issues—Three issues appear to be affecting recreational satisfaction and enjoyment in many areas of the OWA. First among these is safety and security. Although the majority of OWA visitors surveyed felt overall safety and security as well as law enforcement presence was not a problem

in that area, higher percentages (20 and 30 percent, respectively) than in any other area felt these were moderate or big problems. Second is litter accumulation, which was noted at camping and day-use areas as well as along parts of the riverbank and dispersed access areas used by anglers. Three quarters of OWA visitors considered litter along the shoreline to be a moderate or big problem, and 58 percent held this perception of sanitation along the shoreline. Third, parts of the gravel levee-top roads that provide access to most of the OWA are rough and washboarded with frequent potholes.

Camping—Large majorities of OWA and smaller majorities of Thermalito afterbay visitors felt the number of campgrounds, campsites with RV hookups, group campsites, and shower facilities were too few. However, the level of recreational development represented by developed campgrounds generally conflicts with the policies and goals of the DFG for management of state wildlife areas.

Some campers expressed dissatisfaction with the primitive camping facilities provided in the OWA. Litter, vegetation damage, and other ecological effects were noted in the primitive camping areas, as were camper concerns about personal safety and adequate law enforcement presence.

Angling—About 82 percent of OWA anglers and 72 percent of Thermalito afterbay anglers stated they were satisfied with their angling experience. As at Lake Oroville State Recreation Area, those who were not satisfied most often said their failure to catch fish was the reason, but most anglers reported catching fish and catch rates appear to be good. Crowding and undesirable site conditions such as litter, overflowing garbage cans, and dirty or nonexistent restrooms were also given as reasons. Anglers' perception of crowding in the areas where they fished were generally low at Thermalito afterbay with about 63 percent of afterbay anglers considering the area to be not at all crowded to slightly crowded. In contrast, only 31 percent of OWA anglers considered the areas where they fished to be not at all to slightly crowded, while about 54 percent considered it moderately to extremely crowded.

Most afterbay visitors considered the number of fish cleaning stations to be adequate (one is provided at the Monument Hill day-use area), but about 90 percent considered the number provided at the OWA (none are provided) to be too few. It should be noted that DFG recommends that fish be cleaned in the Feather River, as the entrails provide nutrients to the system that would normally be provided by natural salmon mortality.

Other issues about which OWA anglers expressed concern included rude behavior by other anglers, illegal fishing practices, and the amount of litter on the riverbanks. The high concentration of anglers at the Thermalito afterbay outlet can sometimes cause conflicts between anglers (in particular between bank and boat anglers), and many anglers felt additional law enforcement was needed.

Hunting and Other Open Space Activities—Three out of four hunters interviewed within the OWA were satisfied with their hunting experience, and most who were hunting for ducks (the most commonly hunted game in the area) were successful, as were most turkey hunters, and over 40 percent of pheasant hunters. However, dissatisfied hunters felt that the habitat in the area needed improvement and several hunters felt habitat had declined in recent years. Those surveyed believe that the invasion of exotic weeds in many of the ponds used for waterfowl hunting is a major problem.

Wildlife viewing and nature study opportunities are prevalent in the OWA, with a large variety of species of birds, mammals, reptiles, and amphibians. However, as described previously, the lack of facilities along with trash accumulation, dumping, and rough roads may discourage organized nature study field trips by school groups or by individuals. Over one-half of afterbay visitors and nearly three-quarters of OWA visitors said there are too few interpretive programs and educational opportunities.

Boating on Thermalito Afterbay—Use of powerboats and personal watercraft at speeds greater than 5 miles per hour is not allowed by DFG within state wildlife areas, in accordance with boating speed restrictions specified in Title 14 of the Fish and Game Code. However, these speed limits have historically not been enforced. To the contrary, boating access improvements used by all types of power boaters, including water-skiers and personal watercraft riders, have been constructed in recent years and a

water-ski slalom course was installed. Essentially, boating speeds are not enforced on the Thermalito afterbay due to conflicting management goals; in this case, DWR's goal is to provide recreational boating opportunities and DFG's goal is to limit activities inconsistent with wildlife management, enhancement, and protection.

Feather River

The following discussion on the Feather River is limited to sites on the low flow channel portion of the river, upstream of the OWA. Other Feather River sites are included within the OWA discussion because all of the recreational access and sites are within the OWA. Low flow channel survey sites included the Feather River Fish Hatchery (within the FERC project boundary) and Riverbend Park (outside the FERC project boundary).

Most Feather River visitors indicated they were satisfied with their overall recreational experience. About 62 percent of visitors indicated they were satisfied, very satisfied, or extremely satisfied with their trip to the area. About 77 percent of anglers said they were satisfied with their fishing experience. Regarding crowding at recreational sites, about 76 percent of visitors said they were "not at all crowded" and "slightly crowded."

Few issues and problems were identified at the Feather River Fish Hatchery or other Feather River areas through the completion of recreational technical studies. Large majorities considered most trail, camping, and boating facilities to be adequate in number. About 74 percent considered the number of fish cleaning stations to be too few (none are provided). Although not a majority, about 43 percent said there were not enough restrooms. Few visitors considered any management issues, water condition issues, or user interaction issues to be a problem. The issue of litter along the shoreline may be considered an exception, with 41 percent considering this to be a moderate or big problem.

Projectwide Issues

DWR identified a few issues pertinent to recreation across the entire Oroville Facilities. One issue identified by DWR is the need for a comprehensive trails plan to resolve issues around multiple use of trails and trail safety, as well as issues surrounding needs for trail expansion, trail maintenance, development of more loop trails, and the potential for specially designed, single-track mountain bike trails. In addition, DWR noted that few interpretive facilities exist downstream of Lake Oroville, with the exception of fisheries-related displays at the Feather River Fish Hatchery and standard informational bulletin boards at some sites.

Several stakeholder groups believe that non-local visits to the area, an important factor in economic growth, could be increased by additional facilities to support special events. DPR and Feather River Recreation and Parks District are responsible for permitting or organizing several special events each year. Special events that are currently being offered in the Lake Oroville area on an annual or more frequent basis include, but are not limited to, major fishing tournaments, equestrian trail rides, a competitive mountain bike ride, a triathlon, an Independence Day celebration, a salmon festival, and Butte Sailing Club events. Each of these events occurs completely or partially within the Oroville Facilities project boundary. Specific interest has been identified in new or enhanced facilities to support these and other events.

3.3.6.2 Environmental Effects

Recreation Management Plan (Proposed Article A127)

Under Proposed Article A127, *Recreation Management Plan*, DWR would implement, upon license issuance, the Settlement Agreement Recreation Management Plan dated March 2006 to guide and facilitate existing and future recreational resource management associated with the Oroville Facilities.

DWR developed an earlier version (2005) of the Recreation Management Plan in consultation with the Recreation and Socioeconomics Work Group and other stakeholders. The Recreation and Socioeconomics Work Group included representatives of federal and state agencies, Butte County, the City of Oroville, the City of Paradise, local residents and landowners, and other resource and recreation stakeholders. Settlement negotiations resulted in DWR's March 2006 version of the Recreation Management Plan. The six programs identified in the Recreation Management Plan are designed to comply with 18 CFR 4.51(f)(5) which outlines Recreation Management Plan requirements for FERC hydro projects. These programs include: (1) Recreation Facility Development Program, (2) Recreation O&M Program, (3) Recreation Monitoring Program, (4) Resource Integration and Coordination Program, (5) Review and Revision Program, and (6) Interpretation and Education (I&E) program.

Proposed Article A127 is consistent with Interior's section 10(a) recommendation no. 4 and a DFG 10(a) recommendation. In their motions to intervene, American Rivers, American Whitewater, and Chico Paddleheads state that they support the Settlement Agreement measures. Further, we note that representatives of several recreation-related organizations⁷⁶ also signed the Settlement Agreement indicating their support for the Recreation Management Plan.

Our analysis of Proposed Article A127, *Recreation Management Plan*, is presented in two sections: (1) an evaluation of the 6 Recreation Management Plan programs relative to the Commission's regulations pertaining to project recreation management plans (18CFR4.51(f)(5)), and (2) an evaluation of the need for individual developments or programs included in the Recreation Management Plan.

Recreation Management Plan Programs

Recreation Facility Development Program—This program identifies new recreational facilities, modifications to existing facilities (e.g., extended boat ramps) and would provide for reconstructing all recreational facilities to meet existing and future recreational facility needs identified in the project area. DWR would upgrade existing recreational facilities and construct new recreational facilities, based on demonstrated need and associated monitoring results. The Recreation Management Plan identifies: (1) proposed recreational facility developments and upgrades in the project area, (2) locations and conceptual layouts of the proposed recreational facilities or use area improvements, (3) recreational facility design guidelines and approval process, (4) how DWR would bring recreational facilities into ADA compliance, (5) a commitment to complete necessary environmental review (e.g., NEPA, California Environmental Quality Act [CEQA]) and secure any necessary permits, (6) an agency and public review process for planned recreational development, and (7) DWR's responsibility for facility construction, coordination, and scheduling along with an explanation of the five 10-year phases that would be used to plan recreational improvements. DWR would implement several recreational improvements in the first 10 years following license issuance to address immediate needs. As described below under *Individual Recreation Developments and Programs*, DWR proposed improvements at 11 sites at Lake Oroville, 3 sites at the Thermalito diversion pool, 2 sites at the Thermalito forebay, and 5 sites at the OWA, which includes the Thermalito afterbay. Additional improvements would be implemented in phases based on ongoing monitoring results and demonstrated needs.

In its comments on the settlement agreement filed with the Commission on April 26, 2006, Butte County recommends that DWR develop standards providing that management options other than construction of new facilities would only be pursued if there is a lack of space available for new facilities or if construction of new facilities would result in significant adverse environmental effects.

⁷⁶ California State Horsemen's Association; California State Horsemen's Association, Region II; Citizens for Fair and Equitable Recreation; Feather River Recreation and Parks District; International Mountain Bicycling Association; Lake Oroville Bicyclist Organization; Oroville Parks Commission; and Oroville Recreation Advisory Committee.

In its motion to intervene filed with the Commission on March 30, 2006, Butte County points out that DWR does not propose any new facilities in several locations and only proposes modest facility expansions in other locations. Butte County acknowledges that these are useful improvements but insufficient to meet future demand. Butte County also asserts that existing recreational facilities would be degraded by overuse and overcrowding. Butte County recommends that DWR: (1) provide reasonable swimming facilities at the project, (2) develop water skiing facilities, and (3) consider the feasibility and socioeconomic effects of a whitewater park to offset the loss of whitewater opportunities at the project due to development of the project.

In its motion to intervene filed with the Commission on December 16, 2005, the Anglers Committee et al. recommend that DWR: (1) develop a plan to provide sandy beaches at the Oroville Facilities campgrounds located adjacent to a reservoir to address public safety and provide obstacle-free wading opportunities; (2) prepare a plan addressing accessibility pursuant to the ADA for all public facilities at the Oroville Facilities; (3) make all public facilities accessible, including restrooms, campgrounds, day-use areas, parking areas, boat ramps, and boat piers; (4) maintain an ADA-compliant daily shuttle service at the Lime Saddle marina and Spillway boat ramps (i.e., service between the parking areas and ramps); (5) prepare a detailed recreation plan addressing short-term and long-term recreation planning needs and submit it to the Commission; and (6) comply with the needs of the community of Oroville when funding recreational facilities in the future.

In its May 26, 2006, filing with the Commission, DWR points out that the Recreation Management Plan provides for additional beach and swim area improvements. DWR also states that the Recreation Management Plan incorporates ADA-compliance measures into the improvement and expansion of recreational facilities, including its proposal to upgrade several trails to meet ADA-accessibility standards for slope and surface, which would result in approximately 12 miles of ADA accessible trails within the project boundary. DWR points out that all new facility construction proposed in the Recreation Management Plan would comply with the ADA.

Staff Analysis

Numerous existing recreational facilities at the project provide for day and overnight recreational use. DWR's studies indicate the need for additional facilities, necessary upgrades to existing facilities, and the eventual replacement of both new and existing facilities at the end of their useful lives during the term of the license. All of the facility improvements identified in the Recreation Management Plan are within the project boundary or provide access to recreational opportunities that are within the project boundary. DWR identified proposed developments in the Recreation Management Plan in consultation with a number of appropriate parties as a part of settlement discussions.

DWR's implementation schedule is presented in five 10-year planning cycles. The first 10-year cycle targets high-priority needs, including ecological and safety concerns, insufficient recreational site capacity, ADA needs, and distribution of access sites around the reservoir shorelines. The schedule does not indicate when improvements would be scheduled within the first 10-year planning period; however, DWR would provide this schedule within 1 year of license issuance. Reviewing the list of proposed improvements (see the following section, *Individual Recreation Developments and Programs*), it appears that addressing the most immediate recreational and ecological needs would be achieved within 10 years of license issuance.

We note that under the Proposed Action, all recreational facilities would not be ADA compliant until 10 years after license issuance.⁷⁷ Although this may seem like a long time, this is a reasonable time frame for two reasons. First, the major recreational complexes at Lime Saddle, Loafer Creek, and Bidwell Canyon, which constitute the majority of the developed capacity, have accessible facilities. Accordingly, accessible recreational facilities are generally available at the project at this time. Second, waiting to implement ADA upgrades until a particular facility is remodeled or reconstructed is consistent within the ADA guidelines. DWR commits to a public and agency review process for recreational development and to follow ADA guidelines in the design of recreational developments. These two components of the Recreation Management Plan would ensure new accessible opportunities are identified and that facilities would be built to ADA standards. The number of accessible recreational facilities at the project would gradually increase over the course of 10 years as new facilities are built and existing sites are remodeled. In this manner, the Proposed Action would address the recommendations of the Anglers Committee et al. and provide accessible recreational facilities.

As described below in *Individual Recreation Developments and Programs*, DWR proposes additional swimming facilities throughout the project area. DWR would conduct a swimming and day-use feasibility study at Lime Saddle and at Loafer Creek to address the need for additional swimming opportunities at Lake Oroville; the Loafer Creek area has priority over other sites to provide a new swimming venue. At the Thermalito forebay, DWR would improve the swimming areas at both the north and south forebay day-use areas. At Thermalito afterbay, DWR would designate a swimming area at the Larkin Road boat launch. As such, DWR's would accommodate Butte County's recommendation. Sandy beaches are currently provided at the Loafer Creek, North Thermalito forebay, and Monument Hill day-use areas. DWR is investigating additional swimming opportunities at Lake Oroville and proposes to provide sand at the South Thermalito forebay day-use area and the Larkin Road boat launch. It may not be possible to place sand along the Lake Oroville shoreline because it has steep slopes. Nevertheless, the Proposed Action would sufficiently investigate options for locating and providing new swimming opportunities.

Boating, including boat fishing, personal watercraft use, motorboating, houseboating, and water skiing, was the most popular activity identified at the project. Boat launches provide adequate public access for these activities; however, providing a water-ski course, as Butte County recommends, would not be necessary for visitors to water ski on the reservoir. We do not find that the need for this facility corresponds to any identified issue or concern regarding public access or recreational use related to the project.

Recommendations from Butte County regarding whitewater boating in the Feather River relate to the effects of the original project construction. It would not be appropriate to consider these recommendations because the existing project serves as the environmental baseline and the Commission does not require mitigation for original project development. However, we note that Butte County's recommendation may be addressed by implementation of Measure B101, *Feather River Whitewater Boating Opportunity Feasibility Study*, in appendix B of the Settlement Agreement (DWR, 2006a). DWR would initiate and fund a whitewater boating opportunity and recreation feasibility study to assist the Fund Steering Committee of the Supplemental Benefits Fund in determining whether to fund the construction and operation of such a project, or to cost share on such a project somewhere in the region, pursuant to their funding criteria.

⁷⁷ Section 2.7(b) of the Commission's regulations requires a project licensee to consider the needs of the physically disabled in the design and construction of public recreational facilities on project lands and waters, including public access to such facilities. Although the Commission has no statutory role in implementing or enforcing the ADA as it applies to its licenses, we reviewed DWR's approach to ADA compliance to disclose the effects of the proposed action on accessibility.

Currently, the developed recreational facilities appear to have adequate capacity. Survey results show that visitors do not feel crowded during their visit and that they believe the existing facilities are adequate. Although the maximum occupancy is reached at some facilities on holidays and peak weekends, this is typically the case at most recreational facilities in California during the summer and is not unique to this project. At all other times, the existing occupancy rates indicate the recreational facilities have capacity for additional future use. Even though the existing facilities can absorb some increased use, DWR's proposed improvements within the first 10 years of license issuance include additional capacity for overnight and day use. We find that this additional capacity would provide certainty that future demand would be met throughout the licensing period. DWR would provide identified additional facilities based on monitoring results, ensuring that DWR provides such improvements necessary for public use.

The Proposed Action includes developing a schedule for recreational developments over the first 10 years of the project and the Recreation Management Plan lays out potential developments for 50 years, consistent with the recommendation of the Anglers Committee et al.

DWR proposes to conduct periodic workshops to update the community on the progress of projects associated with the project license. The purpose would be to inform the community on the progress of projects associated with license requirements, reservoir conditions, operations, and other issues related to implementation of the Recreation Management Plan. Interested citizens and members of the public would be encouraged to discuss recreation-related items and issues during these meetings. In addition to the general public, representatives of Butte County, City of Oroville, and other affected cities, local agencies, and non-governmental organizations (NGOs) would be invited to participate. This opportunity for community participation would meet the needs identified in the recommendation of the Anglers Committee et al.

Recreation Operations and Maintenance Program—DWR would allocate most of the day-to-day recreational facility management responsibility for most sites within the project boundary to DPR under the terms of a new Memorandum of Agreement.⁷⁸ DWR recognizes that it retains ultimate responsibility for compliance with all license terms and conditions and states that DPR's authority would be consistent with its responsibilities described in the California Public Resources Code. We interpret this to mean that DWR intends to provide sufficient O&M funding to DPR to adequately manage the facilities, even though this is not expressly stated in the Recreation Management Plan. Recreational facility O&M would include: (1) providing ongoing O&M of recreational facilities appropriate to the level of development, density of visitor use, resource protection needs, and recreational activity, (2) providing reasonable and safe public access to the project shoreline (at elevations between 900 and 640 feet msl), (3) providing adequate visitor public health and safety on project lands and waters by working with DPR, DFG, California Highway Patrol, Butte County Sheriff's Office and/or City of Oroville police, as appropriate, and (4) charging appropriate recreational user fees at DPR-managed recreational sites within the project boundary to partially offset ongoing O&M costs and new facility upgrade costs at these sites. DWR would review and assess fees consistent with day-use and camping fees at other, comparable units of the State Park System.

In its comments on the Settlement Agreement, filed with the Commission on April 26, 2006, Butte County expresses its concerns with the current user fees at Lake Oroville. Butte County points out that a season pass for annual boat-launching privileges on Lake Oroville for the 2006 recreation season costs \$200, while a similar pass at Lake Shasta costs \$60 to \$80. Butte County suggests that DWR consider the benefits it derives from the project when calculating user fees on project lands.

⁷⁸ DWR proposes finalizing the new MOU between it and DPR following issuance of a new license for the Oroville Facilities. DWR proposes appending the new MOU to its final Recreation Management Plan.

In its motion to intervene filed with the Commission on December 16, 2005, the Anglers Committee et al. state that the fees charged by DWR to launch boats into Lake Oroville are illegal and inconsistent with the public trust policy of the State of California. The Anglers Committee et al. recommend that DWR provide free public access to the boat launches at the Spillway and Lime Saddle day-use areas. The Anglers Committee et al. recommend that if DWR continues to charge launch fees to boaters, it should hold annual public meetings to develop and finalize the boating fee schedule and that the fees should be approved by the Commission. The Anglers Committee et al. recommend that any documents supporting DWR's fee schedule at the Spillway and Lime Saddle boat launches should be provided to the public.

In its May 26, 2006, filing with the Commission, DWR states that the Commission's regulations allow licensees to charge reasonable fees for recreation without the necessity of Commission approval of such fees and that this practice has been upheld by the U.S. Court of Appeals. DWR also states that the public trust policy of the State of California does not preclude the assessment or collection of such fees. DWR points out that it provides free access to the boat launches at the Thermalito afterbay and other areas of the OWA, including the Feather River, and to unimproved parts of Lake Oroville. DWR explains that while it does require fees in other areas at the Oroville Facilities, the fees are commensurate with those charged at comparable state-owned recreational facilities such as other units of the state park system. DWR further explains that DPR establishes fees at state recreational areas, usually within a prescribed range commensurate with the facilities and services provided and that the fees charged at the Lake Oroville State Recreation Area are at or near the lower end of this statewide range for virtually all facilities and services. DWR states that the fees are non-discriminatory and apply to all residents of California and visitors, but that discounts are available for senior citizens and the disabled.

In the same filing, DWR also points out that DWR and DPR have already implemented enhanced debris removal at the Lake Oroville State Recreation Area in response to debris removal concerns expressed during the relicensing meetings. DWR also states that the Recreation Management Plan provides for the heightened effort of debris removal to continue throughout the term of the new license.

In appendix A of its comments on the draft EIS, DWR points out that the annual pass for parking and launching at Lake Oroville now costs \$165, not \$200 as stated by Butte County. DWR also notes that an annual pass for parking and launching at Lake Oroville may also be used for parking and launching at about 95 other state parks. We also checked the website providing information on Shasta Lake (www.shastalake.com) and found that an annual pass for accessing boat launching facilities there costs \$65 if purchased between January 1 and March 1 and \$90 from March 1 until December 31; the pass is good for the calendar year and expires on December 31. Infrequent or one-time visitors to Lake Shasta also need not pay an annual fee but may pay a one time fee of \$8 for parking and launching. Additional fees for camping are charged at both Lake Oroville and Shasta Lake.

In its motion to intervene, the Anglers Committee et al. also assert that DWR has a duty and responsibility to protect boaters from navigation and public safety problems, such as floating debris, at Lake Oroville. They recommend that DWR prepare and implement a management plan for removing dangerous debris from the reservoir and that DWR be held liable for harm and damage to private boats and equipment by securing a bond of \$1 billion or a feasible amount for the entire recreation season.

In the May 26, 2006, filing, DWR also points out that DWR and DPR have already implemented enhanced debris removal at the Lake Oroville State Recreation Area in response to debris removal concerns expressed during the relicensing meetings. DWR also states that the Recreation Management Plan provides for the heightened effort of debris removal to continue throughout the term of the new license.

Staff Analysis

Ongoing and adequate O&M of existing and future recreational facilities are critical to visitor enjoyment and effective recreation resource management. A continued partnership between DWR and DPR for O&M of project recreational facilities would be beneficial for a number of reasons. As the manager of the Lake Oroville State Recreation Area, DPR is the primary provider of recreational opportunities and facilities within the Oroville Facilities. DPR's core programs, linked directly to the agency's mission, include resource protection; education and interpretation; facilities; public safety; and recreation. DPR staff monitors visitation; cleans and maintains restrooms; services trash receptacles; maintains campgrounds, day-use areas, boat ramps, courtesy docks, and trails; monitors and maintains buoys and vessels; and maintains recreational area grounds and landscaping. DPR is also responsible for carrying out boat safety inspections and providing safety patrols at Lake Oroville. DPR also maintains approximately 21 miles of road, all project utilities (including electrical, water, and wastewater facilities), and provides capital improvements at all recreational facilities. DPR annually hires additional seasonal support staff in the summer to operate entrance stations and carry out basic facility maintenance tasks. DWR currently works with DPR to remove floating debris on Lake Oroville, thus addressing the concerns of the Anglers Committee et al. We do not consider whether DWR should be required to secure a bond for liability because they would remove debris from the reservoir surface, and they should not be accountable for the actions of potentially irresponsible boaters.

The Commission's regulations (18 CFR §2.7) state that the "Commission will not object to licensees and operators of recreational facilities within the boundaries of a project, charging reasonable fees to users of such facilities in order to help defray the cost of constructing, operating, and maintaining such facilities." DPR staff collects entrance fees and camping fees at some of the facilities within the Lake Oroville area. User fees collected by DPR are used by the agency to offset the cost of operating recreational facilities at the Oroville Facilities, including boat launching, day-use and camping fees. DWR's current practices related to charging user fees (indirectly collected through DPR) are consistent with this regulation and are comparable to the practices at other Commission-licensed projects, such as Lake Shasta.

Recreation Monitoring Program—The Recreation Monitoring Program would include using: (1) management units as a monitoring framework for assessing conditions in more discrete geographical areas, rather than just at a reservoir-wide or project-wide level, (2) monitoring indicators and standards specific to each of the management units and at selected sites, and (3) program components, such as methods and tools, monitoring frequency, reporting requirements, and decision-making logistics.

DWR would prepare periodic assessment reports for each management unit per FERC Form 80 reporting requirements, which would document data collection and statistical methods used to analyze monitoring data, success of developed recreation visitor management efforts, recreational facility use levels and counts, trends in recreational facility use, and projected needs based on monitoring indicators and standards. DWR proposes to prepare the FERC Form 80 report in consultation with the Recreation Advisory Committee and submit it to the Commission every 6 years after license acceptance.

In its comments on the settlement agreement filed April 26, 2006, Butte County recommends that DWR conduct comprehensive recreational use surveys every 5 years beginning October 1, 2007. Butte County recommends that DWR develop a plan for conducting recreational use surveys in consultation with the Recreation Advisory Committee, and that in its surveys, DWR use a sample size twice the size as the one used in its 2002–2003 recreational surveys. Butte County also contends that even though the description of monitoring protocols and standards (triggers) is comprehensive and the carrying capacity standards are well defined, the monitoring and trigger provisions are vague, providing so many management options that it seems highly unlikely that new facilities would be built when existing recreational facilities become overcrowded.

In its May 26, 2006, filing with the Commission, DWR states that Butte County makes an unfounded claim that the recreational monitoring proposed in the Recreation Management Plan is inadequate. DWR further states that the monitoring program proposed in the Recreation Management Plan is a comprehensive program with an interactive approach to decision-making that incorporates feedback mechanisms to evaluate actions and incorporate new information as it becomes available. DWR points out that implementation plans at new or expanded recreational facilities would be further developed by DWR and DPR, based on the results of periodic monitoring and identified recreational needs.

Staff Analysis

The proposed monitoring plan provides methodology, opportunities for public and agency review and recommendations, and regular reporting to interested parties as well as the Commission. This program includes sufficient detail to adequately assess the recreational facilities, the effects of recreational use on the project area's resources, and recreational-use capacity issues, and it provides the opportunity for consulting with interested parties and adjust recreational facility development and management over the term of a new license. Establishing the sample size for visitor survey is appropriately a matter determined prior to monitoring. However, it would not be appropriate to set a visitor survey sample size at this point in time, as Butte County recommends, because the sample size could not be adjusted to consider changing use patterns and population or new recreational developments that emerge during the license term. It would be appropriate to consult with the Recreation Advisory Committee to develop statistically valid sample sizes for each monitoring effort that collects visitor survey data.

Whereas Butte County recommends visitor surveys every 5 years, the Recreation Management Plan indicates visitor surveys would be conducted every 10 to 12 years. DWR's proposed survey frequency is adequate because DWR would collect and report other user information on a biennial and 6-year frequency (see table 7.3-1 of the Recreation Management Plan). This interim information would provide a basis for determining trends in the level of recreational use, facility conditions, and any recreational use effects on natural resources. Both data sets (biennial and 6-year) would also provide information that would be used to determine needs for additional recreational facility capacity that may arise in the future. Considering that visitor surveys are not the only data sources that drive recreation management decisions, surveying visitors once every 10 to 12 years would be sufficient and this information would be reported in every other Form 80 filed with the Commission. Periodic assessment reports on the recreational monitoring would allow the Commission to review the proposed recreational facilities as they are planned or as modifications are required over the license term.

Resource Integration and Coordination Program—DWR would make coordinated, timely, and informed decisions related to implementing the Recreation Management Plan and other project-related resource management plans through formal and informal communications regarding simultaneous activities by various resource groups and resource agencies. DWR would encourage greater involvement by the general public through: (1) hosting community workshops designed to share information; (2) maintaining a web-based bulletin board; and (3) implementing a dispute resolution process.

Staff Analysis

A number of parties have oversight for and an interest in various natural resources, commercial interests, and community interests that may be affected either positively or negatively by recreational pursuits. Measures included in this program would meet the need to coordinate among various interested parties and agencies.

Recreation Management Plan Review and Revision Program—DWR proposes to update the Recreation Management Plan not less than every 12 years based on consultation with other parties during

monitoring and coordination meetings and through other appropriate sources to address potential unforeseen recreational needs at the project, changes in visitor preferences and attitudes, and new recreational technologies that may occur over the term of the license (table 46).

Table 46. Recreation Management Plan revision schedule. (Source: Recreation Management Plan)

Plan Components	Frequency of Potential Revisions		
	Annually	6 Years	12 Years
Recreation Management Plan Sections 1 through 8	If needed by DWR		X
FERC Form 80, as amended		X	
Proposed recreational measures, estimated costs, and recreational site conceptual plans(Recreation Management Plan appendices A to D, if needed)	If needed by DWR		X
Baseline recreational information, whenever new report data are developed			X

In its comments on the Settlement Agreement filed April 26, 2006, Butte County recommends that DWR provide a Recreation Management Plan update every 5 years, beginning October 1, 2008. Butte County recommends that DWR would update the Recreation Management Plan in consultation with the Recreation Advisory Committee, which would include Butte County. Butte County recommends that DWR allow consulted parties a minimum of 30 days to review and comment on the updated Recreation Management Plan before filing it with the Commission. Butte County also recommends that DWR file all of the comments and recommendations it receives on the revised Recreation Management Plan with the Commission, as well as reasons why it did not adopt a specific recommendation.

In its motion to intervene filed with the Commission on December 16, 2005, the Anglers Committee et al. recommend that DWR not file any proposed recreational amendments with the Commission until they have been reviewed and agreed upon by the public.

In its May 26, 2006, filing with the Commission, DWR points out that the Recreation Management Plan embraces a flexible approach to provide updates when needed and explains that potential revisions to the plan to clarify potential conflicts or ambiguity or to address changing conditions may occur when necessary, or at least every 12 years to coincide with FERC Form 80 reporting. DWR believes that Butte County’s stringent 5-year rule could result in unnecessary filings with the Commission, is inconsistent with the Commission’s Form 80 6-year cycle, and should be rejected.

Staff Analysis

Updating the Recreation Management Plan at 12-year intervals would allow for two FERC Form 80 reporting periods to take place before any changes to the plan would occur. Additionally, meeting every 6 years to review the data provided in the FERC Form 80 report would provide DWR and interested stakeholders the opportunity to identify and assess changes and trends that have occurred or are occurring over time, and to distinguish them from simple annual variability. Therefore, any changes to the Recreation Management Plan would be appropriate and would address needed changes in the direction of the program. The proposed stakeholder consultation, monitoring, and reporting would ensure that the needs of the public are met throughout the term of the license, thus addressing Butte County’s concerns about future demand. The Recreation Management Plan specifically states that DWR would consult with the Recreation Advisory Committee in determining the frequency for updating the Recreation Management Plan and Butte County would be invited to participate in community workshops where recreation-related issues would be discussed. As proposed, this Recreation Management Plan program

would accommodate most recommendations by Butte County and the Anglers Committee et al. We find that the consultation and public review processes outlined in the Recreation Management Plan would provide sufficient opportunity for public involvement, and it would not be necessary to require DWR to seek any further public approval before submitting recreation-related changes in the project to the Commission, as the Anglers Committee et al. recommend.

Interpretation and Education Program—DWR would provide information to enhance recreational experiences and encourage appropriate resource protection, cooperative and safe behaviors to benefit all project area recreational resources and visitors. DWR proposes developing an Information and Education (I&E) Program for the Oroville Facilities in consultation with DPR and DFG to complement their current interpretation and education efforts at the project. The I&E Program would include themes, media, media design, prioritized sites, and prioritized services. Potential themes include natural resources, Maidu culture and history, American settlement period, the water project, recreational opportunities, environmental and cultural stewardship, and interpretive collections. The program DWR proposes would include improvements, such as interpretive or informational signs, kiosks, brochures, and pamphlets.

Staff Analysis

With an estimated 1.73 million people visiting the project each year, there is a need to inform visitors of the recreational opportunities available at the project, safety factors (e.g., boating use, campfires, and access) and potential effects of recreational use on sensitive project area resources. As evidenced by high use levels at the Oroville Visitor Center, educational programs, which provide local history and cultural and natural resource interpretation, are important to visitors. The program appropriately includes providing information and education specifically related to the project. This program would provide a means to disseminate information regarding project area resources, facilities, and management issues to members of the public who currently use the project area and to members of the public who may be interested in using the area.

Individual Recreation Developments and Programs

Proposed Recreation Facilities and Improvements at Lake Oroville (Within 10 Years of License Issuance)—DWR would complete several recreational enhancements in the first 10 years following issuance of a new license to address existing ADA inadequacies, ecological, and safety concerns, immediate recreational site capacity needs, and the distribution of shoreline access sites around the reservoirs.

DWR proposes the following recreational improvements and actions in the first 10 years following license issuance at Lake Oroville (table 47). The locations of these facilities are shown on figure 18.

Table 47. Proposed recreational improvements and actions in the first 10 years following license issuance at Lake Oroville.

Facility	Improvement or Measure	Purpose/Comments
Nelson Bar boat launch	Install sign, barrier, or gate at end of road	Public safety
Lime Saddle campground	Construct 10 new RV campsites at or adjacent to the Lime Saddle campground	Expand capacity
Lime Saddle group campground	Construct one new six-unit group (50 people at one time) RV campsite	Expand capacity
Lime Saddle day-use area	Replace 13 existing picnic tables and 7 existing shade structures; provide pole stoves/grills	ADA compliance

Facility	Improvement or Measure	Purpose/Comments
	Provide 60 additional paved car/trailer parking spaces adjacent to the existing parking area at the boat ramp/marina	Expand capacity
	Install one new floating dock and new anchor system	Expand capacity/coordinate with DBW
	Conduct swimming and day-use feasibility study in the Parish Cove area (between the Lime Saddle marina and campground)	Meet need for additional swimming opportunities
	Investigate feasibility of providing a concessionaire operated activity center and store/snack bar	Meet need for services
	Coordinate with DPR to provide a fee-based whitewater boating shuttle service for whitewater (next concessionaire contract)	Meet need for services/shuttle from a take-out location on the North Fork arm to Lime Saddle marina
	Provide daily river flow information on releases from Poe Project into Lake Oroville	Provide whitewater flow information/coordinate with PG&E (Poe Project)
	Programmatic actions: ensure adequate adjustment of boarding docks, ensure adequate and timely debris removal at the boat ramp, coordinate with DPR and the concessionaire to improve ADA accessibility at the marina and boat ramp area	Public safety and access, ADA compliance
	Programmatic action: seek fee title land acquisition of the adjacent surplus PG&E property	Expand capacity of marina and boat ramp/ toxicity issues need to be resolved
	Programmatic action: provide boaters with information about substitute boating facilities and reservoir conditions	Public safety and meet visitor needs
Dark Canyon boat launch	Replace vault restroom and install directional signs along access road	Deteriorated facility condition and visitor access
Foreman Creek boat launch	Install vault restroom, 5 to 10 picnic tables with shade ramadas, and interpretive signs; possibly install pole stoves	ADA compliance, fire safety
	Redirect visitor use at this site (restrict usage boat ramp use to a designated area, potentially relocate the access road) and provide site protection for culturally sensitive areas	Avoid recreational use in culturally sensitive areas
Enterprise boat launch	Develop a low-water ramp, install 10 picnic tables, pole stoves/grills, gravel parking area (near elevation 750 feet msl) with 10 cars/trailer spaces, new floating dock and cable system	Expand capacity, meet visitor need to launch when reservoir level is low/coordinate with DBW and protect nearby cultural resources
	Install fencing, barriers, and/or signs	Protect sensitive resources
	Programmatic action: ensure adequate adjustment of the boarding dock	Public safety and access

Facility	Improvement or Measure	Purpose/Comments
Stringtown boat launch	Install sign, barrier, and/or gate at the terminus of the boat ramp during lowered reservoir elevations, provide directional signs, place sand and/or gravel at launch	Public safety and visitor access
Lake Oroville scenic overlook	Provide trash receptacle and removal service, minor grading improvements (filling larger holes) at the head of the old construction road	Public health and safety/coordinate with the Berry Creek Citizen's Association
Saddle dam trailhead access	Install 10 picnic tables and a stock watering trough, construct 1 or 2 additional access trails from the trailhead/parking area to the Lake Oroville shoreline, and provide additional security if and when needed; evaluate feasibility of extending the existing underground water system in order to pipe water to the watering trough and an outdoor handwashing basin with a French drain	Meet visitor needs, public health and safety
Loafer Creek campground	Construct 15 new RV campsites (contingency for Bidwell Canyon development)	Expand capacity/alternate site for campsites displaced at Bidwell Canyon
Loafer Creek group campground	Complete ADA upgrades, construct 2 group RV/tent campsites (25 people at one time) near existing group campsites, construct a combination shower/restroom near the new group sites	Expand capacity, ADA compliance
Loafer Creek equestrian campground	Complete ADA upgrades	ADA compliance
Loafer Creek day-use area	Install fish cleaning station, replace the portable restroom at Brooks Orchard with a new vault restroom, construct a hardened ADA-accessible path from the parking area and restrooms to the lower picnic area, swimming beach and cove, install one to two new floating dock(s)	Deteriorated facility condition (restroom), ADA compliance, access/coordinate with DBW
	Programmatic action: provide boaters with information about substitute boating facilities and reservoir conditions	Public safety and meet visitor needs
	Conduct swimming and day-use feasibility study (swimming lagoon or pool onsite or at an alternative location) to address times when the reservoir level is below elevation 850 feet msl	Meet need for additional swimming opportunities/priority for a new swimming venue over other sites
	Investigate feasibility of providing a concessionaire operated activity center and store/snack bar	Meet need for services
	Widen, grade, and place gravel on existing dirt service road to approximately elevation 750 feet msl and open this gated service road to the public when the boat launch is dewatered	Public safety and access
	Programmatic actions: ensure adequate adjustment of boarding docks and adequate and timely debris removal at the boat ramp	Public safety and access

Facility	Improvement or Measure	Purpose/Comments
Bidwell Canyon campground	Construct a new campground loop (30–38 campsites) adjacent to existing loop, relocate an existing trail	Replace capacity lost due to expanded marina parking area
	Programmatic action: make the existing underused group meeting facility available for use as a concessionaire operated campground activity center and store/snack bar	Meet visitor needs/coordinate with DPR
Bidwell Canyon day-use area	Construct a new marina parking lot with approximately 90 single-vehicle spaces, install one or two new floating docks, extend at least 3 lanes of the boat ramp down to elevation 640 feet msl, provide approximately 45 parking spaces at the top of the new Bidwell boat ramp located at approximately 750 feet and additional parking along the length of ramp, resurface existing gravel lot at Bidwell boat ramp 2 (elevation 700 feet msl) with concrete to provide 80 additional parking spaces	Expand capacity, access/coordinate with DBW
	Coordinate with DPR to provide a fee-based whitewater boating shuttle service for whitewater (next concessionaire contract)	Meet need for services/shuttle from a take-out location on the Middle Fork arm to Bidwell Canyon Marina
	Programmatic actions: ensure adequate adjustment of boarding docks, ensure adequate and timely debris removal at the boat ramp, coordinate with DPR and the concessionaire to improve ADA accessibility at the marina and boat ramp area, support safe and effective options for a new shuttle service (or other feasible options) to operate between the parking facilities and the marina possibly during peak use periods and during low pool periods	Public safety and access
	Programmatic actions: support options, such as state right-of-way via a lease or similar mechanism, to include additional dry boat storage in a new DPR concessionaire contract when it is renewed	Expand capacity
	Programmatic action: provide boaters with information about substitute boating facilities and reservoir conditions.	Public safety and meet visitor needs
Lake Oroville Visitor Center	Provide an I&E Program, upgrade existing facilities	Meet visitor needs, ADA compliance
Spillway day-use area	Determine optimum number and configuration of boarding docks and if feasible, install an additional boarding dock	Expand capacity/coordinate with DBW
	Programmatic actions: ensure adequate boat dock capacity for non-peak recreational season special events, such as fishing tournaments; ensure adequate adjustment of boarding docks; ensure adequate and timely debris removal at the boat ramp; and provide boaters with information on substitute boating facilities	Public safety, access

Facility	Improvement or Measure	Purpose/Comments
Oroville dam overlook day-use area	Install 4 picnic tables with shade ramadas, construct 100-spaces parking area on the terrace to the south of the dam, improve the surface of the walkway connecting the parking lot on the terrace to the south of the dam to dam crest level, provide interpretive panels at the scenic overlook, and modify the existing parking spaces near the south abutment of the dam and the existing restroom	Expand capacity, ADA compliance
Lake Oroville floating campsites	Install 3 additional new floating campsites in Lake Oroville: 2 in the Lime Saddle area and 1 in either the West Fork or North Fork arms of the reservoir	Expand capacity
Lime Saddle trail	Construct a new 3.5-mile trail for hikers and bicyclists from the Lime Saddle campground to the Lime Saddle day-use area	Meet visitor needs, access
Potter's Ravine north fork shoreline trail	Extend the multiple-use trail 2 miles to provide access to additional, remote portions of the Lake Oroville shoreline	Meet visitor needs, access
Loafer Creek loop trail	Change trail designation to allow bicycle use on most of the trail except for a segment near the Loafer Creek equestrian campground	Meet visitor needs, access
	Open an existing graded dirt access and service road that extends from just east and south of the Loafer Creek equestrian campground south to the Saddle dam trailhead to bicycle use to provide bicycle access from the Loafer Creek campground to the Saddle dam area, where the Bidwell Canyon trail begins	Meet visitor needs, access
Roy Rogers trail	Change trail designation to allow bicycle use on the segment connecting the Loafer Creek campground to the service/access road	Meet visitor needs; access
Saddle dam trailhead access	1 or 2 additional access trails from the trailhead/parking area to the Lake Oroville shoreline	Meet visitor needs, access
Bidwell Canyon trail	Relocate a segment of the trail to accommodate other modifications at the Bidwell Canyon complex and change trail designation to allow equestrian use on the entire trail	Meet visitor needs, access
Brad B. Freeman trail	Realign a section to eliminate security concerns due to its proximity to the Hyatt power plant switchyard, construct and designate the new section of trail to multiple-use standards, and allow equestrian use on certain segments of the trail	Meet visitor needs, access
Dan Beebe trail	Change trail designation to allow bicycle use on most of the trail, with the exception of a steep segment over Sycamore Hill	Meet visitor needs, access

Notes: ADA – Americans with Disabilities Act
DBW – California Department of Boating and Waterways

In its comments on the Settlement Agreement filed with the Commission on April 26, 2006, Butte County states its concerns with both the current recreational visitor-use data provided by DWR and

DWR's estimated projected use of the project facilities. Butte County states that the facility upgrades DWR proposes at Lake Oroville are not designed to accommodate current and realistic projections of recreational demand during the new license term but would only allow DWR to comply with ADA. Butte County believes that DWR should construct more facilities, such as campgrounds and marinas, and should provide more docking/moorage.

In its motion to intervene filed with the Commission on March 30, 2006, Butte County recommends that DWR improve the facilities and services offered at the Bidwell Canyon and Lime Saddle marinas.

In their motion to intervene filed with the Commission on March 31, 2006, George Weir, Vicki Hittson-Weir, and Pathfinder Quarter Horses et al. recommend that DWR:

- construct an enclosed multiple-use events center on Lake Oroville State Recreation Area land with grandstands, concessions, support offices, facilities, and parking to be used for events such as sporting events, concerts, conventions, livestock expositions, and fair expositions by 2013;
- provide new marina facilities and a boat ramp at Potters Ravine by 2010;
- improve the Saddle dam trailhead access by providing (1) lighting in the parking area, (2) two vault restrooms with hand washing sinks, (3) 10 concrete picnic tables, (4) shade trees, (5) piped potable water, (6) two water tanks for horses with outlet valves, and (7) tie rails between the picnic tables and at the restrooms by 2009. Allow overnight parking for equestrians during special events by 2009;
- build a new equestrian group campground at Loafer Creek with central water availability, 2 restrooms, washing facilities with showers, parking for 15 vehicles with horse trailers and 15 self-contained RV horse trailers, by 2009;
- coordinate with DPR, Corps, the Forest Service, and volunteers to build the Lake Oroville Rim trail primarily for equestrians and hikers, for sections meeting safety guidelines, and for shared-use with mountain bikers by 2012; and
- annually provide \$10,000 for stocking bass in Lake Oroville and making a donation to the local bass tournament.

In their comments on the draft EIS, George Weir, Vicki Hittson-Weir, and Pathfinder Quarter Horses explain that their recommended equestrian facility with boarding stables and a 1,000-seat amphitheater would be located in the Loafer Creek area and was a facility discussed at the time the original license for the Oroville Facilities was issued. They further illustrate that the continuous multiple-use loop trail they recommended providing around Lake Oroville with smaller sections of trails was from the study conducted by Pete Dangermond in 2003.

In its response filed May 26, 2006, DWR asserts that Lake Oroville provides one of the best lake-based bass fisheries in California. DWR states that requiring it to fund a bass tournament would be tantamount to ordering compensation, in clear violation of long-standing precedent. DWR also asserts that the Commission is not empowered to require payment for an alleged loss of fisheries resources where there is no evidence that fish populations are adversely affected.

Staff Analysis

As proposed, the recreational improvements and measures scheduled for completion within the first 10 years at Lake Oroville would reduce identified environmental and health and safety concerns, improve access to project waters, and increase accessibility and respond to the need for additional day and overnight developed capacity. For the most part, DWR's prioritization seems to accurately reflect:

(1) facility and site condition survey results; (2) the need for providing adequate access to project lands and waters⁷⁹; (3) the need to meet the existing and future recreational demand; (4) the need to accommodate existing and potential types of project-related recreational uses at the project; (5) a commitment to provide accessible recreational opportunities; and (6) a demonstrated nexus between the proposed development and the project. However, we note the following exception at Foreman Creek.

The development planned for Foreman Creek is outlined in the Recreation Management Plan, and Proposed Article A129, *Improve and Redirect Recreation Usage to Specific Areas at Foreman Creek*, includes additional guidance as to how the development should take place to protect cultural resources. As explained in section 3.3.8.2, *Cultural Resources*, we find that the development at Foreman Creek, as proposed, would adequately protect cultural and historical resources at the project. The effects of DWR's proposed development on recreational resources at Foreman Creek are presented later in this section under analysis of Proposed Article A129.

DWR visitor-use data indicate capacity issues at boat launches and parking areas, and campgrounds. DWR proposes increasing capacity at each of these types of facilities across the project. The Proposed Action appears to be consistent with Butte County's recommendation to provide additional capacity at project recreational facilities. However, there may be a shortage of space at boat moorings, docks, and storage at commercial marinas at Lake Oroville. These improvements would not be necessary to provide public access to project waters, but rather they would facilitate the public's use of project waters. We do not find that the need for this facility corresponds to any identified issue or concern regarding public access or recreational use related to the project. Further, we consider that such facilities provide convenience to the public rather than addressing a project effect.

Pathfinder Quarter Horses et al. recommend that DWR construct an enclosed multiple-use events center on Lake Oroville State Recreation Area land in the Loafer Creek area with grandstands, concessions, support offices, facilities, and parking to be used for events such as sporting events, concerts, conventions, livestock expositions, and fair expositions by 2013. This facility would be available to a variety of user groups. Pathfinder Quarter Horses et al. also did not indicate how this facility is linked to the hydroelectric project or if it would even be located within the project boundary. Pathfinder Quarter Horses et al. did not clarify how this facility would address or resolve specific project effects. We do not find that this recommendation has a project nexus.

Pathfinder Quarter Horses et al. recommend that by 2009, DWR provide new marina facilities and a boat ramp at Potters Ravine, which is located on the west side of the main body of Lake Oroville within the project boundary on land currently managed by DPR. The Butte County General Plan includes Potters Ravine under its Policy 5, which provides for development to serve the recreation-minded public (such as parking areas, camping areas, picnicking sites, boat ramps, comfort stations, sales of food, gasoline, oil, and water, observation points, and other facilities). The cove at Potters Ravine is attractive for recreational use because it is protected from high winds and associated waves. Also, the relatively gentle shoreline topography in this location is conducive to dispersed shoreline recreational activities, including shore fishing, picnicking, and swimming. Currently, two full-service marinas are located on Lake Oroville: one at Lime Saddle and the other in Bidwell Canyon. Each marina provides several hundred mooring buoys for long-term rental, primarily for houseboats, along with a smaller number of covered and uncovered boat slips. Only 35 to 38 percent of the respondents to DWR's recreational surveys reported the need for additional boat ramps and marinas and more than 60 percent thought that the number of marinas at the Oroville Facilities was sufficient. We note that DWR implements closures in this area to protect bald eagles during nesting season (see analysis of Proposed Article A118, *Minimization of Disturbances to Nesting Bald Eagles*, later in this section) and placement of a marina in

⁷⁹ Specifically, many boat launches would be improved (e.g., resurfaced, additional boarding docks) and boat ramps extended to accommodate access at low reservoir levels.

this location, as Pathfinder Quarter Horses et al. recommend, may conflict with other resource management objectives.

The Pathfinder Quarter Horses et al. recommendation for installing 10 picnic tables at the Saddle dam trailhead access is consistent with DWR's proposal at this site. Pathfinder Quarter Horses et al. also recommend that DWR provide lighting, 2 additional restrooms with hand washing sinks, shade trees, piped potable water, 2 water tanks for horses with outlet valves, and tie rails between the picnic tables and at the restrooms. DWR proposes evaluating the feasibility of extending the existing underground water system to pipe potable water to the watering trough and an outdoor handwashing basin with a French drain. Providing potable water at this location with water tanks for horses and a hand-washing sink would further enhance this development. This site receives more use in the spring and fall when air temperatures are cooler and amount of daylight diminishes. Even though it is a day-use site, providing lighting in the parking area, as proposed by Pathfinder Quarter Horses et al., would increase public safety for equestrians loading horses and gear in the late afternoon as the sun is going down. Accommodating equestrians who prefer to use the trails during the cooler months when there is less daylight would probably increase the number of visitors who would use this facility. Providing 1 or 2 additional restrooms at this site would also provide for visitor needs and avoid health and safety concerns, particularly since picnic tables are also proposed at this location. Creating designated, hardened areas for tying horses would eliminate potential soil compaction and vegetation damage that can occur when horses are tied indiscriminately to trees throughout an area. Furthermore, tying horses to trees in this area is prohibited by California Public Resources Code Section 4359(b).

Loafer Creek is a popular location for equestrian access to project lands and the Lake Oroville shoreline. Pathfinder Quarter Horses et al. recommend building a new equestrian group campground at Loafer Creek, doubling the existing capacity available to camping equestrians and their horses. Under the Proposed Action, DWR would monitor use at this site and consider various management actions when certain capacity thresholds have been reached, including expanding the existing equestrian campground. Because equestrian use is typically higher in the off-season, it would be appropriate to establish triggers that reflect this use pattern. Considering the existing high use levels and comparing future monitoring data to a trigger that reflects seasonal use may result in additional development in the near future. This would be consistent with the recommendation of Pathfinder Quarter Horses et al.

Pathfinder Quarter Horses et al. recommend that DWR coordinate with DPR, the Corps, the Forest Service, and volunteers to build the Lake Oroville Rim trail primarily for hikers and equestrians. Our review of the Recreation and Socioeconomics Work Group meeting summaries determined that in 2003 a multiple-use loop trail system around Lake Oroville, with smaller sections of trails, was contemplated by a trails subgroup. However, little information about the proposed location of this trail is available on the project record. Undeveloped public land around Lake Oroville is abundant and available for general public use. However, steep slopes are common above 167 miles of the shoreline, and this condition would probably limit the ability to create a trail or, at a minimum, require substantial site modification to avoid soil erosion.

Pathfinder Quarter Horses et al. also recommend that DWR annually provide \$10,000 to enhance bass fishing at Lake Oroville by stocking bass in the reservoir and donating to the local bass tournament. As discussed in section 3.3.3, *Aquatic Resources*, the Lake Oroville warmwater fishery is currently a self-sustained fishery, and its black bass fishery is significant, both in terms of angler effort and economic effect on the area. Because the bass population is self-sustaining and habitat would be enhanced through the Lake Oroville Warm Water Fishery Habitat Improvement Program (Proposed Article A110), stocking would be unnecessary. Considering the existing health of the warmwater fishery, this recommendation would not respond to an effect caused by the project.

Proposed Recreation Facilities and Improvements at Thermalito Diversion Pool (Within 10 Years of License Issuance)—DWR proposes completing the following recreational enhancements in the first

10 years following license issuance at the Thermalito diversion pool (table 48). The locations of these facilities are shown on figure 18.

Table 48. Proposed recreational enhancements in the first 10 years at Thermalito diversion pool.

Facility	Improvement or Action	Purpose/Comments
Diversion pool day-use area	Install 10 concrete picnic tables and pole stoves/grills along Burma Road upstream of the diversion dam, place additional gravel at the existing boat launch, and possibly construct an ADA accessible fishing platform or pier	Meet visitor needs, access, ADA compliance
Lakeland Boulevard trailhead access	Relocate and/or construct a new road to access the lower old railroad grade trail, provide a gravel parking area with space for vehicles pulling small trailers, install a vault restroom, install 10 picnic tables with pole stoves/grills, construct pedestrian access trail to the water, provide a gravel car-top boat launch, install fencing to separate the access road and proposed day-use facilities from the railroad tracks, install stock watering trough at the existing gravel parking area, and consider feasibility of extending the existing underground water system in order to pipe water to the watering trough and an outdoor handwashing basin with a French drain	Access, public health, and safety
Feather River Fish Hatchery	Place gravel at shoreline to improve existing non-motorized boat launch site at the Feather River Fish Hatchery and provide signage and vehicle barriers	Access/coordinate with DBW
Brad B. Freeman trail	Change trail designation to allow equestrian use	Access
	Programmatic actions: trail crossing of Thermalito diversion pool feasibility study	Access
Dan Beebe trail	Change trail designation to allow bicycle use, on most of the trail (exception is a steep segment over Sycamore Hill)	Access
Demonstration mountain bicycle trail	Evaluate feasibility of a new mountain bicycle trail beginning at Lakeland Boulevard trailhead access and if determined feasible, construct 2- to 4-mile trail connecting to Dan Beebe trail at a westward point. After trail construction close the parallel portion of the Dan Beebe trail to bicycle use	Access, resolve potential user conflicts
Feather River Fish Hatchery	Construct a paved trail from the Feather River Fish Hatchery parking/viewing area downstream to the project boundary	ADA compliance, access/contingent on an adjoining trail being built by others

Note: ADA – Americans with Disabilities Act
DBW – California Department of Boating and Waterways

In their motion to intervene filed with the Commission on March 31, 2006, George Weir, Vicki Hittson-Weir, and Pathfinder Quarter Horses et al. recommend that DWR:

- purchase 83 acres of privately owned land adjacent to the Thermalito diversion pool for a regional equestrian park by 2010 with: (1) a covered 125 foot by 250 foot arena with grandstands; (2) two outdoor arenas; (3) a round pen; (4) access to trails; (5) two concession building; (6) parking for 50 horse trailers; (7) camping for individuals or groups; and (8) RV parking. The park would be the home of the Oroville Pageant Riders, with leasing privileges to other equestrian associations, and used for municipal events, special events, and horse stabling;
- improve the Lakeland Boulevard trailhead access by 2009, with: (1) lighting in the parking areas; (2) two vault restrooms with hand-washing sinks; (3) 20 concrete picnic tables, (4) shade trees; (5) piped potable water; (6) two water tanks for horses with outlet valves; and (7) tie rails in between picnic tables and next the restrooms. Allow overnight parking for equestrians during special events (also recommended in their comments filed with the Commission on April 15, 2006).

In its response filed May 26, 2006, DWR states that its recreational needs studies did not identify a need for the grandstands and other facilities requested by Pathfinder Quarter Horses et al. DWR points out that Pathfinder Quarter Horses et al. did not provide any evidentiary support for its recommendation and also fails to demonstrate any nexus to the project.

Staff Analysis

As proposed by DWR, the recreational improvements and actions scheduled for completion within the first 10 years at Thermalito diversion pool would reduce identified environmental and health and safety concerns, improve access to project waters, increase accessibility, and respond to the need for additional day-use developed capacity. DWR's prioritization seems to accurately reflect: (1) facility and site condition survey results, (2) the need for providing access to project lands and waters; (3) the need to meet the existing and future recreational demand; (4) the need to accommodate existing and potential types of project-related recreational uses at the project; (5) a commitment to provide accessible recreational opportunities; and (6) a demonstrated nexus between the proposed development and the project.

Pathfinder Quarter Horses et al. recommend that DWR purchase 83 acres of privately owned land adjacent to the Thermalito diversion pool for a regional equestrian park. Pathfinder Quarter Horses et al. did not specify a location for this facility, so it is not clear if it would be located within the project boundary. Pathfinder Quarter Horses et al. also did not indicate how this facility is linked to the hydroelectric project or clarify how this facility would address or resolve specific project effects. We do not find sufficient information to determine that this recommendation has a project nexus.

The other recommendations of Pathfinder Quarter Horses et al. would double the number of picnic tables DWR proposes at the Lakeland Boulevard trailhead access. Pathfinder Quarter Horses et al. also recommend that DWR provide lighting, two additional restrooms with hand washing sinks, shade trees, piped potable water, two water tanks for horses with outlet valves, and tie rails between the picnic tables and at the restrooms. DWR proposes to evaluate the feasibility of extending the existing underground water system to pipe potable water to the watering trough and an outdoor handwashing basin with a French drain. Providing potable water at this location with water tanks for horses and a hand-washing sink would enhance this development. This site receives more use in the spring and fall when air temperatures are cooler and amount of daylight diminishes. As stated previously, providing lighting in the parking area as recommended by Pathfinder Quarter Horses et al. would increase public safety for equestrians loading horses and gear in the later afternoon as the sun is going down. Accommodating

equestrians who prefer to use the trails during the cooler months when there is less daylight would probably increase the number of visitors who would use this facility. Currently, a portable restroom is available at this site and DWR had proposed installing a vault restroom; providing one or two restrooms would provide for visitor needs and would avoid potential health and safety concerns, particularly since picnic tables are also proposed at this location. Creating designated, hardened areas for tying horses would eliminate potential soil compaction and vegetation damage that can occur when horses are tied indiscriminately to trees throughout an area. Furthermore, tying horses to trees in this area is prohibited by California Public Resources Code Section 4359(b).

Proposed Recreation Facilities and Improvements at Thermalito Forebay (Within 10 Years of License Issuance)—DWR proposes completing the following recreational enhancements in the first 10 years following license issuance at the Thermalito forebay (table 49) (figure 18 shows the location of these facilities):

Table 49. Proposed recreational enhancements in the first 10 years at Thermalito forebay.

Facility	Improvement or Action	Purpose/Comments
North Thermalito forebay day-use area	Install a fish cleaning station	Meet visitor needs, public health and safety
	Programmatic actions: evaluate methods for warming the water in the swimming lagoon and monitor water quality in the swimming lagoon	Public health and safety, meet visitor needs
South Thermalito forebay day-use area	Place approximately 6 inches of sand along about 100 linear feet of shoreline between 220 and 230 feet elevation; install 5 to 10 picnic tables, pole stoves, and shade ramadas; landscape with shade trees and shrubs; construct accessible fishing platform or pier; and designate swimming area by placing buoys	Public safety, meet visitor needs, protect vernal pools/coordinate with DPR
	Programmatic action: monitor water quality at swimming cove	
Brad B. Freeman trail	Change trail designation to allow equestrian use along Thermalito forebay	Access
Thermalito forebay	Create short trails between the existing Brad B. Freeman trail and shoreline and construct a 1-mile-long, hiking-only loop trail near the shoreline of the North forebay	Access, protect vernal pools/coordinate with DPR
	Programmatic action: evaluate feasibility of providing two new multiple-use trails around the south side of the North forebay and around the north side of the South forebay, creating a loop around the entire forebay and connecting to Brad B. Freeman trail	Access, protect vernal pools and giant garter snakes and their habitat/coordinate with DPR

In its comments on the Settlement Agreement filed on April 26, 2006, Butte County points out that DWR’s proposal to close swimming areas that do not meet water quality standards for the protection of human health is inadequate to address water quality problems. In its response filed May 26, 2006, DWR points out that its proposed feasibility analysis of additional swimming areas at the Oroville Facilities addresses the need to mitigate potential health hazards through improving water circulation or other methods to improve water quality. We discuss water quality standards and the current status of water quality at the project swimming areas in section 3.3.2, *Water Quantity and Quality*.

Staff Analysis

As proposed, the recreational improvements and actions scheduled for completion within the first 10 years at Thermalito forebay would reduce identified environmental, health and safety concerns, improve access to project waters, increase accessibility, and respond to the need for additional day-use developed capacity. DWR’s prioritization seems to accurately reflect: (1) facility and site condition survey results; (2) the need for providing access to project lands and waters; (3) the need to meet the existing and future recreational demand; (4) the need to accommodate existing and potential types of project-related recreational uses at the project; (5) a commitment to provide accessible recreational opportunities; and (6) a demonstrated nexus between the proposed development and the project.

Proposed Recreation Facilities and Improvements at Thermalito Afterbay and Oroville Wildlife Area (Within 10 Years of License Issuance)—DWR proposes completing the following recreational enhancements in the first 10 years following license issuance at the Thermalito afterbay (table 50) (figure 18 shows the location of these facilities):

Table 50. Proposed recreational enhancements in the first 10 years at Thermalito afterbay.

Facility	Improvement or Action	Purpose/Comments
Wilbur Road boat launch	Install directional signs along the roadside to the site	Meet visitor needs
Larkin Road boat launch	Place approximately 6 inches of sand along about 100 linear feet of shoreline between 125 and 132 feet msl; install 5 to 10 picnic tables, pole stoves and shade ramadas; landscape with shade trees and shrubs; construct accessible fishing platform or pier; and designate swimming area by placing buoys	Meet visitor needs, public safety, protect vernal pools and giant garter snakes and their habitat
Thermalito afterbay outlet area	Construct 20-site campground north of outlet channel (tables, graveled spurs, vehicle control barriers)	Meet visitor needs, protect special status species and their habitat
	Construct 5 to 10 day-use area sites south of outlet channel (gravel access roads, vehicle control barriers, signage); revegetate disturbed areas; install 1 to 2 additional vault restrooms, if needed; install directional signs; upgrade existing boat ramp surface with concrete; and pave the access road and parking area at the boat ramp	Meet visitor needs, protect special status species and their habitat
OWA dispersed use sites	Install 2 accessible watchable wildlife sites with trash receptacles, vehicle barriers, signs, and gravel shoulder parking and evaluate site hardening versus closure; improve 2 existing non-motorized boat launch sites (place gravel in small area of shoreline, signage, vehicle barriers, minor grading and graveling the roadway or access trail); and possibly develop a river trail ^a	Access, meet visitor needs, protect special status species and other resources, provide accessible opportunities
	Programmatic action: maintain and enhance existing access opportunities for traditional uses such as hunting and fishing in OWA	Access/coordinate with DFG

^a The term “river trail” refers to a navigable route of travel along the river with designated points of shoreline access.

In its motion to intervene filed with the Commission on December 16, 2005, the Anglers Committee et al. recommend that DWR construct additional public boat launching facilities into the

navigable water of the Feather River downstream of the fish barrier dam and downstream of the Thermalito afterbay outlet for public access to the waters of the Feather River. The Anglers Committee et al. also recommend that DWR fund the maintenance of garbage cans for trash at all public facilities in the OWA.

In its response filed May 26, 2006, DWR points out that it has agreed to construct additional launching facilities in its Recreation Management Plan, even though its recreational needs studies did not specifically identify additional launching facilities as a project-wide need.

Staff Analysis

As proposed, the recreational improvements and actions scheduled for completion within the first 10 years at Thermalito afterbay and OWA would reduce identified environmental, health and safety concerns, improve access to project waters, increase accessibility and respond to the need for additional day-use developed capacity. DWR's prioritization seems to accurately reflect: (1) facility and site condition survey results; (2) the need for providing access to project lands and waters; (3) the need to meet the existing and future recreational demand; (4) the need to accommodate existing and potential types of project-related recreational uses at the project; (5) a commitment to provide accessible recreational opportunities; and (6) a demonstrated nexus between the proposed development and the project.

The Proposed Action includes additional boat launch development at the OWA, which would accommodate the recommendation of the Anglers Committee et al. to provide additional public access to the Feather River. We note that appendix B of the Settlement Agreement also includes a measure to provide funding to manage the OWA, which would accommodate the recommendation of the Anglers Committee et al. related to trash cans and collection.

Proposed Recreation Facilities and Improvements Beyond 10 Years of License Issuance—Under the recreational facility development program in the Recreation Management Plan, DWR would complete other recreational improvements after the first 10 years of a new license. The decision to construct new facilities would be based on capacity threshold monitoring and demonstrated need as revealed by monitoring results. DWR expects new facilities, such as campsites, parking areas, and swim areas, may be needed after the first 10 years of a new license at Lime Saddle campground, Lime Saddle group campground, Lime Saddle day-use area, Loafer Creek campground, Loafer Creek group campground, Lake Oroville Visitor Center, and Wilbur Road boat launch (figure 18 shows the location of these facilities). Beyond year 10 of the license, DWR also anticipates replacing or refurbishing facilities and structures that have reached the end of their life expectancy and would be in need of replacement.

Staff Analysis

DWR states that additional recreational facilities, including campsites, parking areas, and swim areas, at Lime Saddle campground, Lime Saddle group campground, Lime Saddle day-use area, Loafer Creek campground, Loafer Creek group campground, Lake Oroville Visitor Center, and Wilbur Road boat launch would likely be needed over the term of the license. Monitoring recreational use would provide relevant information about visitors' needs and capacity issues throughout the license term. DWR could use this monitoring information to take timely and appropriate action to build new facilities and correct problems that may arise. DWR would not construct unwanted or unneeded facilities because the decision to provide additional facilities would be based periodic analysis of monitoring results that would reflect actual conditions.

DWR would not begin replacing or refurbishing⁸⁰ existing recreational facilities until, at least, 10-years after license issuance. This is an appropriate time frame for recreational facilities that have been recently constructed or reconstructed. However, some of the older facilities may require attention sooner than 10 years. In particular, the boat-in campgrounds (Goat Ranch, Bloomer, and Craig Saddle) appear to have some environmental and health and safety concerns (e.g., erosion, wildland fire potential, and deteriorating facility components) that are consistent with criteria used to determine the recreational improvements that would be scheduled within the first 10-year planning cycle of the Recreation Management Plan. If the boat-in campgrounds were not replaced until the second 10-year planning cycle, existing erosion problems would not be corrected and health and safety concerns associated with aging infrastructure and fire safety would persist.

Trails and Trail Management—Although DWR identified relatively low trail use and a high level of satisfaction with the trails during its user surveys, DWR proposes a comprehensive non-motorized trails program as part of its Recreation Management Plan. This program would change existing trail designations, as listed in table 51, and additional trails would be built changing the level of access to project lands and waters for all user groups. To balance public access and recreational needs or desires with management requirements, DWR would do more trail planning and design assessment before implementing the program to address resource protection and public safety. Before changing the trail use designation along an existing trail, particularly a change to multiple use, DPR and/or DWR would assess whether the proposed change was safe or appropriate for multiple use by checking for adequate trail sight distance, slope, width, tread, signage, etc. and addressing any issues identified.

Table 51. Current and proposed trail designations for project trails. (Source: DWR, 2006e and DWR, 2005a)

Name of Trail	Miles of Trail	Current Allowable Uses	Proposed Allowable Uses
Existing Trails			
Roy Rogers trail	5.7	Equestrian, hiking	Equestrian, hiking ^a
Dan Beebe trail	14.6	Equestrian, hiking	Multiple use ^b
Loafer Creek loop trail	7.1	Equestrian, hiking	Multiple use ^c
Chaparral interpretive trail	0.3	Hiking only	Hiking only
Loafer Creek day-use/campground trail	1.6	Hiking only	Hiking only
Wyk Island trail	0.7	Hiking only	Hiking only
Bidwell Canyon trail	4.9	Bicycles, hiking	Multiple use
Brad B. Freeman trail	44.7	Bicycles, hiking ^d	Multiple use ^e
Sewim Bo trail	0.5	Multiple-use	Multiple use
Potter’s Ravine trails	10.0	Multiple-use ^f	Multiple use ^f

⁸⁰ We distinguish between *installing new infrastructure* and *replacing or refurbishing* an existing recreational site. Installing new infrastructure would include actions such as (1) improving a boat ramp and installing a new bathroom at an existing development and (2) constructing new campgrounds, day-use areas or trails. Replacement or refurbishment would entail redesigning and reconstructing an entire existing facility when it has reached the end of its useful life. Replacement or refurbishment would include actions such as (1) redesigning the development (e.g., campground), if necessary; (2) constructing new infrastructure, such as restrooms and access roads; (3) reconstructing tent pads and spurs; and (3) installing new signs, vehicle control barriers, and gates throughout.

Name of Trail	Miles of Trail	Current Allowable Uses	Proposed Allowable Uses
Proposed Trails			
Saddle dam shoreline access	<0.1	Proposed, not yet constructed	Hiking only
Thermalito forebay shoreline access	0.1–0.5	Proposed, not yet constructed	Hiking only
Service road bicycle access to Saddle dam	0.7	Currently closed to the public	Hiking, bicycles
Lakeland Boulevard-Sycamore Hill demonstration trail (parallel to Dan Beebe trail) ^g	2.0–4.0	Proposed, not yet constructed	Hiking, bicycles
North and South Forebay loop trails (new segments connecting to Brad B. Freeman trail)	2.0–3.0	Proposed, not yet constructed	Multiple use
Potter’s Ravine (extension of existing trail system)	2.0	Proposed, not yet constructed	Multiple use

- ^a A segment of this trail connecting the campground to the service/access road would be opened to bicycle use.
- ^b The Sycamore Hill segment would remain closed to bicycle use.
- ^c The segment of this trail south of the equestrian campground and parallel to the service/access road would remain closed to bicycle use.
- ^d Currently, some portions of the Brad B. Freeman trail outside of the Lake Oroville State Recreation Area are open to equestrian use.
- ^e Additional segments of the Brad B. Freeman trail on the north shore of the Thermalito diversion pool and around Thermalito forebay would be open to equestrian use.
- ^f All but a short pedestrian-only segment near spillway cove is multiple use.
- ^g The Sycamore Hill section of the Dan Beebe trail would be closed to bicycle use, if this trail were constructed.

During settlement negotiations, DWR convened a Trails Focus Group that developed the following objectives for the project trails: (1) provide some separate-use trail segments predicated on widely recognized safety concerns (Sycamore Hill portion of Dan Beebe trail); (2) maintain connectivity of project recreational areas for all trail users, to the degree practicable; (3) make much of the project’s trail resources available to as many public trail users as possible; (4) provide some equestrian-only trail segments associated with the unique equestrian campground in the Loafer Creek area (much of the Roy Rogers trail and a portion of the Loafer Creek loop trail); and (5) develop a monitoring plan to protect natural and cultural resources associated with trail routing and maintenance. Using these objectives, DWR developed a trail program that would modify the designations of most of the existing 90 miles of trails (table 51, figure 20).

In addition to trail designation changes, DWR proposes to maintain the project trails according to the standards and frequency that are already established. Trails are maintained every 3 years according to the standards set in DWR’s 1996 *Vegetation Management Guidelines for Trails and Roads* (DWR, 1996) and the 1991 DWR Trail Handbook (DWR, 1991). These standards address safety issues, aesthetic considerations, and accessibility for various types of skill levels and activities. The standard equestrian/hiker trail is at least 4 feet wide and has a 10-foot overhead clearance. Bicycle trails have the same widths and clearances as the equestrian/hiker trails, but the sight distance is increased to allow for cyclists to see oncoming users and safely pass on the trail. Multiple-use sections of trails are wider, with increased lines of sight (letter from Raymond D. Hart, Deputy Director, DWR, to David Boergers, Secretary, Federal Energy Regulatory Commission, dated August 31, 2001).

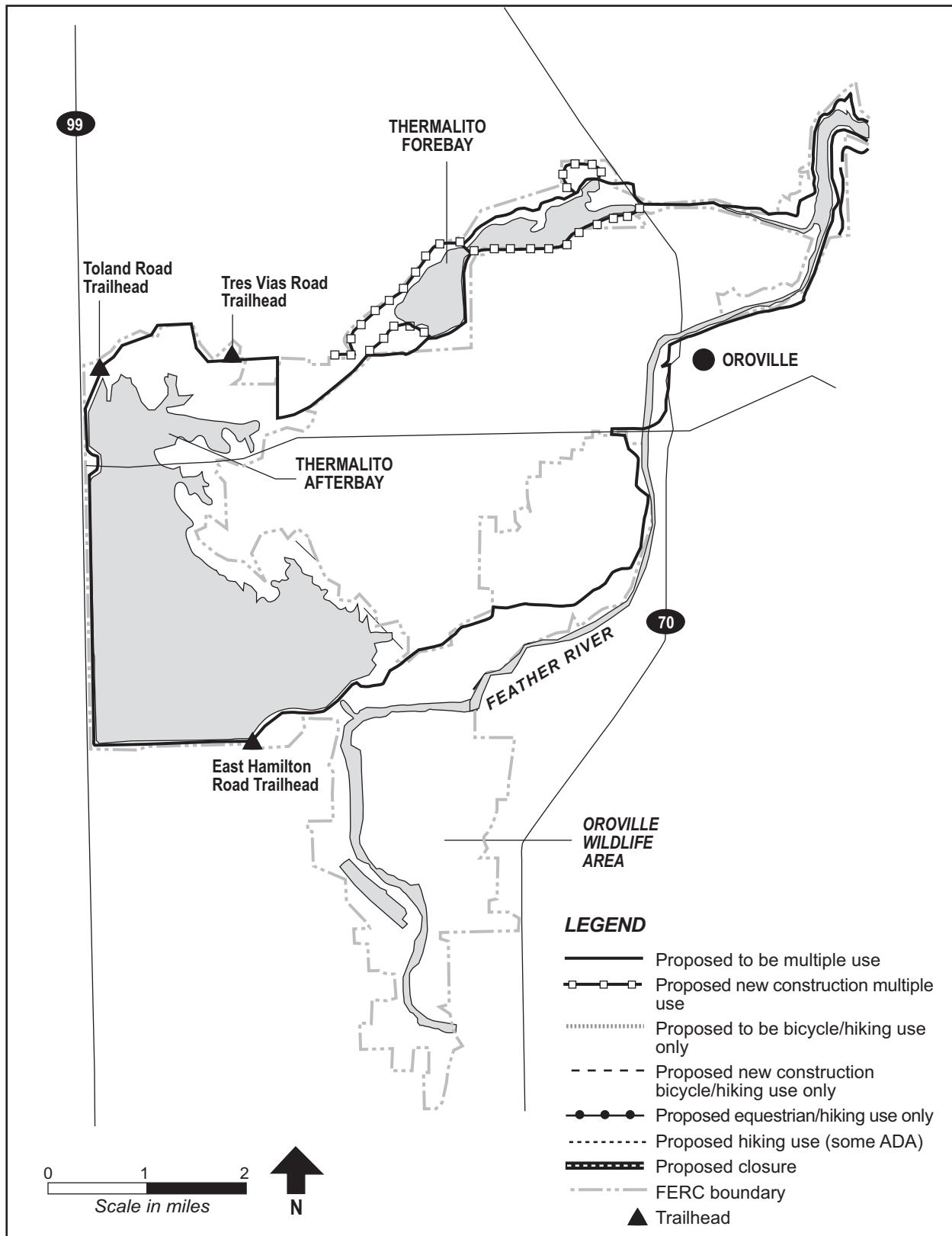


Figure 20. DWR's proposed trails and trail designations for Oroville Facilities. Page 1 of 2

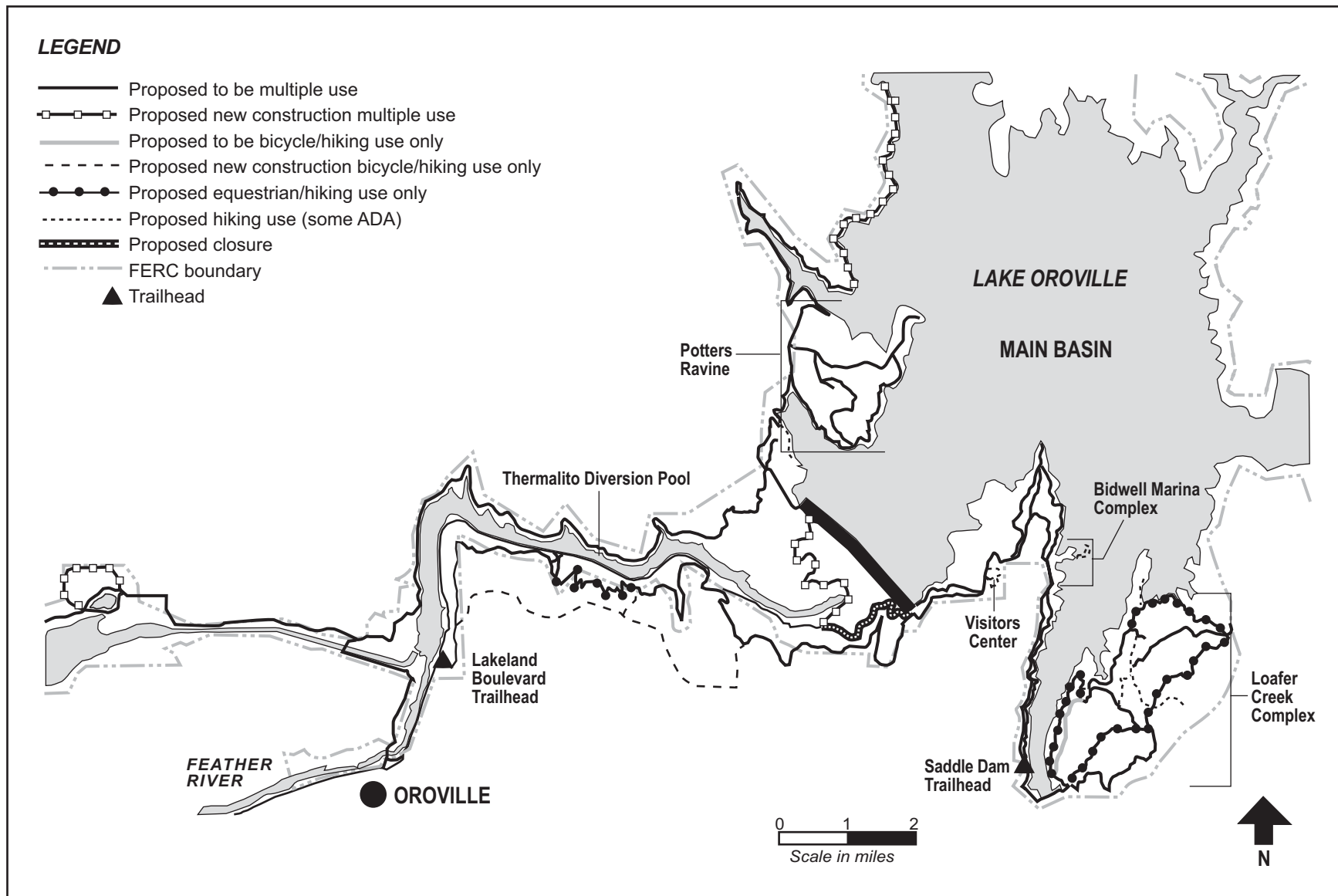


Figure 20. DWR's proposed trails and trail designations for Oroville Facilities. Page 2 of 2

According to the 1991 Trail Handbook, the Oroville Facilities trails are Class I trails. Class I trail beds are a minimum of 36 inches wide with a preferred width of 48 inches. The trail tread surface varies from 30 inches to 48 inches, depending on the surrounding terrain, trees, and vegetation. During trail maintenance activities, the trail tread surface is maintained to provide an adequate walking or riding surface, free from obstacles or hazards. Additionally, the trail is cleared to allow access, and brush is cut to define and protect the established tread.

Several organizations representing both bicycle and equestrian users signed the Settlement Agreement and 102 comment letters were filed in support of the proposed draft trail designations in the Recreation Management Plan. Although DWR's proposed comprehensive non-motorized trails program has considerable support, many oppose it: 37 comment letters were filed in opposition. The key concerns raised in these 37 filings include (1) the lack of a demonstrated need for multiple-use trails, (2) safety/user conflicts, (3) resource damage, (4) the process that DWR used to develop the proposed designated uses, (5) historical use, and (6) accessibility.

Although there were many filings related to trails, only a few entities provided recommendations. The Anglers Committee et al. recommend that DWR maintain the current trail designations as described in the project recreation plan⁸¹ and not allow bicycles on trails designated for horses.

In its motion to intervene filed with the Commission on March 30, 2006, Butte County recommends that DWR improve trails in the project area in response to the high demand for trail use by hikers, equestrians, and bicyclists.

In its motion to intervene filed with the Commission on March 31, 2006, the Action Coalition of Equestrians recommends that DWR preserve and protect the traditional single-track hiking and equestrian trails as a unique resource and not maintain or modify the trails by widening them beyond their current single-track configuration.⁸² It recommends that DWR protect hikers and equestrians using the trails by supervising trails, posting signs, and erecting barriers to inappropriate and unsafe mountain bicycle use.

In their motion to intervene filed with the Commission on March 31, 2006, George Weir, Vicki Hittson-Weir, and Pathfinder Quarter Horses et al. recommend that DWR:

- adopt California Equestrian Trails and Land Coalition Safety Guidelines⁸³ for all multiple-use trails at the Oroville Facilities by 2007 (also recommended in their comments filed with the Commission on April 15, 2006);

⁸¹ On September 22, 1994, the Commission approved a revised recreation plan for the project.

⁸² The Dan Beebe Trail was originally designed as a narrow, single-track trail, where two horses could not travel side by side (April 1, 2002, Oroville Recreation Advisory Committee Meeting Notes).

⁸³ These guidelines, which were filed with the Commission by both the California State Horsemen's Association and Pathfinder Quarter Horses, support multiple-use trails where appropriate and include trails where the terrain and slope do not limit safe passage between equestrian and bicycle users. The California Equestrian Trails and Land Coalition suggests several standards for consideration in multiple-use trail design: (1) visual clearance—switchbacks and curves should have 50 feet of visual clearance to allow users to see oncoming users, (2) trail width—a minimum of 6 feet to allow equestrians and bicyclists to safely pass, (3) trail slope—less than 12 percent if possible to allow for safe passing and visibility, and (4) separate trails—where terrain is steep, visibility is limited, and safe passage is hazardous consider having separate parallel trails. The California Equestrian Trails and Land Coalition also addresses safety associated with a slippery trail surface and safe speeds on multiple-use trails. The California Equestrian Trails and Land Coalition recommends adopting the classic triangle yield sign along with a right-of-way protocol where equestrians have the primary right of way, hikers next, and then bicyclists.

- maintain existing hiking/equestrian trails, according to the Oroville Recreation Advisory Committee's recommendations (in its letter filed with the Commission on March 31, 2003, the Oroville Recreation Advisory Committee stated that it supports multiple-use trails and is in favor of building additional trails but does not support the conversion of the Dan Beebe trail, the Loafer Creek trail, and the Roy Rogers trail to multiple-use);
- allow equestrians on all trails identified as dirt roads and trails that meet the California Equestrian and Land Coalition Safety Guidelines;
- complete the loop trails and water crossings as discussed during settlement negotiations by 2009; and
- permanently classify the Dan Beebe, Loafer Creek Loop, and Roy Rogers trails as Lake Oroville and state of California historical equestrian and hiking trails by 2007 (also recommended in their comments filed with the Commission on April 15, 2006).

In their comments filed with the Commission on April 15, 2006, George Weir, Vicki Hittson-Weir, and Pathfinder Quarter Horses et al. recommend that DWR:

- Recognize and adopt the California Riding and Hiking Trail laws at the Oroville Facilities;
- Provide separate and equal equestrian and hiking trails;
- Repair and maintain the historical Dan Beebe equestrian and hiking trail to its original condition (with watershed erosion prevention) and as a footpath;
- By 2011, cooperate with California Department of Parks and Recreation and the Plumas National Forest to extend the equestrian and hiking trail from the Dan Beebe trail to Feather Falls village and trail and then to the Pacific Crest Trail, according to the California Riding and Hiking Trail laws.

In his motion to intervene filed with the Commission on March 31, 2006, Ronald E. Davis recommends that the Dan Beebe, Roy Rogers, and Loafer Creek Loop trails, which were built for foot traffic, continue to be managed as vehicle-free footpaths and only for hiking and equestrian use. Mr. Davis states that the recreation studies have not identified the need to include bicycles on these trails and that DWR has not cooperated with stakeholders to sufficiently analyze data or to develop alternatives. Mr. Davis states that DWR refused to negotiate with stakeholders in planning new trails, developing trail maintenance standards, enforcing regulations, controlling noxious weeds along the trails, and expanding wheelchair access opportunities.

In her comment letter filed on April 26, 2006, regarding the Settlement Agreement, Annette Kolkey recommends making improvements at the Loafer Creek equestrian campground to accommodate larger vehicles and trailers to reduce congestion. She also recommends DWR build, enhance, and expand stable and arena facilities and retain the equestrian/hiker-only trail designation for the Dan Beebe trail.

In the 102 filings in support of the proposed trail designations proponents explained that: (1) multiple-use trails would provide equal access for trail users and ensure the maximum trail use opportunities for hikers, bicyclists and equestrians, (2) decisions regarding trail uses should be made by local land managing agencies because the Commission's expertise lies elsewhere and (3) the proposed trail designations would increase the loop trail opportunities at the project for both equestrians and bicyclists. Concerns raised in these filings also include: (1) safety, (2) equal access for trail users, (3) the fact that environmental effects of bicycle use on trails are similar to those caused by hikers, and (4) future funding opportunities afforded by a united trails community.

Equestrians who support the proposed trail designations cite the proposed changes for the Bidwell Canyon trail as examples of the improved access that would be provided for all trail users. Currently, half of this loop trail is accessible to bicyclists/hikers with the other half accessible to equestrians/hikers only.

Consequently, neither user group has the opportunity to travel the entire loop because of the “out-and-back” route of travel. In addition, the portion of the trail leading to the shoreline is not accessible to equestrians. Under DWR’s proposed designations, bicyclists and equestrians would have loop trail opportunities and equestrians could access the shoreline from this trail.

In its May 26, 2006, filing with the Commission, DWR states that it along with DPR would manage all project trails pursuant to the cited policies of the California Recreational Trails Committee.⁸⁴ DWR points out that its relicensing studies concluded that existing relatively low-use project trails provided the opportunity for increased use and enhanced loop opportunities through multiple-use designation. DWR believes that the extensive existing trails network of more than 75 miles did not warrant vast expansion through construction of additional trails to maintain full user segregation. DWR points out that it proposes to retain 6 miles of trail for exclusive use by hikers and equestrians and that it also proposes to expand equestrian opportunities in the project by designating many more miles of relatively low use trails as multiple use. DWR contends that it is committed to preserving an “equestrian-only” experience and has preserved and expanded equestrian trails, in addition to providing the Loafer Creek equestrian campground. DWR also states that it is pursuing a right-of-way outside of the project boundary to construct a new mountain bicycle trail and, if successful, it would revert an additional 3- to 5-mile trail segment back to equestrian/hiker-only status.

In the same filing, DWR asserts that the proposed segregated and multiple-use trails can be operated safely and points out that fewer than 2 percent of project hikers and equestrians surveyed during the period of multiple-use trails reported any perception of risk when encountering bicyclists on the trails. DWR also contends that its relicensing studies concluded that the project facilities, including trails and trailheads, were in good condition. DWR states that the trails would be maintained pursuant to established standards and trail conditions and any additional need for special maintenance.

In Appendix A of its comments on the draft EIS, DWR also notes that the demonstration mountain bicycle trail originally nominated as an interim project was dismissed by the Interim Projects Task Force because it did not meet its screening criteria. DWR notes that in order to complete the demonstration mountain bicycle trail, it needs to acquire rights-of-way outside of the project boundary which may affect the timing of its development. DWR also points out that it has proposed investigating the feasibility of constructing a new 2 to 4 mile-long trail. Construction of the trail, if feasible, may occur with some supplemental benefits funds for trail segments outside the project boundary, but is contingent upon topographic, jurisdictional, and ownership/easement constraints.

Staff Analysis

Both trail use designation and related trail maintenance have been controversial subjects at the Oroville Facilities for many years. As we show in figure 19 and table 51, the current trail use at the project consists of 2.6 miles of hiking trails, 27.4 miles of equestrian/hiking trails, and 60.1 miles of bicycling/hiking trails (some segments of these trails are also open to equestrians). Overall, equestrians and bicyclists do not share trails at the Oroville Facilities, and it is these two groups that are the most vocal about trail-use designations here. Bicyclists can currently access four main trails in addition to fire roads and other designated areas: the Brad B. Freeman (portions closed to equestrian use) and Bidwell Canyon trail (closed to equestrian use), and the multiple-use Sewim Bo and Potter’s Ravine trails. Equestrians can access three main trails closed to bicycle use: the Dan Beebe, Roy Rogers and Loafer Creek Loop trails. About half of the bicycling/hiking trails are on flat gradient near the Thermalito forebay and afterbay; the trail surface for about half of these trails is paved and the other half is graveled. The remaining bicycle/hiking trails and all of the equestrian/hiking trails are in the hills surrounding the Thermalito diversion pool and Lake Oroville; about half of the bicycle/hiking trails in this area are

⁸⁴ Staff could not locate these policies on the record or in any publicly available source.

graveled with the remaining trails either paved or dirt. The vast majority of the equestrian/hiking trails are dirt paths; only a small amount are paved or graveled. Bicyclists, equestrians, and hikers may access a small amount of the west side of Lake Oroville from the Potter's Ravine trail.

Under DWR's Proposal, bicyclists and equestrians would gain access to more miles of trail but would have fewer miles of exclusive access⁸⁵ than under current conditions. Bicyclists would be able to travel along the Dan Beebe and Loafer Creek Loop trails (approximately 21 additional miles), and equestrians would gain access to the Bidwell Canyon trail and all of the Brad B. Freeman trail (approximately 50 additional miles). This would result in 2.6 miles of trails being available only to hikers, just over 6 miles of trails being available only to hikers and equestrians, and the remaining 81 miles of trails being available to hikers, bicyclists, and equestrians. DWR's Proposal also includes the construction of 0.7 mile of bicyclist/hiking trail and 2 to 5 miles of multiple-use trails. It also proposes to construct 2 to 4 miles of bicycling/hiking trail and then close a portion of the Dan Beebe trail to bicyclists. These additions would create more route options by connecting existing trails to create a looped trail system.

Several entities have recommended that DWR provide separate equestrian and hiking trails instead of creating multi-use trails. Our review of the Recreation and Socioeconomics Work Group meeting notes indicates that several participants actively promoted the development of a mountain bicycle trail parallel to the Dan Beebe trail. In fact, in May 2001, this proposed trail was the second item on the list of high priority items proposed as interim projects at the Oroville Facilities and also appeared in an October 2003 report on the Lake Oroville Trails System. In its Recreation Management Plan, DWR proposes to construct a demonstration mountain bicycle trail from Lakeland Boulevard to Sycamore Hill and upon its completion, closing the Dan Beebe trail to bicycle use. However, DWR contemplates constructing this trail sometime after the first 10 years of the new license. Because this proposed development has had continuous support from so many individuals during the relicensing proceeding, this schedule would not be consistent with DWR's goal of completing high-priority projects within 10 years of relicensing. Furthermore, conversion of the Dan Beebe trail to multiple use, constructing the bicycle trail, and then closing the Dan Beebe trail to bicycle use would result in a change to the physical characteristics of the single-track equestrian trail in order to meet multiple-use standards. While this would allow bicyclists to access portions of the Dan Beebe trail for a period of 10 years, the conversion would have permanent effects, including the expansion of the trail tread width, which would be undesirable to equestrians.

Several equestrian users, who support the proposed trails program, have cited the opportunity to use the Bidwell Canyon loop trail as one improvement that would benefit multiple-user groups. Some bicyclists have also pointed out that a united trails community, including mountain bicyclists and other trail groups, can be a powerful, effective voice for increased funding for federal, state, and local recreational trails.

The many supportive filings for the proposed trail designations conclude that the Proposed Action provides the most public benefit because it opens more trails to more types of use. While bicyclists would gain access to more unpaved trails in the hills and equestrians would be able to travel throughout the project, DWR would do so by opening more than 17 miles of trails to bicycle use where it historically has not been allowed. This change would result in about a 68 percent reduction in the length of trails where equestrians could ride without encountering bicyclists. As a result, many comments focused on the fundamental need for trail use changes and the quality of the recreational experience, as well as for safety and maintenance.

⁸⁵ Exclusive access in this sense means access without the other user group. Both equestrians and bicyclists already share trails with hikers.

Demand: DWR and DPR convened various trail user groups in an effort to achieve a compromise on trail-use designations; it appears this effort was based on the premise that there is insufficient trail access for bicycling at the project. We recognize a considerable number of filings by bicyclists stating that they want to have increased access to project lands and waters and that regional demand data indicate bicycling is increasing in popularity. We also recognize that the existing trails are appealing to bicyclists and that some may be suitable for this type of use. However, we cannot find adequate documentation (e.g., adequate recreational use data for the project) to form a solid justification for this premise. DWR’s mailback survey data⁸⁶ indicate existing latent demand for different types of trails. Table 52 shows the percentage of respondents who said there were too few unpaved bicycle and equestrian trails in various locations of the project. Whereas these data show variation in demand between different areas of the project, at Lake Oroville, where most of the trail use occurs, there may be only slightly greater demand for more bicycle trails than equestrian trails. In analyzing the responses regarding Thermalito diversion pool, which is where the Proposed Action would eliminate approximately half of the equestrian-use only type of trail, it appears that more visitors would like to see equestrian trails as compared to bicycle trails. We note that the survey question responses do not distinguish between the need for single-use as opposed to multiple-use trails. However, these data indicate that there is almost equivalent existing demand for bicycle and equestrian trails at the project.

Table 52. DWR mail-back survey responses indicating need for additional types of trails. (Source: DWR, 2004w)

Type of Trail	Percent of Respondents Who Marked ‘Too Few’ on the Survey					
	Lake Oroville	Thermalito Diversion Pool	Low flow Channel	Thermalito Forebay	Thermalito Afterbay	Oroville Wildlife Area
Unpaved bicycle trail	32.6	31.8	8.0	20.9	26.3	51.9
Equestrian trails	28.1	42.9	7.7	13.3	31.3	28.6

We scrutinize the details of trail demand because on April 1, 2003 DWR filed an application for amendment to the project recreation plan to request approval to change trail designations to multiple-use. In a final environmental assessment and order issued August 17, 2004, the Commission stated that converting project trails to multiple use would adversely change the recreational experience for equestrian users primarily because it may increase the potential for user conflicts and necessitate more trail maintenance and modifications to accommodate the multiple uses. Further, the Commission’s research of trails and trail uses in the region identified many trails available to mountain bikers, and it states the approved recreation plan designated special-use trails for equestrians to provide a unique recreational experience. Considering this finding and that there is almost equivalent demand for equestrian and bicycle trails at the project, the fact that existing trails appeal to bicyclists is not necessarily sufficient rationale for reducing the existing opportunity for a unique recreational experience where equestrians can ride without encountering bicycles. Due to the character of project trails we cannot necessarily apply regional recreation-demand data to project recreation.

It is also important to note that DWR’s recreational data were, in some cases, inaccurate or incomplete (e.g., counters moved or malfunctioned during data collection period) and the data were collected in 2002-2003, at a time when the trails were managed for multiple use instead of their approved designation. Several equestrian trail users filed letters with the Commission indicating that they no longer used the trails that bicycles were using when the trail designations were changed in 2002. On this basis,

⁸⁶ DWR collected 1,071 mailback surveys (2002 to 2003).

the trail use estimates may not reflect the estimated use at the project as it is currently licensed. In addition, DWR states in its report that the data, as collected, did not allow it to accurately determine the proportion of each type of trail use, which leads us to question the proportional trail use estimates presented in the preliminary draft environmental assessment.

Quality of Experience: Equestrians opposed to the proposed trail designations identify some site-specific drawbacks with DWR’s proposal. If implemented they state the remaining equestrian/hiker-only routes would consist of three disconnected trail sections that could only be accessed by traveling on multiple-use trails. Further, they point out that some of the proposed loop trail opportunities would not be desirable to many equestrians because they have paved sections. They also point out that planned changes to the Brad B. Freeman trail would create a new route crossing below the Oroville dam leading to the top of the spillway. Once here, equestrians would need to travel over the spillway with two-way vehicular traffic, putting bicyclists and pedestrians in a relatively narrow space, which would deter many equestrians and potentially create safety problems. As such, the Proposed Action would not actually provide the intended benefit of increasing loop trail opportunities for equestrians.

Converting the Dan Beebe trail to multiple-use designation would eliminate the longest equestrian/hiker-only trail at the project. Under the Proposed Action, bicycle use would not be allowed on trails with widely recognized safety concerns, including the Sycamore Hill segment of the Dan Beebe trail. Equestrians would have to use multiple-use trails to access this equestrian/hiking-only segment of the trail unless a parallel trail were constructed at this location. Consequently, equestrians who do not want to ride trails where bicycles are allowed would not be able to use this trail segment. Similarly, bicyclists would not have a continuous route along the Dan Beebe trail because their travel would end at the equestrian/hiker-only portion of the trail, from either direction (see figure 19).

Safety: In addition to site-specific drawbacks, equestrian groups state that poor trail conditions can contribute to accidents and that bicycle use causes more erosion on trails, degrading their condition, impairing user safety, and harming natural resources. Use of the trails by hikers, equestrians, or bicyclists has the potential to harm natural resources if the trails are not properly designed or maintained. On January 27, 2007, DWR filed its year 2 progress report on Recreational Facilities and Operations Effects on Water Quality – Recreational Trails (SP-W3) with the Commission. This report provides detailed information on the composition of the surfaces of the project trails, documents the locations of erosion problems on the trails, and provides an explanation of the causes of the erosion. The information provided in this report is summarized in table 53. This information could be used as a starting point for a trail condition inventory and provide a basis for trail planning.

Table 53. Locations of trails with obvious erosion problems and their causes (Source: DWR, 2006f)

Location of Trails		
<i>Names of Trails</i>	Trail Surfaces	Problems Observed
Potters Ravine <i>Dead Cow Ravine</i> <i>North Fork</i> <i>Potter Point</i> <i>Potter Ravine</i>	Dirt – 10 miles	Several erosion events related to 74 uncontrolled (i.e., no bridge or culvert) stream crossings 6 sites with erosion caused by steep grades, low spots, or seeps (visitor induced damage in these areas included ATV tire tracks, deep horse prints, bicycle tire tracks, and foot traffic damage)

Location of Trails		
<i>Names of Trails</i>	Trail Surfaces	Problems Observed
Loafer Creek <i>Loafer Loop</i> <i>Roy Rogers</i> <i>Day-use Area</i> <i>Campfire Center</i>	Dirt – 13.2 miles Paved – 1.2 miles	47 sites with obvious erosion due to both natural causes and human activities: uncontrolled (i.e., no bridge or culvert) intermittent stream or swale crossings or high gradient slopes, :
Kelly Ridge <i>Bidwell Canyon</i> <i>Dan Beebe</i> <i>Bidwell Bar Bridge/Wyk Island</i> <i>Visitors Center</i>	Dirt – 12.2 miles Gravel – 0.2 miles Paved – 0.4 mile Wood - 0.05 mile	40 sites with obvious erosion primarily associated with uncontrolled (i.e., no bridge or culvert) intermittent stream crossings (high amount of human traffic from the Kelly Ridge neighborhood and the Bidwell Canyon campground)
Thermalito diversion pool <i>Dan Beebe</i> <i>Brad Freeman</i>	Dirt – 9 miles Gravel – 14.3 miles Paved – 5.7 miles	107 sites with erosion, particularly along the steeper trails where hikers, bicyclists, and equestrians take shortcuts across switchbacks thus developing new overly (some near vertical) steep trails. Also, mountain bicyclists, motorcyclists, and ATV users cut new detour trails by driving off the established trails, destroying the already-scant vegetation and exposing more soils.
Thermalito forebay <i>Brad Freeman</i>	Gravel – 5.9 miles Paved – 1.6 miles	Few sites with erosion on the north side of the forebay
Thermalito afterbay <i>Brad Freeman</i>	Dirt – 1.7 miles Gravel – 1.6 miles Paved – 7.75 miles	8 sites with erosion in area with graded native soil including roadside sedimentation and culvert scour. Also some off-road vehicle damage
Riverbend Park <i>Brad Freeman</i>	4.4 miles – mostly paved with some buried gravel/cobble or dirt	Minor damage due to off-road vehicles

In their filings, equestrians opposed to the proposed trail designations provided case histories documenting user conflicts between equestrians and bicyclists. Circumstances such as excessive speed, uncontrolled bicycle descents, sudden encounters at narrow trail sections or blind corners and bicyclists failing to yield to equestrians can spook horses and potentially cause accidents. Although we do not debate whether user conflicts would or would not occur, we find that the proposed trail designations, at a minimum, could create the potential for conflicts. DWR rebuts the equestrian's assertion that user conflicts currently exist based on its recreational survey data. However, as stated earlier, we find that DWR's data may be inadequate and it should not necessarily be relied upon to fully assess whether user conflicts are occurring. Proper trail design, maintenance, patrols, and enforcement on multiple-use trails could minimize potential user conflicts but they would not entirely eliminate them because discourteous and inappropriate trail behavior cannot be addressed through these management actions. We also find that equestrian/hiking-only use trails provide a safer environment for equestrians with disabilities.

Maintenance: Pathfinder Quarter Horses et al. recommend that DWR adopt the California Equestrian Trails and Land Coalition Safety Guidelines for all multiple-use trails at the Oroville Facilities by 2007. Although a trail may be designated for a particular use or uses, improper trail maintenance can render the trail unsuitable for such use(s) and create user conflicts. Trails should provide a safe environment for all users, including those disabled individuals who use stock animals, such as horses or mules, to provide access to the outdoors. DWR, in its comments on the draft EIS, states that it is more appropriate to use the trail guidelines developed by DPR.

We note that Pathfinder Quarter Horses et al.'s recommended standards differ from those currently applicable to project trails. The existing project trail maintenance standards were developed more than 10 years ago, and these state of California standards are currently being updated (personal communication from F. Green, Recreation Specialist, Berger, Tallassee, AL, with S. Musillami, State Trails Coordinator, Sacramento, CA, on June 23, 2006). Incorporating DWR's standards into the Recreation Management Plan or providing them as an appendix, would make this information readily available to those participating on the Recreation Advisory Committee and provide a consistent measure for monitoring purposes. It would be reasonable to replace the 1991 Trails Handbook with DWR's updated version when it becomes available.

Pathfinder Quarter Horses et al. recommend that DWR recognize and adopt the California Riding and Hiking Trail laws at the Oroville Facilities. Approximately 7 miles of the Dan Beebe Trail was constructed as part of legislation passed in 1944 that established the California Riding and Hiking Trails Project, the purpose of which was to initiate the development of a statewide trails system (Equestrian Land Conservation Resource, 2005). In 1955, the California Riding and Hiking Trails Act was amended to permit the establishment and construction of secondary trails to provide better use and access from communities to the trail. By the early 1960s 1,060 miles of the trail had been completed, including approximately 7 miles of the Dan Beebe trail, which was intended as one of the secondary trails. In 1974 the act was repealed, amended, and renamed the California Recreational Trails Act (Equestrian Land Conservation Resource, 2005). This act required that the Department of Parks and Recreation prepare California's first comprehensive plan for trails. The 1978 California Recreational Trails Plan supported the creation of trail corridors and provided a general guide for the future growth of California's trail system. The California Recreational Trails Plan was updated in 2001, and in that document DPR proposed evaluating the status of previously secured easements for the California Riding and Hiking Trail and evaluating the feasibility for continuance of the trail's expansion (DPR, 2001). The proposed project would retain access for riding and hiking along this trail, which is consistent with California's trail plan.

Pathfinder Quarter Horses et al. also recommend that DWR classify the Dan Beebe, Loafer Creek Loop, and Roy Rogers trails as Lake Oroville and state of California historic equestrian and hiking trails. The Dan Beebe trail was originally constructed as part of the California Riding and Hiking trail. DWR evaluated historic resources at the project and did not report any historic significance for these trails. We

can find no evidence on record to support historic designation as Pathfinder Quarter Horses et al. recommends.

Pathfinder Quarter Horses et al. recommend that DWR cooperate with California Department of Parks and Recreation and the Plumas National Forest to extend the equestrian and hiking trail from the Dan Beebe trail to Feather Falls village and trail and then to the Pacific Crest Trail, according to the California Riding and Hiking Trail laws. It appears that this recommendation was part of the original plan for the California Riding and Hiking trail. This recommended trail extension would not provide access to project lands and waters and does not have a nexus to the project.

License Coordination Unit—Within 6 months of license issuance, DWR would establish a License Coordination Unit in Oroville to manage the terms and conditions of the new license. This unit would: (1) manage the recreational, environmental, and other terms and conditions of the license; (2) ensure compliance with the regulatory framework defined by the Commission and other regulatory agencies; and (3) provide a local point of contact for the community. As proposed, the License Coordination Unit would encourage and facilitate more local awareness and involvement in implementation of the terms and conditions of a new license through biannual community workshops and a web-based bulletin board with project status reports, community workshop notes, and other information related to the new license. The License Coordination Unit would also investigate and evaluate disputes associated with the new license and recommend a course of action to resolve each dispute. It would also be responsible for coordinating with PG&E to provide daily flow release information from the Poe Project via a web link and/or a flow phone.

In its motion to intervene filed with the Commission on March 30, 2006, Butte County recommends that DWR provide adequate funding, staffing and facilities to support public safety patrols, project O&M, information and interpretive services, and other reasonable expected services. These recommendations are analyzed in section.3.3.10.2, *Socioeconomic Resources*.

Staff Analysis

Providing DWR staff whose sole responsibility would be implementing the new license at the Oroville Facilities would provide a centralized point of contact within DWR for license compliance. Locating staff in Oroville would provide a local DWR presence, allowing the community to interact with DWR staff on a more frequent basis to discuss any concerns with the current project operations. Biannual community workshops would provide a forum for citizens with concerns or comments on the Oroville Facilities to share their thoughts and opinions.

Recreation Advisory Committee—Within 6 months of license issuance, DWR would establish and convene a Recreation Advisory Committee for the purpose of advising DWR on Recreation Management Plan implementation, reviewing recreational use data, and recommending modifications to the plan throughout the term of the new license. As proposed, the Recreation Advisory Committee meetings would be held in Oroville, meeting announcements and agendas would be posted on DWR's web site and noticed in the local paper, and meeting summaries would be posted on its web site and made available at the Butte County library or other suitable location. In addition, members of the Recreation Advisory Committee would cover their own costs to attend meetings, meetings would be open to the public, and the public would be allowed to ask recreation-related questions and provide potential solutions to issues at Recreation Advisory Committee meetings.

Section 4.4 of the Recreation Management Plan states that Recreation Advisory Committee members must be signatories to the Settlement Agreement and include representatives of DWR, DPR, DFG, California Department of Boating and Waterways (DBW), SWC, Butte County, Feather River Parks and Recreation Department, the city of Oroville, the city of Paradise, the Oroville Chamber of Commerce, American Rivers, one Native American representative who is collectively selected by agreement among the tribes in the project vicinity, and two at-large public representatives who are chosen

by the Recreation Advisory Committee from lists of candidates supplied by Butte County and the city of Oroville. The at-large public representatives would serve a 2-year term.

DWR, through its License Coordination Unit, would arrange, administer, and permanently chair the Recreation Advisory Committee meetings. DWR would provide a facilitator during meetings if the Recreation Advisory Committee determines a need for one. DWR would provide an annual report on attendance and other monitoring of project recreational facilities to the Recreation Advisory Committee to the Commission. Every 2 years, DWR would provide project recreational use monitoring data and reports, along with a record of all of the recommendations made by the Recreation Advisory Committee to the Commission.

As proposed, the Recreation Advisory Committee would meet at least 3 times per year during the first 2 years of the new license and a minimum of 2 times per year thereafter; however, the Recreation Advisory Committee could recommend and request additional meetings in writing as necessary to address license conditions and to make recommendations to DWR.

As proposed, the Recreation Advisory Committee would: (1) advise DWR on Recreation Management Plan compliance and implementation and other recreational license requirements, including priorities, schedules, public workshops, and operational issues associated with recreation, (2) review and assess monitoring results and recreation studies and provide recommendations to the License Coordination Unit, (3) recommend goals and objectives regarding recreational resources to the License Coordination Unit, (4) assist with addressing comments/issues raised in the community workshops through recommendations to the License Coordination Unit, and (5) periodically review the Recreation Advisory Committee operations, and modify them if needed.

In its comments on the Settlement Agreement filed April 26, 2006, Butte County points out that it and some other key stakeholders who, because they are not signatories to the Settlement Agreement, would be excluded from participating in the Recreation Advisory Committee. Butte County states that the Oroville Facilities are located entirely in Butte County and DWR depends on Butte County for many governmental services, including fire protection and law enforcement. Butte County contends that it can speak for all of the directly affected public and effectively represent their interests. Butte County is concerned that it would not be a consulted party during the implementation of a new license and would not receive the license compliance reports. Butte County also recommends that DWR consult with the Recreation Advisory Committee during the implementation of Proposed Articles A104, *Structural Habitat Supplementation and Improvement Program Plan*, and A110, *Lake Oroville Warm Water Fishery Habitat Improvement Program*.

In its motion to intervene, filed with the Commission on March 30, 2006, Butte County states that it should be a consulted party with respect to the project's recreational activities and recommends that the existing Recreation Advisory Committee be continued under the new license.

In its motion to intervene filed with the Commission on December 16, 2005, the Anglers Committee et al. recommend that (1) DWR and the Commission should, without prejudice, decide which parties should be members of the Recreation Advisory Committee, (2) the Recreation Advisory Committee should include at least three NGOs, (3) citizens be allowed to file applications to become members of the Recreation Advisory Committee, (4) DWR should hold Recreation Advisory Committee meetings at least 6 times a year at locations in Oroville at an accessible facility, (5) the Recreation Advisory Committee should develop and implement by-laws and protocols for conducting business, (6) the Recreation Advisory Committee should develop a complaint process allowing citizens to file complaints against DWR and/or the Recreation Advisory Committee, (7) the Recreation Advisory Committee should not discriminate against anyone filing comments or complaints with the Recreation Advisory Committee, (8) DWR should develop both a mailing list and a web site to advise the public of Recreation Advisory Committee meetings and provide meeting agendas and minutes, (9) DWR should prepare an annual report detailing the Recreation Advisory Committee activities for submission to the

Commission and for public review, and (10) DWR should fund all Recreation Advisory Committee business activities.

In its motion to intervene filed with the Commission on March 31, 2006, the Action Coalition of Equestrians recommends removing the following provisions from the Recreation Management Plan related to the Recreation Advisory Committee: (1) only parties signing the Settlement Agreement may be members of the Recreation Advisory Committee, (2) a signatory may not consider material new evidence, particularly such material provided through NEPA, CEQA, or other environmental reviews, (3) a signatory may not withdraw from the Settlement Agreement, and (4) a signatory may not criticize the Settlement Agreement or any of the management plans to the Commission or any other agency.

In their motion to intervene filed with the Commission on March 31, 2006, and in comments filed with the Commission on April 15, 2006, George Weir, Vicki Hittson-Weir, and Pathfinder Quarter Horses et al. recommend that the existing Oroville Recreation Advisory Committee⁸⁷ remain in place to receive community recommendations, oversee feasibility and environmental studies, and advise, on a quarterly basis, the Oroville Joint Powers Authority of recommended projects. Pathfinder Quarter Horses et al. recommend that the existing committee oversee DPR management of the project recreational facilities. Pathfinder Quarter Horses et al. also recommend establishing the Oroville Joint Powers Authority, whose members would include Butte County supervisors representing the cities of Oroville, Richvale, and Paradise, three Oroville City Council members, and the mayor of Paradise. Pathfinder Quarter Horses et al. recommend that the Oroville Joint Powers Authority would serve as trustee for the Lake Oroville Enhancement Trust, which would be created from 30 percent of the value of the hydropower revenues in a given year, beginning January 31, 2008, with the 2007 revenue value. Pathfinder Quarter Horses et al. recommend that the Oroville Joint Powers Authority would administer this trust for all recreational facilities for the duration of the license.

In his motion to intervene filed with the Commission on March 31, 2006, Ronald E. Davis states that restricting participation on the Recreation Advisory Committee to signers of the Settlement Agreement is a violation of public trust. Mr. Davis contends that the Feather River and Lake Oroville are navigable waterways and are subject to the Public Trust Doctrine. Mr. Davis believes that committees, such as the Recreation Advisory Committee, which are relevant to the operation plan of navigable waterways, should be open and not restricted to only those who have promised to agree with state government.

In its May 26, 2006, filing with the Commission, DWR points out that the Oroville Recreation Advisory Committee was a concept proposed by DWR under the current license, not a unilateral mandate by the Commission. DWR states that the Recreation Management Plan establishes the Recreation Advisory Committee for the purpose of advising DWR on implementation of the components of the plan, reviewing recreational use data for project facilities, and periodically recommending modifications to the plan at prescribed milestones throughout the term of the new license. DWR also explains that only allowing parties to the Settlement Agreement to serve on the Recreation Advisory Committee was a provision specifically negotiated by settlement parties and is wholly consistent with Commission precedent.

Staff Analysis

Recreation management has been one of the most contentious issues raised during DWR's relicensing effort. Entities with an interest in recreation management at the Oroville Facilities include federal, state, and local agencies; a multitude of user groups; and many individuals. In essence, there is extensive public and agency interest in recreation management at the project. Under the current license,

⁸⁷ The Oroville Recreation Advisory Committee is the name of the *existing* oversight committee. The Recreation Advisory Committee is the name of the *proposed* oversight committee.

the Commission approved the licensee's revised recreation plan on September 22, 1994. The revised recreation plan includes a provision for convening the Recreation Advisory Committee, which comprises representatives of the following entities: DFG, DPR, DBW, the city of Oroville, Butte County, the Oroville Chamber of Commerce, the California Sportfishing Alliance, the Enhancement Committee, Butte County Citizens, the Butte Sailing Club, Citizens for Fair Use, the State Water Contractors, and DWR. The Oroville Recreation Advisory Committee has met on a monthly basis since its inception in 1994 and is charged with reviewing existing recreational facilities in the project area and use at the Oroville Facilities and assessing the need for any additions or improvements, including the type, quantity, location, and installation schedule of additional facilities. The Oroville Recreation Advisory Committee also discusses operating schedules and procedures, management and maintenance issues, and the need for changes to such practices. DWR participated in the monthly Oroville Recreation Advisory Committee meetings until March 2003, including three meetings in 2003. In March 2003, DWR informed the Commission of its decision to limit its participation to two meetings a year, (letter from Raymond D. Hart, Deputy Director, DWR, to Magalie R. Salas, Secretary, Federal Energy Regulatory Commission, on March 18, 2003). DWR indicated that its workload had increased significantly with relicensing and other projects and that recreational issues were also being addressed by the Recreation and Socioeconomics Work Group and the Oroville Joint Powers Authority.

As part of a new license for the Oroville Facilities, DWR proposes to replace the Oroville Recreation Advisory Committee with the Recreation Advisory Committee. Consulting with various entities regarding the implementation of the Recreation Management Plan would efficiently ensure that the intent of the various terms and conditions would be met. Under the process outlined in the Recreation Management Plan, the Recreation Advisory Committee would receive community recommendations, as Pathfinder Quarter Horses et al. recommend. We note the Oroville Recreation Advisory Committee is a signatory to the Settlement Agreement, which indicates its support for the Settlement Agreement, including the proposed Recreation Advisory Committee.

We find that the Recreation Advisory Committee would be the appropriate entity to provide advice, guidance to DWR on matters involving project recreation management. It is not appropriate to establish a Joint Powers Authority that would administer recreational facilities, as Pathfinder Quarter Horses et al. recommend. Such an entity may implement recreation management actions that are not consistent with DWR's ultimate responsibility to provide adequate recreational facilities at the project.

Several entities do not agree with the Recreation Advisory Committee membership provision to be a signatory to the Settlement Agreement. DWR proposes that Recreation Advisory Committee members be signatories to the Settlement Agreement because the voting structure of the Recreation Advisory Committee represents months of settlement negotiations. Further, DWR cites relicensing proceedings whereby the Commission determined that entities with decisional roles regarding a Settlement Agreement should be bound by the terms of the Settlement Agreement. Recreation Advisory Committee membership requirements, as proposed, would be consistent with prior Commission findings.

Regarding specific Recreation Advisory Committee organizational recommendations from the Anglers Committee et al., we find that the process outlined in the Recreation Management Plan would provide: (1) sufficient number of meetings per year, (2) adequately outlined protocols, (3) a dispute resolution process, (4) an open and accessible public participation process, (5) a forum for reporting on matters related to project recreation, and (6) citizen membership.⁸⁸ As proposed, the Recreation Management Plan would accommodate all but one of the recommendations made by the Anglers Committee et al. Contrary to the recommendation of the Angler Committee et al., DWR would not fund

⁸⁸ The Proposed Action provides for two at-large public members selected from lists of candidates suggested by the city of Oroville and Butte County.

member participation for the Recreation Advisory Committee. Such reimbursement is not a licensee's responsibility and could create a conflict of interest.

We recognize Butte County's role as it relates to the project and that there may be several matters during the course of the license term that may affect its interests whether or not Butte County becomes a signatory to the Settlement Agreement in the future.⁸⁹ The County could still participate with the Recreation Advisory Committee through its public participation process. Further, all compliance reports filed for the project are accessible to the public through eLibrary located on the Commission's web site, and Butte County could participate in matters involving Proposed Articles A104, *Structural Habitat Supplementation and Improvement Program Plan*, and A110, *Lake Oroville Warm Water Fishery Habitat Improvement Program*, through the proposed License Coordination Unit public workshops.

Action Coalition of Equestrians expressed its concern that the Recreation Advisory Committee may not consider material new evidence, particularly such material provided through NEPA, CEQA, or other environmental reviews. We agree that new information should be considered by the Recreation Advisory Committee and our understanding is that the Recreation Advisory Committee would review and assess usage surveys and monitoring results and provide recommendations to the License Coordination Unit.

Action Coalition of Equestrians is also concerned that a signatory may not criticize the Settlement Agreement or any of the management plans to the Commission or any other agency. We understand that DWR proposes to resolve disputes through its administrative and dispute resolution process but also recognize that any entity may file a complaint with the Commission at any time.

Oroville Recreation Coordinating Agencies—To ensure that recreational opportunities at the Oroville Facilities are adequately and efficiently provided to the public, local staff from DWR, DPR, DFG, DBW, and California Highway Patrol would continue to meet regularly to address project and non project interagency management through a forum called the Oroville Recreation Coordination Agencies (ORCA). As proposed, ORCA would meet periodically as needed during each year and throughout the license term to facilitate short- and intermediate-term interagency and inter-departmental operations coordination and planning.

In its comments on the Settlement Agreement, filed April 26, 2006, Butte County expresses its concern with ORCA, as proposed. Butte County does not believe that infrequent meetings would be effective for meeting the project's recreational needs.

Staff Analysis

ORCA would provide a means for clarifying the roles of DWR, DPR, DFG, DBW, California Highway Patrol, and other responsible entities in managing, maintaining, and developing project area recreational resources. ORCA would provide a forum for agencies with jurisdiction in the project area to clarify its recreational resource related financial, managerial, legal, security and patrol, development, and maintenance responsibilities at the Oroville Facilities. This would have a beneficial effect on recreation by providing more efficient, effective, and coordinated recreation management within the project area.

A set ORCA meeting schedule could be filed with the Commission for informational purposes and to inform the Commission staff members responsible for license compliance of its immediate and short-term plans at the Oroville Facilities. Although DWR is ultimately responsible for actions under the project license, we recognize that other agencies have jurisdiction in the project area. DWR could use the reporting component of the Recreation Management Plan to report the ongoing and agreed-upon responsibilities of these other agencies.

⁸⁹ Section 4.4 of the Recreation Management Plan already lists Butte County as a member of the Recreation Advisory Committee.

Fourth of July Fireworks—DWR would cooperate with local groups to plan the annual fireworks presentation at Lake Oroville on or about the fourth of July and provide an estimated \$210,000 to support this event.

Staff Analysis

We understand DWR's long-standing commitment to supporting the popular Fourth of July event. DWR has not identified the effect of the project that creates the need for this measure. Accordingly, we cannot determine that this measure has a project nexus and determined that its implementation would not mitigate any project effect(s). We recognize the value of this event to the local community, and DWR may choose to continue to support this effort outside of the project license.

Recreation Implementation Plan—Within 1 year of license issuance and following consultation with the Recreation Advisory Committee, DWR would file a Recreation Implementation Plan with the Commission for approval. DWR would include in this plan an implementation schedule for the first 12 years, any comments or recommendations made during consultation, and an explanation of why any comment or recommendation was not adopted. DWR recognizes that the Commission may change the Recreation Management Plan and/or the Recreation Implementation Plan. DWR would implement the plan approved by the Commission.

Staff Analysis

In its Recreation Management Plan, DWR would provide a schedule for completing its proposed recreational facilities developments to would ensure these improvements would be completed in a timely manner.

Structural Habitat Supplementation and Improvement Program Plan (Proposed Article A104)

Under Proposed Article A104, *Structural Habitat Supplementation and Improvement Program Plan*, DWR would provide additional salmonid rearing habitat in the Feather River by adding structural habitat, including LWD, boulders, and other objects. The LWD used in this program would include multi-branched trees at least 12 inches in diameter at chest height and at least 10 feet long, but preferably 20 feet or longer. See section 3.3.3.2, *Aquatic Resources*, for a detailed description of this proposed article.

Staff Analysis

Nearly 14 miles of the Feather River downstream of the Thermalito diversion pool is within the project boundary. The OWA is adjacent to or straddles 12 miles of the Feather River. Bank fishing is the most popular recreational activity along the Feather River, and a few motorized and non-motorized boaters use the low flow channel. Adding structural habitat to the Feather River channel would improve habitat for salmonid fish species and would likely have a beneficial effect on recreation by increasing the number of fish in the river. Catch rates would likely increase with more fish in the river, improving angling opportunities. It is possible that adding structures in the channel could impede navigation and create hazards for river users. However, DWR's Proposed Article A103, *Channel Improvement Program*, includes completing a safety analysis and modifying any planned projects to ensure that issues relating to human safety are adequately addressed.

Fish Weir Program (Proposed Article A105)

Under proposed Article A105, *Fish Weir Program*, DWR would develop and implement a plan to install and operate a monitoring fish weir in the Feather River upstream of the Thermalito afterbay outlet within 3 years of license issuance. DWR would also install and operate an anadromous fish segregation

weir in the Feather River upstream of the Thermalito afterbay outlet within 12 years of license issuance. See section 3.3.5.2, *Threatened and Endangered Species*, for detailed description of this proposed article.

Staff Analysis

Providing fish weirs in the Feather River channel would likely have a temporary adverse effect on recreation if angling closures or restrictions are required when either installing the fish weirs or seasonally operating them. Additionally DFG may impose fishing closures around the weirs to reduce the opportunity for poaching or inadvertently catching spawning Chinook salmon due to increased Chinook densities below the weir. Boating recreation activities may also be adversely affected by both the installation and operation of the fish weirs.

Flow/Temperature to Support Anadromous Fish (Proposed Article A108)

Proposed Article A108, *Flow/Temperature to Support Anadromous Fish*, specifies minimum instream flow releases in the low and high flow channels. During most of the recreational season, the target temperature in the low flow channel would be 63°F; the target temperature during the last week of the recreational season would be 58°F. DWR anticipates meeting specific temperature targets with the specified flows. However, if DWR does not meet the temperature targets, it would increase flow releases in the low flow channel up to 1,500 cfs. Minimum flow releases would not result in the elevation of Lake Oroville going below elevation 733 feet msl. DWR also proposes to possibly modify some of the Oroville Facilities to lowering temperature conditions in the low flow and high flow channels for anadromous fish. See section 3.3.2, *Aquatic Resources*, for a detailed description of this proposed article.

Staff Analysis

DWR currently provides a 600-cfs minimum flow in the Feather River to support occasional kayaking and floating. The marginal increase would not create a noticeable difference in the boating conditions in the Feather River, so it is likely that the same level of boating activity would occur under the proposed flow regime. This measure could have a beneficial effect on recreational by increasing spawning and potentially, in the long term, increasing the number of fish in the Feather River.

Further, DWR proposes to increase flow releases in the low flow channel up to 1,500 cfs if it does not meet its temperature targets, which could have a mixed effect on recreation. Under this contingent operation, the flow regime would only occasionally occur because of the conditional nature of this measure and because DWR would only need to release sufficient water *up to* 1,500 cfs. In the event DWR releases the maximum required release of 1,500 cfs, it would more than double the current minimum flow in the low flow channel. This flow would increase the boating difficulty by creating new, but infrequent, boating opportunities in the Feather River. This higher flow would occasionally present difficult conditions for wading anglers. Motorized boating use does not usually occur in the low flow channel, so these users would not be affected by any of the flow releases.

Proposed Article A108, *Flow/Temperature to Support Anadromous Fish*, would not likely affect swimming in the low flow and high flow channels within the project boundary. We note that there is a public, non-project swimming beach in the low flow channel upstream of Highway 70. The area is enclosed by a berm that provides calm water for swimmers. This berm has retained its function even during high flow events in the past. We would expect this swimming area would continue to be protected from the river current, despite the proposed increase in minimum instream flows.

Water temperatures in the low and high flow channels may be slightly lower under the Proposed Action. Since the existing swimming use is already low because of cool water temperatures, further lowering water temperature, albeit slightly, would not affect many swimmers. Also, most swimming at the project occurs at Lake Oroville, Thermalito forebay, and Thermalito afterbay, and swimming in these areas would not be affected by increased minimum instream flows downstream of Lake Oroville.

Lake Oroville Warmwater Fishery Habitat Improvement Program (Proposed Article A110)

Under Proposed Article A110, *Lake Oroville Warm Water Fishery Habitat Improvement Program*, DWR would develop a plan to improve the warmwater fishery spawning and rearing habitat in Lake Oroville. The plan would be implemented in 7-year intervals and would include constructing, operating, and maintaining projects to improve the warmwater fishery habitat within the reservoir or fluctuation zone; constructing specific habitat units in the first 7 years of the license; conducting a monitoring program, including angler creel surveys; and modifying habitat units based on monitoring results, need, or improvements in technology. See section 3.3.3.2, *Aquatic Resources*, for a detailed description of this proposed article.

Staff Analysis

As discussed in section 3.3.3.1, *Affected Environment* in *Aquatic Resources*, the Lake Oroville warmwater fishery is self-sustaining and includes warmwater sport fish, such as bass species (spotted, largemouth, redeye, and smallmouth bass), catfish species (channel and white catfish), and white and black crappie. Terrestrial vegetation along the reservoir shoreline provides spawning and nursery habitat for warmwater fisheries, offers protection from predation, and results in increased food availability. This terrestrial vegetation is inundated at higher lake levels but gradually becomes unavailable to fish as the reservoir is drawn down during the summer months. DWR currently increases and/or improves the structural complexity of habitat for warmwater fish species in Lake Oroville by constructing reefs of recycled Christmas trees, weighted pipes, riprap, LWD, and boulders, and placing them in the fluctuation zone. Continuing to improve habitat for warmwater fish species in Lake Oroville would likely increase the number of warmwater fish in the reservoir and increase catch rates for anglers.

Considering the shortage of suitable swimming areas at Lake Oroville, it appears likely that there would be considerable overlap between suitable areas for swimming and habitat enhancement (e.g., shallow slopes in the inundation zone). The warmwater habitat structures, as proposed, could introduce safety hazards to swimmers, if such improvements were placed in areas where swimming occurs at depths where swimmers could not see these structures and strike them or become entangled.

Lake Oroville Coldwater Fishery Improvement Program (Proposed Article A111)

Under Proposed Article A111, *Lake Oroville Cold Water Fishery Habitat Improvement Program*, DWR would develop a plan to provide a coldwater fishery in Lake Oroville primarily for the purpose of recreational fishing. The plan would provide for the stocking of 170,000 yearling salmon or equivalents per year in Lake Oroville. See section 3.3.3.2, *Aquatic Resources*, for a detailed description of this proposed article.

Staff Analysis

As discussed in section 3.3.3.1, *Affected Environment*, in *Aquatic Resources*, the Lake Oroville coldwater fishery is managed as a put-and-grow fishery, meaning that hatchery raised fish are stocked in Lake Oroville as juveniles, with the intent that they will grow in the lake before they are caught by anglers. The coldwater fishery is sustained by hatchery stocking because natural recruitment to the Lake Oroville coldwater fishery is very low (e.g., project blocks natural migration and inundates spawning habitat). DWR's stocking goal for Lake Oroville for 2006 and 2007 would be 170,000 yearling or yearling-equivalent coho raised in the Feather River. Continuing to stock coldwater fish species in Lake Oroville would benefit recreation by maintaining the current number of catchable coldwater fish for anglers in the reservoir. Coldwater angling opportunities would likely remain the same as those that currently exist at the project.

Comprehensive Water Quality Monitoring Program (Proposed Article A112) and Public Education Regarding Risks of Fish Contamination (Proposed Article A114)

Under Proposed Article A112, *Comprehensive Water Quality Monitoring Program*, DWR would develop and implement a water quality monitoring program at the Oroville Facilities. DWR would develop and implement a fish tissue bioaccumulation monitoring plan for metals and organic compounds and a recreational site water quality monitoring plan for monitoring pathogens, petroleum products, and soil erosion. Under this plan, DWR would conduct bacteriological monitoring during the summer at 12 to 16 locations throughout the project, including developed beach areas, marinas, boat launch areas, and high use dispersed beach and shoreline locations. The North Thermalito forebay swimming lagoon and the South Thermalito forebay swimming area would be sampled every year, and sampling other project sites would occur on a rotating schedule. DWR would also monitor 6 project sites, including Lime Saddle marina, Foreman Creek boat-in campground, Spillway day-use area (including the boat ramp), Bidwell Canyon marina, Oroville dam, and Monument Hill day-use area throughout the summer for the presence of petroleum projects. Finally, DWR would inspect trails to identify soil erosion in the spring and at the conclusion of the summer recreational season. See section 3.3.2.2, *Water Quantity and Quality*, for a detailed description of this proposed article.

Under Proposed Article A114, *Public Education Regarding Risks of Fish Consumption*, DWR would post notices at all boat ramps and other locations specified by OEHHA within the project boundary, notifying the public about health issues associated with consuming fish taken from project waters. DWR would also provide funding to OEHHA to facilitate publishing written materials notifying the public about health issues associated with consuming fish taken from project waters. DWR would file an annual compliance report with the Commission. See section 3.3.2.2, *Water Quantity and Quality*, for a detailed description of this proposed article.

Staff Analysis

Sampling of fish tissue at the Oroville Facilities has shown occasional elevated metal concentrations based on comparison to recommended guidelines from various regulatory agencies (see section 3.3.2.1, *Water Quantity and Quality*). Monitoring metals and organic compounds in fish taken from the Oroville Facilities throughout the term of the license would inform DWR and the angling public of the safety of fish taken for human consumption.

In 2003, DWR detected coliform bacteria at several recreational sites at Lake Oroville, the Thermalito forebay, and the Thermalito afterbay, and bacteria levels were high enough to trigger beach posting or closure at 9 sites (see section 3.3.2.1, *Water Quantity and Quality*). DWR also investigated the presence of MTBE, oils, greases, or waxes because of the potential for these compounds to be released into Lake Oroville through boating use, fuel pumping, and fuel storage activities at or near marinas or along the Lake Oroville shoreline. DWR found only a small amount of MTBE (a concentration well below the allowable maximum contaminant level) in the Thermalito diversion pool. The presence of bacteriological pathogens and/or petroleum products in recreational waters used by swimmers and/or waders is a human health hazard. Considering contaminants have recently been detected in project waters, DWR would monitor for their presence in project waters throughout the license term to ensure public safety.

The level of total suspended solids is currently low in all of the project waterbodies. However, monitoring trails for soil erosion would ensure that trails are maintained to appropriate standards and would eliminate a potential source of sediment in the reservoirs and the Feather River.

Monitoring of Bacteria Levels and Public Education (Proposed Article A113)

Under Proposed Article A113, *Monitor Bacteria Levels and Provide Public Education and Notification*, DWR would monitor fecal coliform, enterococcus bacteria, or other bacterial indicators as required by the Basin Plan from June 1 until September 30 at developed and popular undeveloped swimming areas within the project boundary, including the Lime Saddle, Loafer Creek, and Monument Hill day-use areas, the Foreman Creek and Stringtown boat launches, the North and South Thermalito forebay swimming areas, and One Mile Pond. DWR would provide the monitoring information to the appropriate public agencies and the Recreation Advisory Committee. If directed to do so by a public agency, DWR would post notices notifying the public if unsafe levels of bacteria are present in the water. DWR would also post notices educating the public on sanitary measures designed to prevent or minimize contamination of water. DWR would also consult with the Butte County Health Department, DHS, the Water Board, and the Regional Board to determine if a public education program is needed to inform visitors to the project about water quality and the risk of recreating in contaminated waters. If needed, DWR would develop the public education program in consultation with the above agencies. DWR would file an annual compliance report with the Commission. We analyze the effects of this measure on water quality in section 3.3.2.2, *Water Quantity and Quality*.

Staff Analysis

DWR's studies revealed sufficiently high levels of coliform bacteria at several recreational sites at Lake Oroville, the Thermalito forebay, and the Thermalito afterbay to trigger beach posting or closure at nine sites. Continuing to post notices of unsafe levels of bacteria in the water would safeguard human health and safety. Providing information to the public about sanitary measures to prevent or minimize contamination of water may eliminate some of the causes of the bacterial contamination, which would then protect human health and safety. Incorporating a public education program about the risks of recreating in contaminated waters into the I&E Program component of the Recreation Management Plan would enhance the efficiency of such a program.

Oroville Wildlife Area Management Plan (Proposed Article A115)

Under Proposed Article A115, *OWA Management Plan*, DWR would develop and implement a management plan for the OWA, including the Thermalito afterbay. The plan would address strategies for minimizing current and future conflicts between wildlife and recreation, recreation management goals and objectives, and actions designed to improve conditions for special status species and their habitats. Among other things DWR would re-evaluate the plan every 5 years after initial implementation. The Recreation Advisory Committee would have an opportunity to provide input to the original plan and during the subsequent reevaluations of the plan. See section 3.3.4.2, *Terrestrial Resources*, for a detailed description of this proposed article.

In Appendix A of its comments on the draft EIS, DWR suggests coordinating the schedule for reevaluating the plan with updates required by DFG to avoid having multiple plans in place for the same area at the same time. DWR notes that DFG has a 2 to 3 year cycle for regulation changes and DWR suggests using this shorter recurring period so that it would also coincide with staff's recommendation to re-evaluate the OWA Management Plan every 6 years.

Staff Analysis

DWR's studies found areas of conflict between recreational and wildlife resources in the OWA. For example, unmanaged OHV use has caused soil compaction and altered water flow to vernal pool habitat. In addition, there are multiple entities with management responsibility for this area which have differing mandates. Defining priorities and responsibilities would assist with resolving existing conflicts

between wildlife management objectives and recreational activities in the OWA and would lead to more efficient and accountable recreation management.

As proposed, the OWA Management Plan would be reevaluated every 5 years, including an opportunity for Recreation Advisory Committee to provide input, whereas the Recreation Management Plan would be reevaluated every 12 years. Considering the overlap between these two plans, it would be most efficient to synchronize the schedule for re-evaluating these plans by re-evaluating the OWA Management Plan every 6 years. DWR has more recently proposed reevaluating the OWA plan every 2 to 3 years as required by DFG. Reevaluating the OWA Management Plan every 3 years would still allow the Recreation Advisory Committee to synchronize its updates of the 2 plans; therefore, we recommend the plan be reevaluated every 3 years.

Protection of Vernal Pools (Proposed Article A117)

Under Proposed Article A117, *Protection of Vernal Pools*, DWR would implement conservation measures set forth by the FWS final biological opinion to protect the vernal pool invertebrate habitat within the project boundaries. See section 3.3.5.2, *Threatened and Endangered Species*, for more information about the biological opinion and its requirements with respect to vernal pools.

Staff Analysis

At the Oroville Facilities, vernal pools are found primarily near the Thermalito forebay, the Thermalito afterbay, and the OWA; over half of the vernal pools found at the project are at the south end of Wilbur Road and around the boat ramp at the South Thermalito forebay. As proposed in the draft biological assessment, DWR would protect vernal pools by excluding OHV traffic near these features by increasing signage, increasing patrols and providing public education related to OHV use, increasing enforcement, and if necessary, installing fencing in locations where other measures have failed. Signage would be focused in areas of current observed vehicular effects on vernal pools. These measures would not reduce OHV access to project lands because these areas are generally dispersed use areas where vehicular use is, in some cases, already prohibited.

Minimization of Disturbance to Nesting Bald Eagles (Proposed Article A118)

Under Proposed Article A118, *Minimization of Disturbances to Nesting Bald Eagles*, DWR would include the conservation measures required by the FWS final biological opinion in any bald eagle management plan(s). If additional bald eagle nest territories were identified within the project boundary, DWR would either amend the current plan(s) or develop additional management plan(s). See section 3.3.5.2, *Threatened and Endangered Species*, for more information about the biological opinion and its requirements with respect to bald eagles.

Staff Analysis

The bald eagle territory at Potters Ravine is the only territory located completely within the project boundary. Other bald eagle nest territories are located partially within the project boundary. The Potters Ravine trails are the only developed recreational facilities in this area, and DWR closes portions of them seasonally to protect nesting bald eagles from human disturbance. Recreational access would be temporarily diminished by closing trails to protect bald eagles. Posting signs describing the need for the trail closure would likely minimize a hiker's negative reaction to the closure.

Protection of Giant Garter Snake (Proposed Article A119)

Under Proposed Article A119, *Protection of Giant Garter Snake*, DWR would implement conservation measures set forth by the FWS final biological opinion to protect the giant garter snake

within the project boundary. See section 3.3.5.2, *Threatened and Endangered Species*, for more information about the biological opinion and its requirements with respect to giant garter snakes.

Staff Analysis

Habitat for the giant garter snake primarily occurs at the Thermalito forebay, the Thermalito afterbay, the OWA, and along the Feather River where backwater areas and side channels exist. The best habitat is located along the northern and eastern edges of the Thermalito forebay near recreational development such as boat ramps, picnic areas, and fishing access areas. As proposed in its draft biological assessment, DWR would maintain existing amounts and quality of snake habitat. This could limit recreational development and trail expansion along the shoreline of the North and South Thermalito forebay and the Thermalito afterbay. Actions in giant garter snake upland habitat that would be considered deleterious include trails, roads and other permanent recreational features which could disturb, destroy, fragment, or otherwise modify the uplands. Giant garter snake habitat conservation measures may therefore limit additional shoreline access at the North Thermalito forebay and a connecting trail around the South Thermalito forebay may not be feasible. DWR also proposes a public education program consisting of signs describing the sensitive nature of the giant garter snake and the need to avoid harming it. Dog training would also be restricted in these locations thereby reducing this recreational opportunity.

Protection of California Red-legged Frogs (Proposed Article A121)

Under Proposed Article A121, *Protection of Red-Legged Frogs*, DWR would implement conservation measures set forth by the FWS final biological opinion to protect the California red-legged frog within the project boundary. See section 3.3.5.2, *Threatened and Endangered Species*, for more information about the biological opinion and its requirements with respect to California red-legged frogs.

Staff Analysis

Approximately 4,281 acres of potentially suitable habitat for California red-legged frogs occurs within the Thermalito forebay, the Thermalito afterbay, the OWA, and along the Feather River. Measures proposed by DWR in its draft biological assessment to conserve the giant garter snake and vernal pool wildlife species would be implemented to protect and conserve potential California red-legged frog habitat for possible future reintroduction or natural recolonization at the Oroville Facilities. As described above, these measures would have little effect on recreational use and access in the project area; there may be a beneficial effect on recreation by providing more wildlife for viewing.

Construction and Recharge of Brood Ponds (Proposed Article 122), Provision of Upland Food for Nesting Waterfowl (Proposed Article A123), Provision of Nest Cover for Upland Waterfowl (Proposed Article A124) and Installation of Wildlife Nesting Boxes (Proposed Article A125)

Under Proposed Article A122, *Construction and Recharge of Brood Ponds*, DWR would construct one waterfowl brood pond every 5 years over a 20 year period by creating a small earthen berm across an inlet in the Thermalito afterbay; DWR would maintain the brood ponds by filling them no later than April 15 of each year and ensuring that the water surface level of the ponds would not fluctuate more than 1 foot during the primary waterfowl brooding season of April 15 through July 31.

Under Proposed Article A123, *Provision of Upland Food for Nesting Waterfowl*, DWR would annually prepare and plant a total of 60 to 70 acres of upland cover/forage crops to support upland game birds and wintering waterfowl within the Thermalito afterbay portion of the OWA on a rotational basis.

Under Proposed Article A124, *Provision of Nest Cover for Upland Waterfowl*, DWR would actively manage 240 acres of waterfowl nest cover, including preparing and planting 60 acres and maintaining and additional 180 acres annually within the Thermalito afterbay portion of the OWA.

Under Proposed Article A125, *Installation of Wildlife Nesting Boxes*, DWR would install and structurally maintain 100 wildlife nesting boxes within the OWA within 1 year of license issuance.

See section 3.3.4.2, *Terrestrial Resources*, for a detailed description of these proposed articles.

Staff Analysis

The OWA provides hunting and viewing opportunities for waterfowl within the project boundary. Providing forage, food, nesting boxes, and brood ponds for upland game birds and waterfowl would encourage these species to visit the project area and thus could have a beneficial effect on recreation by providing more wildlife for viewing and hunting.

Improve and Redirect Recreation Usage to Specific Areas at Foreman Creek (Proposed Article A129)

Under Proposed Article A129, *Improve and Redirect Recreation Usage to Specific Areas at Foreman Creek*, DWR would develop and implementing a plan to protect cultural resources at Foreman Creek while continuing to provide recreation at that location. The plan would include measures to restrict the usage of the existing boat launch and to develop facility improvements to encourage recreational use at Foreman Creek in designated areas, including picnic tables and restrooms. See section 3.3.8.2, *Cultural Resources*, for a detailed description of this proposed article and its effects on cultural and historic resources.

In motions to intervene filed with the Commission on February 9, 2006, and March 30, 2006, the Tyme Maidu Tribe of the Berry Creek Rancheria and the Mooretown Rancheria of Maidu Indians recommend that DWR protect cultural resources in the Foreman Creek area by precluding or severely limiting public access to this site. Both entities point out that cultural resources at this location have been and continue to be disturbed due to recreational use and vandalism. The Tyme Maidu Tribe states that it does not object to DWR operating the project in the Foreman Creek area for the purposes of water supply and power generation.

In joint comments of the Berry Creek and Mooretown rancherias filed with the Commission on April 26, 2006, the Tribes recommend closing Foreman Creek to recreational and other public use. They assert that allowing recreational use to continue in the Foreman Creek area would cause further, irreversible damage to the cultural resources there and recommend reserving the area for cultural resources protection and permitting recreation throughout the rest of the project area.

In its May 26, 2006, filing with the Commission, DWR states that it believes that it would be inappropriate for the Commission to impose additional requirements at Foreman Creek or to take any action that would undermine the progress made in section 106 and settlement negotiations.

Staff Analysis

Cultural resources in the Foreman Creek area have been and continue to be disturbed by recreational use and vandalism. DWR proposes to install interpretive and informational signs to educate visitors about the cultural resources in the area and to redirect visitor use at this site away from culturally sensitive areas, as well as providing site protection for culturally sensitive areas. As proposed, recreational capacity would be maintained but redirected, and planned restrooms and picnic tables would be installed.

Informing visitors that sensitive resources are located at this location would increase visitor awareness and may minimize disturbance and damage to cultural resources. However, it is also possible that visitors with little or no regard for cultural resources could use this information to harm or destroy cultural resources.

The Berry Creek and Mooretown rancherías recommend closing this site to recreational and other public use. Closing the site to public use would eliminate most of the risks to cultural resources at the site, but this action would eliminate a project boat launch with 15 to 30 parking spaces and 26 campsites. Also, Foreman Creek is an unimproved access area that does not require a fee to access. Those living close to Foreman Creek would be particularly affected because there are no nearby alternative day-use areas. Because overnight use and site capacity is low, only a few visitors would need to relocate to other boat-in campgrounds if the site were closed.

3.3.6.3 Unavoidable Adverse Effects

Under Proposed Article A127, *Recreation Management Plan*, recreational facility reconstruction and some facility maintenance activities would require sites to be closed for public safety, causing a temporary decrease in developed capacity at the project that could displace and inconvenience visitors. Scheduling reconstruction outside of the summer season would minimize these effects.

Under Proposed Article 122, *Construction and Recharge of Brood Ponds*, the water surface elevation of the Thermalito afterbay would need to be drawn down to allow construction of a brood pond, causing a greater drop in the water surface there. However, the elevation of the Thermalito afterbay fluctuates regularly and only one brood pond would be constructed every 5 years so the effects would be intermittent and temporary.

Under Proposed Articles A123, *Provision of Upland Food for Nesting Waterfowl*, and A124, *Provision of Nest Cover for Upland Waterfowl*, preparing the site and planting the crops may temporarily disturb the recreational setting in the OWA for some visitors, causing a short-term adverse effect on recreation.

3.3.7 Land Use and Management

3.3.7.1 Affected Environment

Land Ownership

The Oroville Facilities are located on the Feather River in the Sierra Nevada foothills in Butte County, California (figure 21). The project boundary encompasses about 41,540 acres, which includes all of the Oroville Facilities. All land within the project boundary is publicly owned, with about 14 percent (5,900 acres) of the land owned by the federal government and 86 percent (35,300 acres) owned by the state.

DWR, on behalf of the state of California, has fee-title to (i.e., is the controlling agency for) about 29,200 acres and DFG has fee-title to about 5,700 acres of state-held lands within the project boundary. In addition, DWR owns and manages about 2,200 acres of land in noncontiguous parcels east of Oroville dam and along the banks of the Thermalito power canal in specific areas both inside (400 acres) and outside (1,800 acres) the project boundary. DWR compiled land ownership and management information in collaboration with the Land Use, Land Management, & Aesthetics Work Group, which adopted a study area that extended 0.25 mile beyond the project boundary.

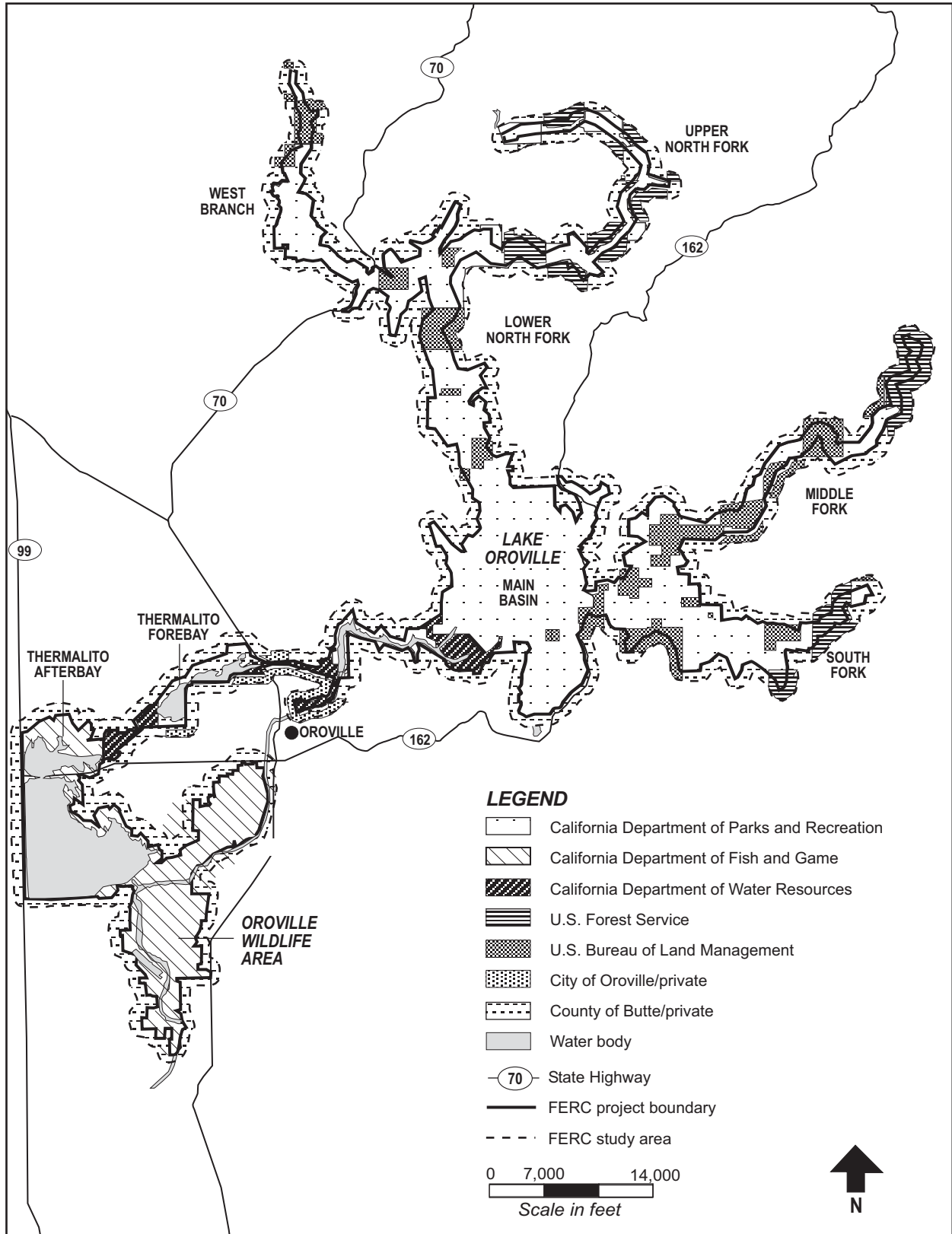


Figure 21. Primary land management responsibility. (Source: DWR, 2005a)

Land management in the study area is diverse, as illustrated by the multiple public land owners/managers shown in table 54 and described in greater detail in the following section. In addition, substantial private property interests are located inside the study area, but outside the project boundary. Land management direction for most lands within the project boundary emphasizes recreation, wildlife conservation, and public facilities. Lands adjacent to the project boundary within the study area have different management objectives, such as agricultural/rural residential development, timber preserve, conservation, recreation, and scenic lands.

Land Management

Federal

As noted above, federal lands managed by two federal agencies (Forest Service and BLM) account for about 15 percent (6,240 acres) of the area within the project boundary (table 54).

Forest Service—The Forest Service manages about 4 percent (1,620 acres) of the area within the project boundary. About 95 percent of the Forest Service lands are contained within the Plumas National Forest. The remaining 5 percent of Forest Service lands are located in the Upper North Fork arm, and although these lands are included within the boundary of the Lassen National Forest, they are managed by the Plumas National Forest.

Table 54. Summary of public entity land management. (Source: DWR, 2005a)

Public Entities	Acres of Management			
	Inside Project Boundary (acres)	Percent of Area Inside Project Boundary	Study Area (acres)	Percent of Total Study Area
Federal				
Forest Service ^a	1,620	5	5,100	7
BLM	4,620	9	5,800	8
Subtotal	6,240	14	10,900	15
State				
DWR	2,000	5	2,200	3
DPR	22,100	54	23,000	32
DFG	11,200	27	12,000	17
Subtotal	35,300	86	37,200	52
Local Jurisdictions				
Butte County	0	0	21,300	31
City of Oroville	0	0	1,100	2
Subtotal	0	0	22,400	33
Total	41,540	100	70,500	100

^a Includes all management authority except for recreation and law enforcement, which was transferred to DPR.

Management of Forest Service lands in the study area and project boundary is guided by the following management plans and documents:

- Plumas National Forest Land and Resource Management Plan,
- Herger Feinstein Quincy Library Group Forest Recovery Act Environmental Impact Statement, and
- Sierra Nevada Framework Record of Decision.

The Forest Service’s Land and Resource Management Plan contains directives for the lands in the study area and project boundary that primarily emphasize resource conservation, provision of high quality recreational opportunities, and protection of visual resources. All public lands administered by the Plumas National Forest are managed through specific land use designations called Management Prescriptions. Each Management Prescription comprises appropriate standards and guidelines to meet a particular need (such as special habitat protection, recreation, recreation quality enhancement, or timber production) while allowing for other compatible activities. This direction supplements the Forest-wide Standards and Guidelines.

Some Forest Service-managed public lands in the study area and project boundary (along the North Fork and South Fork) have Management Prescriptions that would allow for varying degrees of timber harvest. However, some of the public lands are located in areas that might support timber harvest if not for steep terrain and difficult access, and many of these lands have been classified as unproductive or unsuitable for timber harvest. Because of resource protection concerns and difficult access, many of the Forest Service-administered public lands in the study area and project boundary have been managed in the past as de facto resource conservation lands. Under current Forest Service direction, these lands are being evaluated to determine if they constitute a fire danger to nearby urbanized areas.

The Forest Service does not actively manage facilities or activities on most lands within the study area and project boundary. The Forest Service and DPR have an agreement concerning management of Forest Service-administered public lands within the project boundary that are part of the Lake Oroville State Recreation Area. The agreement, dated March 16, 1978, allows DPR to conduct law enforcement activities on Forest Service-administered public lands. The Forest Service does, however, provide law enforcement to address illegal activities, such as illegal dumping of trash and hazardous materials, drug production lab debris, and vandalism of cultural resource sites, and the Forest Service retains all other authorities. In the agreement, the Forest Service “transferred interest” in National Forest System lands “within project boundaries shown in Exhibit K of the FERC license No. 2100 to permit the DPR to use, and protect said lands in a manner necessary to administer them for recreational purposes and, to the extent permissible, to enforce all applicable laws and regulations thereon.” DWR states that the Forest Service is not interested in changing or terminating the agreement at this time but will re-evaluate the agreement during the next Forest Plan revision. Currently, any development planned in conjunction with the Oroville Facilities on Forest Service-administered public lands, including construction of any facilities or infrastructure within the National Forest, must be approved by the Forest Service prior to implementation.

Bureau of Land Management—Federal lands managed by BLM are scattered throughout the region, primarily in the northern reaches of the West Branch, within the main body of the reservoir, and in the Middle and South Forks. In total, BLM manages about 11 percent (4,620 acres) of lands within the project boundary. Most of these lands are noncontiguous, scattered parcels, some of which are submerged under Lake Oroville.

BLM manages lands in the study area under the direction of the 1993 Redding Resource Management Plan. Lands managed by BLM in and around the study area are designated as “undeveloped public lands.”

At an operational level, BLM has prioritized the following three management objectives for lands in and near the study area:

1. Identify what lands are of specific interest to the state of California within the study area;
2. Design the mechanism(s) to effect transfer of surplus federal lands to the state of California; and
3. Complete transfer.

DWR and DPR have engaged in discussions with BLM regarding potential transfer of BLM-administered public lands to the state of California. In addition, DPR has submitted applications to BLM for land transfer sites within the study area in the vicinity of Stringtown Mountain along the South Fork. This area is of great cultural interest to the four recognized tribes in the Oroville area. BLM-managed public lands within the study area are designated for transfer to the state of California.

State of California

The state of California (i.e., DWR) owns and manages about 53 percent (37,200 acres) of land in the study area and 86 percent (35,300 acres) of land within the project boundary. DWR and DFG have fee title to all of the state-owned land within the project boundary and have a mandate to manage these lands for public recreation and fish and wildlife preservation and enhancement in connection with the State Water Project. At the Oroville Facilities, the management of various resources is shared among three agencies—DWR, DPR, and DFG. In 1961, DWR transferred recreational interests and management responsibility for 23,000 acres within the project boundary to DPR. These lands constitute the majority of the Lake Oroville State Recreation Area. DPR is charged with designing, constructing, operating, and maintaining public recreational facilities on these lands. In 1961, DWR transferred about 12,000 acres of land within the project boundary to DFG. These lands constitute much of the OWA, reserving any interests necessary to construct, operate, and maintain the State Water Project. DFG is charged with state-wide management of fish and wildlife habitats and associated recreational facilities. The following sections discuss the state agencies with land and resource management responsibilities within the study area and project boundary.

California Department of Water Resources—As the owner, manager, and operator of the Oroville Facilities, which includes all dams, powerhouses, and transmission facilities located within the project boundary, DWR has direct management responsibility for about 2,000 acres within the project boundary that are not managed by DPR as part of the Lake Oroville State Recreation Area or DFG as part of the OWA. The lands that DWR has primary management responsibility for are generally related to operation of the project. DWR also has primary management responsibility for about 2,200 acres in the study area. Management of the Oroville Facilities is based on the terms of the existing license and existing biological opinions and biological assessments (DWR, 2004m; NMFS, 2002; BOR, 2004) for the Feather River downstream of Oroville dam. Day-to-day operations of the facilities are the responsibility of DWR. DWR has leased several parcels totaling about 700 acres to private groups or individuals in locations where DWR has primary management authority, as well as in locations within the OWA and Lake Oroville State Recreation Area. These leases are generally located on scattered, noncontiguous parcels west of Oroville dam and within the OWA and are summarized in table 55.

Table 55. DWR third-party leases. (Source: DWR, 2005a)

Purpose	Type	Acres	Lessee	Term
Cattle grazing	Private	417	John Campbell	Renewed after September 30, 2004
Community recreation	Local public	44	Feather River Recreation and Park District	November 1, 1997, to October 31, 2015
Cemetery	Private	23.7	Cemetery ^a	No lease
Site for flying model airplanes	Private	Not Known	Model Aircraft Flying Facility	--
Shooting range	Local public	9	Butte College	August 15, 2001 to August 14, 2016
Rock removal	Local public	10	Joint Water Districts Board	April 26, 1988, to April 26, 2018
Gravel extraction	Private	50	Mathews Ready Mix	June 22, 1987, to June 22, 2037
Gravel extraction	Private	100	Granite Construction	June 18, 1991, to June 18, 2041
Game bird raising	Private	77	K & L Quail Rancha	May 1, 1997, to April 30, 2007

^a Outside project boundary but within the 0.25-mile study area.

California Department of Parks and Recreation—As mentioned previously, upon completion of the Oroville Facilities, the recreational interest for lands within what is now the Lake Oroville State Recreation Area was transferred by DWR to DPR. The transfer was completed under the Agreement for Transfer to Department of Parks and Recreation of Interest in Certain Real Property at Oroville Division of State Water Project. DPR has the primary recreation management responsibility for most of the land underlying and surrounding Lake Oroville and its facilities, including lands that comprise the Lake Oroville State Recreation Area. DPR coordinates management of the Lake Oroville State Recreation Area with DWR, DBW, DFG, California Department of Forestry and Fire Protection (CDF), Butte County, California Highway Patrol, Forest Service, volunteer organizations, and other groups and agencies. Although DPR manages the majority of Lake Oroville State Recreation Area’s recreational aspects, DWR bears the ultimate responsibility under the current FERC license for ensuring funding, development, and management of current and potential future additional recreational facilities. The Davis-Dolwig Act (Water Code Sections 11910–11925) requires DWR to plan for and acquire land for recreation in conjunction with all State Water Project facilities. In keeping with its responsibility, DWR works with DPR and DFG to provide for recreational opportunities and funding throughout the project boundary and Lake Oroville State Recreation Area.

DPR has management responsibility for about 54 percent (22,100 acres) of the land within the project boundary, all of which is located in the Lake Oroville State Recreation Area. DPR’s management responsibilities for the Lake Oroville State Recreation Area include public safety, facilities maintenance, and overall visitor management for all recreational activities. DPR coordinates these activities, when appropriate, with DWR, DBW, DFG, CDF, Butte County, California Highway Patrol, volunteer organizations, and other groups and agencies.

The Lake Oroville State Recreation Area is managed under the guidance of the Lake Oroville State Recreation Area General Plan, which was developed by the DPR in 1973 and is currently being

updated. An amendment adopted in 1988 details additional development in the Lime Saddle area. The General Plan describes allowable recreational uses and intensities for various areas around the reservoir, such as Bidwell Canyon, Lime Saddle, Goat Ranch, and others. In compliance with the FERC Order of October 1, 1992, DWR prepared the Amended Recreation Plan in 1993 as the recreation plan for the Lake Oroville State Recreation Area. The Amended Recreation Plan was adopted by the FERC Order of September 22, 1994, and supersedes the 1966 Plan, Bulletin 117-6. DWR developed the Amended Recreation Plan for the Lake Oroville State Recreation Area to address public concerns associated with the recreational developments associated with the project. The 1993 Amended Recreation Plan describes a number of improvements and DWR commitments to construct specific facilities and take actions to address the fisheries and recreational needs at the project; additional improvements and actions deemed necessary by FERC were included in the September 22, 1994, Order. The 1993 Amended Recreation Plan also detailed the timeframe for completing additional proposed recreational facilities. DWR acknowledges in the Amended Recreation Plan that as the licensee, it is responsible for funding specific improvements. The Amended Recreation Plan describes the fish and wildlife resources, facilities, local area, user patterns, operation of Lake Oroville State Recreation Area and OWA facilities, economic considerations, recreation plan, and the fisheries management plan. The Amended Recreation Plan puts forth recommendations for facility expansion and modification in light of these findings. Facility expansion and modifications set forth in the Amended Recreation Plan have been implemented.

California Department of Fish and Game—DFG manages 11,200 acres of land (or about 27 percent of the land) within the project boundary and about 800 acres within the study area but outside the project boundary. DFG manages fish and wildlife habitat and associated recreational use for both surface water and dry lands within the OWA. In addition, DFG manages and operates the Feather River Fish Hatchery (a project facility). Most of the land area for which DFG provides day-to-day management is within the OWA and is located within the project boundary. The OWA includes Thermalito afterbay and a wide swath of wildlife habitat on both sides of the Feather River downstream of Oroville dam, which is south and west of the city of Oroville.

DFG manages the OWA and its other state-wide responsibilities under the California Fish and Game Code, Sections 1525–1530, and the California Fish and Game Commission’s Hunting and Other Public Uses on State and Federal Lands California Regulations (DFG, 2002). To ensure compatibility with the goals and uses of the Oroville Facilities within the Lake Oroville State Recreation Area, DFG is also responsible for managing fish and wildlife resources and recreational activities pursuant to the Davis-Dolwig Act (Water Code Section 11917). Within the OWA, DFG strives to carry out management responsibilities as identified in the 1978 Oroville Wildlife Area Management Plan (DFG, 1978), although, due to budget constraints, DFG has done no habitat management of the OWA for several years. DFG intends to revise the Management Plan in the near future.

Remote areas exist within the OWA that are accessible by road, but have been susceptible to illegal activities, such as dumping, fires, and lawless behavior. Consequently, some access restrictions have been implemented by DFG.

Local Entities

Butte County—All lands in the study area owned by Butte County are located outside the project boundary. County-owned properties generally reflect administrative uses for government services. In total, Butte County owns about 100 acres of land, which represents less than 1 percent of the study area. Butte County has land management jurisdiction over about 21,300 acres of private lands within the study area, which represents about 31 percent of the entire study area. There are no privately owned lands within the project boundary. All private development in Butte County is subject to the policies detailed in the Butte County General Plan and Zoning Ordinance.

The majority of private land under Butte County jurisdiction outside of and adjacent to the project boundary is designated Unclassified, consisting primarily of road rights-of-way or river channels that require minimal oversight.

City of Oroville—The city of Oroville owns about 150 acres of land in the study area. These areas are located south of Lake Oroville and west of Saddle dam and include the shoreline of Lake Oroville between the Saddle dam and the northeastern edge of the Oroville dam spillway, the Thermalito diversion pool, Thermalito forebay, Thermalito afterbay, the low flow channel, and the OWA. In total, roughly 1,100 acres (or 2 percent of the total study area) are located within the city limits. The city of Oroville does not own any land within the project boundary.

All development and activity within the city of Oroville are subject to the policies outlined in the city's General Plan and Zoning Ordinance. The objectives detailed in the General Plan pertaining to land use serve as a framework within which the city makes decisions relating to activities and developments within the study area that fall under its authority. The policies detailed in the plan represent the city's adopted commitments to actions that are intended to implement the community's broader objectives. The Land Use Element of the Oroville General Plan designates areas near the project facilities as Medium Density Residential and Parks.

Oroville General Plan policies that relate to the operation and management of Lake Oroville generally include enhancement of recreational and biological resources at Lake Oroville, as well as reducing potential flood and seismic hazards.

Feather River Recreation and Park District—The Feather River Recreation and Park District is another local entity that owns and administers lands in the study area. The Feather River Recreation and Park District was established in 1953 and provides a variety of park and recreational services to residents of southeast Butte County. Its holdings in the study area include Riverbend Park located west of State Route 70 at Montgomery Street and consisting of 50-owned and 100 DFG -leased acres, as well as Nelson Avenue Park, which includes roughly 18-owned acres and 34 acres leased from DWR.

Other Local Districts/Agencies—A set of public agencies, including local districts, also owns property in the study area. Aside from the Feather River Recreation and Park District described above, the following entities own land within the study area but outside the project boundary: Sacramento and San Joaquin Drainage District, County Board of Education, County Housing Authority, Thermalito Irrigation District, Richvale Irrigation District, Oroville Area Public Utility District, Oroville Elementary School District, Oroville Union High School District, Thermalito Elementary School District, Biggs-West Gridley Water District, Western Canal Water District, and South Feather Water and Power Agency. In total, these entities own about 156 acres of land in the study area, representing less than 1 percent of the study area total.

Private Ownership—No private interests own lands within the project boundary; however, private interests own about 29 percent of lands in the study area (specifically land outside the project boundary). PG&E, one of the larger private landowners in the study area, primarily uses lands in the study area for transmitting power. In general, management of private lands must comply with the current land use planning guidelines (i.e., general plans) and regulations (i.e., zoning ordinances) of Butte County and the city of Oroville.

Other Ownership—The remaining lands in the study area are either state or county road rights-of-way or areas without an official parcel number, which are often attributed to public trust lands, such as the river channel. Because these lands do not reflect meaningful ownership information, they have been classified as "Other." There are about 1,200 acres of other-owned land, representing nearly 2 percent of the study area total.

Land Use

DWR, in consultation with the Land Use, Land Management & Aesthetics Work Group, established a land use study area within 0.25 mile of the project boundary. Existing land uses in the study area have been organized into eight major land use classifications. Table 56 summarizes the respective major land use classifications within the project boundary and in the study area.

Table 56. Land uses in the study area. (Source: DWR, 2005a)

Land Use	Project boundary		Study Area ^a	
	Acres ^b (approx.)	Percent	Acres ^b (approx.)	Percent
Urban				
Residential	0	0	1,100	2
Commercial/industrial	0	0	100	<1
Project facilities	400	<1	700	1
Other urban	100	<1	400	<1
Subtotal: Urban	500	1	2,300	4
Rural				
Rural residential	0	0.0	400	1
Agriculture	0	<1	2,200	3
Subtotal: Rural	0	0	2,600	4
Recreation	12,600	30	13,900	20
Conservation	7,300	18	12,300	17
Resource extraction	200	<1	700	1
Undeveloped/habitat	1,000	2	18,700	26
Other	200	<1	700	1
Reservoir/open water^c	18,900	46	19,300	27
Total^d	41,540	100.0	70,500	100.0

^a Includes lands within the project boundary and non-project lands adjacent to and within 0.25 mile of the project boundary.

^b Acres are approximate and rounded to the nearest 100.

^c Measured at full pool elevation (including all project water features).

^d Numbers may not add up to 100 percent due to rounding.

Gravel Harvesting

Gravel harvest currently occurs within the portion of the OWA that straddles the Feather River. Piles of barren gravel/cobble, called dredger piles, are remnants of hydraulic mining in the 1800s and provide a large source of gravel. Dredger piles cover about 615 acres within the OWA. These areas are all located within the floodplain of the Feather River and provide significant gravel resources for projects throughout the surrounding area in the county, including the Oroville Facilities. DWR maintains leases with local companies for extracting gravel within the OWA and these leases evolved from a land transfer between DFG and local commercial gravel interests that occurred many years ago. DWR regulates this land use.

Fuel Load Management

CDF, one of the primary agencies responsible for fire suppression in the project area, has developed a fuel assessment method that uses models to describe current fuel load conditions and rank fuel hazard situations. This information assists CDF and other entities in targeting critical areas for fuel treatment. The fuel ranking method assigns ranks based on current flammability of a particular fuel and includes variables such as slope, ladder fuels (fuel that connects ground fire with tree crowns), and crown density. The models use geographic information system technology to build and analyze the data. The results of the fuel hazard ranking model for lands in the project area show that about 53 percent of the project area was classified with a hazard score of Moderate, 23 percent High, and 15 percent Very High. The highest concentration of lands classified as Very High is along the South Fork and Middle Forks, with other areas scattered along the North Fork and West Branch of the North Fork.

The lands surrounding the project are prone to wildfire because of the terrain, vegetation, climate patterns, and residential development. Accordingly, a number of agencies have developed policies, plans, and programs to address the threat of wildfire and deal with fuel loading. The Forest Service, CDF, and DPR are responsible for the primary fire management programs on lands immediately surrounding the study area. BLM, DFG, Butte County, and the city of Oroville also have lands within the vicinity that are governed by policies on fire management or suppression. Relevant fire management plans are shown by responsible entity in table 57. In addition, the Butte County Fire Safe Council and the Oroville Community Association focus on wildfire-related issues. The main function of these organizations is to provide education to local residents relating to issues associated with wildfires, such as reducing fuel loading. These organizations work closely with CDF's local Butte Unit in outreach and educational programs.

Table 57. Fire management policies and plans in the study area. (Source: DWR, 2005a)

Agency	Document Title	Year
Department of Agriculture	Healthy Forest Initiative	2002
Forest Service	Sierra Nevada Forest Plan Amendment, Record of Decision	2001
Forest Service	Plumas and Lassen National Forests, Proposed Administrative Study	2002
BLM	Redding Resource Management Plan	1993
CDF and State Board of Forestry	The California Fire Plan	1996
CDF	Butte Unit Fire Management Plan	2002
DPR	Wildfire Management Planning: Guidelines and Policy	2002
DPR	Loafer Creek Prescribed Fire Management Plan	1999
DFG	Oroville Wildlife Area Management Plan	1978
City of Oroville	General Plan	1995
Butte County	General Plan	1996

Between 1990 and June 2003, 13 fires burned more than 50 acres each within the project boundary. CDF has kept records of all known fire ignitions in Butte County, regardless of size, since 1990. The most frequent ignitions have occurred in the urbanized areas around Oroville, Thermalito, and other communities; the Clay Pit State Vehicular Recreation Area; and along roadways. Although not all of these areas are within the study area, fires that start in the region can move into the study area. The most common cause of ignitions within the study area was use of equipment (24 percent). Unidentified and miscellaneous causes each made up about 15 percent, while arson was the fourth most frequent cause of ignitions (14 percent).

DWR mapped vegetation types and canopy cover classifications in the study area. The canopy cover is mostly dense (60 to 100 percent), especially in the area around Lake Oroville and the Thermalito diversion pool, which is dominated by various oak, pine, and chaparral type communities. Grasslands are most abundant in the Thermalito forebay and afterbay areas (32 percent of area), but small areas (2 to 3 percent) are present in the Lake Oroville area and in the OWA.

Vehicular Access and Roads

DWR, in consultation with the Recreation & Socioeconomics Work Group, assessed the adequacy of vehicular access routes to the Oroville Facilities recreation areas. In general, transportation routes to project area recreational sites are without constraints to vehicular access. Principal and minor arterial roads (e.g., state highways, Grand Avenue, Kelly Ridge Road, Oroville Dam Boulevard, etc.) leading to areas that receive the highest use are paved and in good condition. Recreation areas that receive average and low use are also accessed by paved roads in good condition; however, some low use areas are located in areas where roads are closed or in poor condition. Locations with these conditions include the following: (1) lands in the vicinity of the North Fork arm of the reservoir where many roads are closed due to steep topography, (2) the OWA where many of the dirt/gravel roads are in poor condition, and (3) access roads to various car-top boat ramps that are in need of maintenance.

Car-top boat ramps and informal recreational sites that have closed or compromised access roads resulting from gates or lake levels include Big Bend access⁹⁰ (unpaved, poor road condition), Nelson Bar (limited ability to launch at low lake elevations), Enterprise boat ramp (shoreline driving eliminated), Foreman Creek (shoreline driving eliminated), Bald Rock Canyon⁹¹ (unpaved, unmaintained access), Stringtown boat ramp (boat ramp road and ramp in poor condition at lower levels), and Vinton Gulch car-top ramp (unpaved access and limited parking). Access roads to the recreational sites located at the other project facilities (e.g., other than Lake Oroville) are generally passable with some maintenance needs for unpaved roads within the OWA; in their current condition, their use is limited to four wheel drive/high clearance vehicles. These access roads are typically native-surfaced collector streets or local roads.

3.3.7.2 Environmental Effects

Effects on Land Ownership, Management, and Use

The proposed management plans and associated land management strategies and implementation measures could affect land use and land management within the project over the term of a new license.

OWA Land Management

Land use and management conflicts exist between resource protection needs and visitor use and management of this area that is located within the project boundary. The OWA also has the need for relatively high levels of law enforcement related to visitor use and illegal dumping activities that currently occur within the OWA. Under Proposed Article A115, *OWA Management Plan*, DWR proposes to develop and implement a management plan for the OWA. The OWA Management Plan would include measures for resource protection and management, affecting land use and management within this area. The proposed OWA Management Plan would identify resource conservation and management actions, strategies to minimize current and future conflicting resource management goals, recreation management goals and strategies for the OWA (to be consistent with the proposed Recreation Management Plan),

⁹⁰ This site is not provided by a California state agency. Pacific Gas and Electric Company manages this access road.

⁹¹ This site is not provided by a California state agency. The Forest Service and private entities manage these access roads.

monitoring requirements, and agency management responsibilities. The proposed OWA Management Plan would be developed in consultation with DFG, DPR, and the Ecological Committee, including specifically FWS, NMFS, the Water Board, and the Regional Board. Under Proposed Article B111, *Oroville Wildlife Area Funding*,⁹² DWR proposes to provide annual funding to DFG for managing the OWA and implementing continuing tasks associated with the project. For further description of the proposed measures associated with the OWA Management Plan, please refer to section 3.3.4, *Terrestrial Resources*. Interior's (on behalf of FWS) 10(j) recommendation no. 10 and DFG's 10(j) recommendations no. 2 and 3 are consistent with this proposed article.

Butte County states that the DWR should immediately remove all existing trash, abandoned vehicles, and other unlawfully dumped material from the OWA, and Butte County should be included as a consulted party in the development of the OWA Management Plan (letter from C.A. Smoots, Attorney for Butte County, Perkins Coie LLP, Washington, DC, to the Commission, dated April 26, 2006). Butte County states that the county has been required to provide a range of local governmental services to the project area without any reimbursement, including coordinating the region's response to flood control events, responding to medical emergencies, providing sheriff department patrol, and responding to calls for assistance, fire and emergencies, and providing roadway construction and maintenance services. Specific to OWA management, Butte County states that it is responsible for responding to law enforcement and public safety issues within the OWA, particularly related to illegal dumping of trash and abandoned vehicles. Please refer to section 3.3.10, *Socioeconomics*, for further discussion of issues related to provision of governmental services.

DWR responds that Proposed Article A115, *OWA Management Plan*, would address recreation management goals and objectives, including public safety concerns. It points out that it has a contract⁹³ with the County Sheriff's Department to provide law enforcement for the Thermalito afterbay and portions of the OWA. DWR also states that Butte County would have an opportunity to provide input into the OWA Management Plan through the state public consultation process (letter from M.A. Swiger, Attorney for DWR, Van Ness Feldman P.C., Washington, DC, to the Commission, dated May 26, 2006).

Staff Analysis

The proposed OWA Management Plan would include the means for the development and implementation of comprehensive management strategies for the OWA. The proposed OWA Management Plan would also help to develop and implement land use management strategies that would address potential conflicting resource needs. In addition, the identification of agency management responsibilities would help to coordinate the responsibilities of land management within the OWA. Monitoring, reporting, and periodically updating the OWA Management Plan would help to address potential changing resource needs and land management actions associated with the OWA. All of these measures would help to ensure that resource and land use needs within the OWA are coordinated for the best overall management of resource protection, land use, and public access needs over the term of a new license. Furthermore, including Butte County as a consulting party in the development of the OWA would help ensure coordination of law enforcement measures and land management within the OWA. We note that under Proposed Article B111, *Oroville Wildlife Area Funding*, DWR would provide funding to DFG for actions associated with the management of the OWA. However, because this measure is included in appendix B of the Settlement Agreement, DWR does not propose to include this in the project license. We acknowledge that the funding, although not included as part of the project license, would be

⁹² Included in appendix B of the Settlement Agreement as part of the measures the Settlement parties agreed to, but propose to be outside of the terms and conditions associated with a new license for the project.

⁹³ Estimated at \$190,000 per year.

beneficial to implement land management measures for the OWA and would help to implement future measures developed as part of the OWA Management Plan. We discuss the proposed measures associated with the OWA Management Plan and the potential effects of these measures in more detail under section 3.3.4, *Terrestrial Resources*, and section 3.3.6, *Recreation Resources*.

Bald Eagle Nesting Protection Measures

Restricting or alternating public access near bald eagle nesting sites could influence land use and public use and access at the project. Under Proposed Article A118, *Minimization of Disturbances to Nesting Bald Eagles*, DWR proposes to develop additional or amend current Bald Eagle Management Plans to include biological opinion measures, as recommended by Interior, for the protection of bald eagle nesting sites. Interior (under 10(j) recommendation no. 12) and DFG recommend measures consistent with the proposed article. For further description of these proposed measures, please refer to section 3.3.4, *Terrestrial Resources*.

Staff Analysis

Existing recreational use could potentially affect the territory associated with the bald eagle nesting site located at Potters Ravine. Measures for the protection of the nesting site may lead to restricting recreational access in this area and altering the existing land use that currently occurs in this area. Coordination between the proposed Recreation Management Plan and the measures developed for the protection of the bald eagle nesting site would help to ensure that land use and resource protection measures for these areas are managed in a consistent manner. We discuss the proposed measures associated with minimizing Bald Eagle nesting disturbance and the potential effects of these measures in more detail under section 3.3.5, *Threatened and Endangered Species*, and section 3.3.6, *Recreation Resources*.

Fuel Load Management

Under Measure B102, *Development of a Fuel Load Management Plan*,⁹⁴ DWR proposes to develop and file for Commission information within 1 year of license issuance a Fuel Load Management Plan for the project lands to be developed in coordination with the Forest Service, BLM, CDF, and Fire Protection Butte Unit, DPR, DFG, Paradise Fire Department, Butte County Fire Safe Council, Butte County Resource Conservation District, State Water Contractors, Native American Tribes and other appropriate agencies and associated public process. DWR states that the plan would be consistent with the OWA Management Plan and would include identification of the issues, prioritization, and recommended actions to address fuel load management. The Forest Service, under 4(e) condition no. 19, recommends that DWR develop a Fuel Load Management Plan for National Forest System lands located within the project area. The Forest Service specifies that the Fuel Load Management Plan identify fuel management issues, prioritization, and recommended actions to address them. In its comments on the draft EIS, DWR states that Measure B102 would include Forest Service lands consistent with the Forest Service 4(e) condition no. 19.

Staff Analysis

The lands surrounding the project are prone to wildfire because of the terrain, vegetation, climate patterns, and residential development. As stated by the Forest Service, relicensing stakeholders have expressed concerns that land use practices and fire suppression activities result in increased fuel loads and

⁹⁴ Included in appendix B of the Settlement Agreement as part of the measures the Settlement parties agreed to but propose to be outside of the terms and conditions associated with a new license for the project.

an increased risk of wildfires. As stated previously, multiple agencies in the project area are responsible and have developed fire management policies, including the Forest Service, CDF, and DPR who are responsible for the primary fire management programs on lands immediately surrounding the study area, and BLM, DFG, Butte County, and the city of Oroville also have lands within the vicinity that are governed by policies on fire management or suppression.

Over the term of a new license, the buildup of vegetation would cause fuel load accumulation, thereby increasing the potential for wildfire occurrence and making suppression increasingly difficult. As fuel loading would increase without treatment, recreational use and public access to project facilities would continue to increase the risk of wildfire ignitions within the project area. A Fuel Load Management Plan would provide the means to manage the land resources within the project to reduce fuel loading in the wildland/urban interface and improve future related interagency planning, management, and coordination for wildfire protection measures. Implementing a Fuel Load Management Plan would improve fuel load management on project lands and lead to an associated reduction in the occurrence and suppression of wildfires in the future.

Effects of Proposed Recreation Enhancements and Management Measures

Recreation Management Plan

The proposed recreation enhancement measures associated public recreational access and proposed recreation management measures can affect land use and land management of the project. Under Proposed Article A127, *Recreation Management Plan*, DWR would implement the Recreation Management Plan that includes measures for the development of recreational enhancement and management of recreational resources at the project (see section 3.3.6.2, *Recreational Resources*). Elements of the Recreation Management Plan that pertain to land use and management of the project would include measures to continue interagency coordination in the management of the recreational resources associated with the project and the development of the FERC License Coordination Unit that would manage the recreational, environmental, and other terms and conditions of a new license; help ensure regulatory compliance; and provide a local point of contact for the community. The Recreation Management Plan also identifies six geographic management units that represent different distinct geographic areas and recreational experiences for visitors to the project for the purposes of long-term recreational planning and monitoring of the project's recreational resources.

Interior 10(a) recommendation no. 4 and a DFG 10(a) recommendation also recommend the development of the Recreation Management Plan, consistent with this proposed article.

Staff Analysis

The proposed recreational facility enhancements specified in the Recreation Management Plan would provide enhancements to existing recreational facilities and would also provide for some new recreational areas, such as the Thermalito afterbay outlet camping area. These facilities would result in minor land use changes and enhanced public access within the project. The FERC License Coordination Unit and the interagency coordination specified in the Recreation Management Plan would help provide measures for coordinated management of actions associated with recreational and land use and management of the project over the term of a new license. This coordination would help ensure resolution of any potential interagency or resource management conflicts that arise. We discuss proposed recreational facility and management measures in more detail in section 3.3.6, *Recreational Resources*.

Foreman Creek Area

Under Proposed Article A129, *Improve and Redirect Recreation Usage to Specific Areas at Foreman Creek*, DWR proposes to develop a plan, in consultation with federally recognized Native

American Tribes located in Butte County, the KonKow Valley Band of Maidu, and the Recreation Advisory Committee, to protect cultural resources at Foreman Creek while continuing to provide recreational use at that location. The plan would include measures to restrict the usage of the existing car-top boat ramp and develop facility improvements to encourage recreational use at Forman Creek in designated areas, including the installation of a restroom and picnic tables. The plan is also recommended by Interior under 10(a) recommendation no. 6, which is consistent with the proposed article.

The Berry Creek Rancheria and the Mooretown Rancheria (collectively referred to as the Tribes), in comments on the Settlement Agreement (dated April 26, 2006), stated that the Foreman Creek area should not be exposed to further disturbance by the public, particularly as a result of recreational use, and that the area should be protected and set aside from public use, including recreation and any other use that is inconsistent with protection of cultural resources and unnecessary for the operation and management of the project. Specifically, the Tribes are concerned that the area would remain open to the public during the development of the plan specified in Proposed Article A129 and would remain open to the public over the term of a new license for recreational activities that would adversely affect cultural resources in this area. The Tribes recommend that the Commission require DWR to grant a cultural resource easement that would transfer rights to the Berry Creek Rancheria to visit the Foreman Creek Area and manage and restore cultural resources there, with all remaining rights retained by DWR. Also, the Berry Creek Rancheria seeks a determination from the Commission that public access should not be allowed in the Foreman Creek area.

DWR states that the Tribes' proposed easement transfer would not allow for multiple-use management of the project lands in the Foreman Creek area and that the Commission should not require granting such an easement. Furthermore, DWR states that Proposed Article A129, completing section 106 consultation and implementing the Settlement Agreement provisions, would protect cultural resources in the Foreman Creek area (letter from M.A. Swiger, Attorney for DWR, Van Ness Feldman P.C., Washington, DC, to the Commission, dated May 26, 2006).

Staff Analysis

The proposed plan for public use and management the Foreman Creek area and the HPMP (see section 3.3.8, *Cultural Resources*) would help to provide measures to resolve existing conflicts associated with the current land use and management of the Foreman Creek area. However, until the development of the plan and associated land and resource management measures, potential adverse effects on cultural resources could occur as a result of the continued recreational use of the project lands within this area. Temporarily closing the site until the management plan is developed and approved by the Commission, and resource protection measures are implemented, would help to limit the potential adverse effects of the existing land use conflicts in this area and help to ensure that the cultural resources in this area would be adequately protected. The proposed plan and HPMP would be developed in consultation with the Tribes and would, therefore, would provide the means to help address the Tribes concerns for resource protection in the Foreman Creek area. Land use management actions, such as closing culturally sensitive areas, implementing cultural resource protection and mitigation measures, and/or redirecting recreational use in this area could provide adequate resource protection for this area. See also sections 3.3.6, *Recreational Resources*, and section 3.3.8, *Cultural Resources*, for further discussion.

Screening of Material Storage Area

Proposed Article A132, *Screening of Material Storage Area*, stipulates that DWR would plant vegetation to screen the storage/staging area located northwest of the emergency spillway from view of Oroville Dam Boulevard. Interior's 10(a) recommendation no. 9 is consistent with this proposed article.

Staff Analysis

The proposed screening would result in minimal changes in land use and management of the project, but would afford aesthetic benefits as a result of the screening of the storage/staging area. See section 3.3.9, *Aesthetic Resources*, for further discussion.

3.3.7.3 Unavoidable Adverse Effects

None.

3.3.8 Cultural Resources

3.3.8.1 Affected Environment

A comprehensive overview of cultural resources located within the project area, including the prehistory and history of the Feather River and Lake Oroville can be found in the license application (DWR, 2005a,b) along with other supporting documents.

Section 106 of the National Historic Preservation Act of 1966, as amended, requires that the Commission evaluate the potential effects on properties listed or eligible for listing in the National Register of Historic Places (National Register). Such properties listed or eligible for listing in the National Register are called historic properties. In this document, we also use the term “cultural resource” for properties that have not been evaluated for eligibility for listing in the National Register. Cultural resources represent objects, structures, places, or archeological sites that can be either prehistoric or historic in origin. In most cases, cultural resources less than 50 years old are not considered historic. Section 106 also requires that the Commission seek concurrence with the State Historic Preservation Officer (SHPO) on any finding involving effects or no effects to historic properties, and allow the Advisory Council on Historic Preservation an opportunity to comment on any finding of effects to historic properties. If Native American (i.e., aboriginal) properties have been identified, section 106 also requires that the Commission consult with interested Indian tribes that might attach religious or cultural significance to such properties. In this case, the Commission must take into account whether any historic property could be affected by a proposed new license within the project’s area of potential effects (APE) and allow the Advisory Council on Historic Preservation an opportunity to comment prior to issuance of any new license for the project.

Area of Potential Effects

The APE is the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of National Register-eligible sites (36 CFR 800.16[d]).

For prehistoric and historic archaeological resources, the limit of the APE for the Oroville Facilities was defined as being the existing FERC project boundary, which encompasses about 41,540 acres. The APE established for the evaluation of historic structures also was equivalent to the FERC project boundary and expanded to include the DWR Oroville Field Division facility.

Ethnographic and ethno-historic resources are locations that have special cultural significance or sensitivity for Native Americans or other ethnic groups. These resources may be related to sacred and/or traditional uses of both site-specific locations, such as an ethnographic village, and general areas such as a mountain that is a central element of myth or legend. For this project, the APE for ethnographic resources was expanded beyond the FERC project boundary to include Stringtown Mountain and Bald Rock Canyon to the base of Bald Rock Dome.

Archaeological Research and Background Investigations related to the development of the Oroville Facilities

As reported by the Anthropological Studies Center (DWR, 2005f), early archaeological efforts within the project area were carried out in conjunction with the development and operation of the Oroville Facilities and focused primarily on Native American or prehistoric physical remains. These investigations included a 2-month, university-sponsored program in 1952 led by Adan Treganza focused on seven watersheds in central and northern California under consideration for hydropower development. Treganza (1953) documented 30 archaeological sites within the study area. Beginning in 1960, Francis Riddell of the State Indian Museum conducted preliminary surveys of prospective sites for the Oroville Facilities and, joined by William Olsen, more extensive investigations of the Feather River. The most extensive inventory effort of the project area was conducted by Eric Ritter and Joseph Chartkoff, who documented 153 prehistoric archaeological sites in 1966. Two more field seasons of extensive investigations by Ritter and Chartkoff established the prevailing prehistoric temporal framework for the project area.

Following completion of the Oroville Facilities in 1971, DPR conducted surveys in support of ongoing recreational development during the 1970s, 1980s, and 1990s. The systematic survey of the Lime Saddle Recreation Area (1976 and 1977) documented six additional sites including three sites that were the first historic era resources formally recorded within the project boundary. In response to concerns about the effects of public use, specifically looting, vandalism, and unauthorized OHV use, on cultural resources, DWR conducted various site assessments in the 1980s and 1990s. Inventories of artifact collections associated with human remains from the project area have been conducted by DPR (1992) and Kautz and Taugher (1987).

Investigations Related to DWR's Relicensing Effort

DWR completed three technical cultural resources investigations in support of the relicensing of the Oroville Facilities and is continuing work on subsequent studies related to the evaluation of documented cultural resources. The Anthropological Studies Center at Sonoma State University and the Archaeological Research Center of the California State University at Sacramento conducted a joint archaeological and historical resources inventory (DWR, 2005f). They identified 897 prehistoric and historic archaeological properties. The Far Western Anthropological Research Group conducted an ethnographic and ethno-historic inventory of Konkow Maidu cultural places (DWR, 2004n). They identified 144 ethnographic locations within the project boundary or close to the Oroville Facilities. JPR Historical Consulting completed a historic properties inventory and evaluation of Oroville facilities, Butte County, California (DWR, 2004o). It identified 16 buildings and structures, including 12 historic properties that contribute to the Oroville Field Division Historic District and two individual historic properties associated with the historic district. The Archaeological Research Center also prepared a report for the public to explain the goal, objectives, and findings of the archaeological and historical resources inventory.

Prehistoric Archeological Chronology and Background

Archaeologists working in Northern California have been researching a number of major trends, themes, and issues characterizing the prehistory of the Feather River-Lake Oroville area. Prehistoric archaeology in this region has focused on defining archaeological contexts, examining past lifeways, and studying cultural processes. Important research topics include the paleoenvironment, site-formation processes, and cultural chronology. Issues related to determining past lifeways, including technology, subsistence-settlement, social organization, demography, and ideology/religion, have also been explored.

Oroville Vicinity

The basic outline of prehistoric cultural chronology in the project vicinity was first developed by Olsen and Riddell (1963) and later expanded and elaborated by Ritter (1968, 1970) and Kowta (1988). Prior to about 5,000 years before present (BP), there is little direct evidence of human occupation in the Lake Oroville vicinity, although surrounding areas show indications of human presence. Sometime prior to 11,000 BP, people entered the New World and occupied western North America. The interval between 11,000 BP and 8,000 BP is characterized by the presence of the Fluted Point and Stemmed Point traditions in California. Conventional wisdom holds that these Late Pleistocene/Early Holocene traditions reflect lifeways focused upon hunting big-game mammals.

These traditions are followed between 8,000 BP and 5,000 BP by as-yet poorly defined Early Archaic traditions. Cultural assemblages at this time are typified by the occurrence of handstones and milling slabs, presence of Pinto and Borax Lake series dart points, and infrequent use of obsidian for the manufacture of flaked stone tools. This evidence is assumed to indicate the existence of a subsistence base emphasizing the gathering hard seeds and other vegetables and hunting. Sometime after 5,000 BP, the Middle Archaic tradition emerges, and the Lake Oroville locality shows its first indications of intensive occupation.

The earliest securely dated archaeological complex in the Lake Oroville area is the Mesilla Complex, which has been dated between about 3,000 and 2,000 BP. Kowta (1988) has described this as the Butte County foothills variant of the regional Martis tradition. Manos and metates (i.e., hand-held stones or rollers and stone blocks with a shallow concave surface) were used for grinding vegetables and grinding and preparing hard seeds. Pestles and bowls were present but rare. This complex is defined by variations of Martis series points, including leaf-shaped, stemmed, and side notched points made from basalt, slate, and chert. *Haliotis* and *Olivella* beads, charm stones, and bone pins and spatulae are also part of the Martis Complex assemblages. This complex may represent sporadic, possibly seasonal occupation of the northern Sierra foothills by local bands and task groups.

The subsequent Bidwell Complex (2,000 to 1,200 BP) continued the use of basalt and slate dart points. People probably lived in relatively permanent villages that included formal cemetery areas. These peoples hunted; collected freshwater shellfish; fished with nets held in place by grooved, notched sinker stones; and gathered acorns to be processed on milling slabs and wooden mortars. Steatite vessels were used for cooking. The initial development of tribelets is associated with this period.

The Sweetwater Complex (1,200 to 500 BP) is associated with the first use of the bow and arrow. Tipped arrows with small, lightweight, stemmed and corner-notched projectile points were used. Mortars and pestles were the principal grindstone tools. Steatite vessel use became more elaborate with cups, platters, bowls, and tubular smoking pipes. The period is associated with a large variety of bone artifacts and an expanded inventory of marine-shell artifacts. The acorn complex appeared well developed, and a tribelet form of political organization probably prevailed.

The Oroville Complex (500 to 150 BP) represents the protohistoric Maidu-Konkow. Acorn processing became focused as bedrock mortars and desert series projectile points predominated. Diagnostic artifacts included small, tubular bone beads, incised bird-bone tubes and whistles, bone gorge hooks, gaming bones, awls, tubular steatite pipes, and clamshell disk beads. People constructed circular dance houses, and other large structures, and continued to dwell in caves and rock shelters. During this period the acorn complex reached its greatest development; political organization continued to be tribelets; and population density reached its highest levels.

Southern Cascades

North of the Lake Oroville areas, a more temporally limited cultural chronology was first formulated by Baumhoff (1955, 1957) and subsequently elaborated on by Johnson (unpublished

manuscripts) for the Yana territory. The Deadman Complex (4,500 to 2,500 BP) largely corresponds to the earlier part of the Martis tradition. Use of basalt for the manufacture of flaked-stone tools predominated over the use of obsidian and chert. Assemblages are dominated by large, side-notched projectile points along with large, unifacially flaked, leaf-shaped points and stemmed forms.

The Kingsley Complex (2,500 to 1,500 BP) corresponds to the later part of the Martis tradition. Use of basalt continues with the addition of other lithic tools including small, well-shaped scrapers, and cobble core tools. A variety of groundstone tools are present, and spatulate bone tools, *Olivella* shell beads, and flat *Haliotis* beads also occur. The remains of multi-family houses are present.

The Dry Creek Complex (1,500 to 500 BP) is characterized by the preference for obsidian over basalt and chert for flaked-stone tool manufacture. Introduction of the bow and arrow is indicated by the presence of projectile points similar to Columbia Plateau corner-notched and Gunther series points. Diagnostic shell beads and ornaments include M series and spire-hopped *Olivella* beads and disc-shaped *Haliotis* ornaments and perforated freshwater shellfish ornament. Deer ulna awls and flakers are also present. Tight flexed burials are interred in prepared grave pits.

Northern Sierra Nevada

The prevailing prehistoric cultural chronology for the northern Sierra Nevada was initially developed during the 1950s by Elsasser (1960) and Heizer and Elsasser (1953) and expanded upon by Elston (1971 and 1979) and others. The Late Pleistocene/Holocene cultural chronology for this region includes the Washoe Lake Phase (from before 10,000 BP). It is the earliest known manifestation of human presence in the broader region and is represented by isolated fluted points. The subsequent Tahoe Reach Phase (10,000 to 8,000/7,500 BP) is distinguished by the presence of large, stemmed, edge-ground projectile points, usually made from basalt, which still generally occurred as isolated finds. Finds from this phase suggest highly mobile groups. The Spooner Phase (8,000/7,500 to 5,000 BP) is poorly known and lacks diagnostic projectile points.

The Early (5,000 to 3,000 BP) and Late (3,000 to 1,300 BP) Martis Phases are characterized by the presence of large numbers of ground stone artifacts, and the occurrence of pit houses and storage pits that suggest long-term residence, intensive seed processing, and food storage. The Early Martis Phase is distinguished by Martis contracting-stem, split-stem, and Steamboat diagnostic projectile points and the Late Martis Phase is typified by Martis corner-notched, Elko corner-notched, and Elko-eared diagnostic projectile points. The Early Kings Beach Phase (1,300 to 700 BP) sees the introduction of the bow and arrow, tipped with Rosegate and Gunther-series projectile points. Chert is the preferred toolstone with obsidian somewhat important, and the use of basalt uncommon. Tool size is reduced and more specialized, and bedrock mortars are introduced, likely related to acorn processing. Fishing probably played a greater role than large game in diets. The Lake Kings Beach Phase (700 to 150 BP) is typified by Desert-series projectile points.

Summary

The investigations and chronologies give insights into the occupation of the Feather River region by Native American peoples for at least 3,000 years and continued up to and beyond the arrival of European-American immigrants in the mid-1800s. The Feather River provided fresh water, abundant fish and other riverine resources, and a transportation corridor. The adjacent woodlands provided oaks, numerous other plants, and game, such as deer. These resources, supplemented by trade with neighboring tribal groups, provided the Konkow-Maidu with the resources they needed for food, shelter, clothing, and the pursuit of a variety of ceremonial and sacred practices.

Prehistoric peoples of the Feather River region resided in an area containing a suite of habitats embedded within grasslands, scrublands, deciduous woodlands, and coniferous forests. Over time, the people developed subsistence adaptations increasingly focused upon the gathering and use of fish, large

mammals, and acorns. These were supplemented by a host of other plants and animals. Various technological innovations were intimately tied to subsistence, including changes in weaponry (e.g., the introduction of the bow and arrow, fishing facilities), milling equipment (e.g., the shift from use of manos and metates to mortars and pestles), and textile arts (e.g., the development of basketry). Procuring additional resources was a primary goal of elaborately developed trade networks, which frequently transported goods (e.g., obsidian and marine-shell ornaments) over long distances. Trade was one aspect of the increasing elaboration of social organization through time and development of regional religions, such as the Kuksu cult. Forces affecting cultural change through time have been proposed to include localized population growth, in-migration of foreign peoples, and environmental change.

Ethnographic Background

The Lake Oroville area is within the territory of the Konkow peoples occupied at the time of contact with the EuroAmericans through the present. The Konkow peoples are sometimes referred to as the Northwestern Maidu, one of the three major divisions of linguistically related groups identified as Maidu, the other two being the Mountain Maidu to the northeast and the Nisenan to the south (DWR, 2004n). Residents of the project area spoke four closely related dialects of the Konkow language, which extended throughout the Northwest Maidu or Konkow territory. Konkow is a sister language to Maidu (Northeastern or Mountain Maidu) and to Nisenan (Southern Maidu). Together, these three languages make up the Maidu language family, classified as a member of the Penutian language stock (Shipley, 1978).

The Konkow were organized in village communities in which a larger, major village provided the central ceremonial and political focus for several nearby affiliated villages. These communities incorporated three to five smaller villages, with a total population estimated at 200 people.

Subsistence was based on a mixture of gathering, fishing, and hunting that occurred on a seasonal basis during the course of the year. Salmon, deer, acorns, and pine nuts were among the most important food items. The Feather River fishery offered an abundant and reliable food source, particularly the seasonal salmon runs. Konkow Maidu continue to take salmon from the Feather River and still hold an annual salmon ceremony reflecting the importance of salmon in Konkow life. The Konkow people had detailed knowledge about the distribution and usefulness of plants in their territory. Families moved to strategic locations at harvest times to gather desired foods, which included various greens, tubers and roots, seeds, nuts, and berries. Pine nuts were also highly valued, but the most important of these foods were acorns from oak, particularly black oak in the higher elevations beyond the APE and at the Enterprise area within the APE. Acorns, along with many other foods, were gathered, dried, and stored for winter use.

Trade with neighboring tribes was used to supplement the locally available resource base and to foster intertribal relationships. Konkow Maidu traded arrows, bows, deer hides, salmon, foothill pine nuts, acorns, and other foods for beads, obsidian, and green-dye pigment from neighbors to the north. They also received abalone shell and clam shell disc beads from the coast through their Patwin neighbors to the west. The trade network both east-west and north-south across California was extensive so that materials from different ecozones moved considerable distances, with many tribes acting as middle men (DWR, 2004n). Elaborate ceremonies, including the Kuksu cult, were practiced during the fall, winter, and spring. Traditional competitive games provided an important opportunity for social interactions with teams from neighboring communities.

The influx of Spanish explorers, trappers, early settlers, and cattle ranchers in the early 1800s introduced diseases and disrupted both the environment and certain traditional Native American practices. With the onset of the Gold Rush in 1848, the Feather River was the site of intensive settlement and mining activities that affected the fishery and disrupted the lifeways of Native American inhabitants. Some Native Americans began working for miners, ranchers, or settlers. Because of land use conflicts,

treaties were negotiated by the federal government in 1851. One of these treaties would have given the Maidu a substantial reservation stretching from Chico to Oroville. However, the Senate refused to ratify the treaty and many of the Maidu were sent to the Nome Lackee Reservation in Tehama County, only to return shortly thereafter because of poor conditions. A second relocation of local Native Americans was undertaken in fall 1863, when almost 500 Indians were forced to march 100 miles across the Sacramento Valley to the Round Valley Reservation in Mendocino County. During this devastating march, the Maidu suffered heavy losses, particularly among the very young and older populations. Ultimately, the Maidu lost 80 to 90 percent of their population and virtually all of their lands as a result of European-American colonization. The Maidu continued to practice traditional lifeways, but they did not have a secure land base until the turn of the twentieth century when several small Rancherias were created. Several tribes obtained federal recognition, but others did not.

In 1964, the land on which one of the Rancherias was located, Enterprise #2 Rancheria, was sold to the state of California for the construction of the Oroville Facilities and the Rancheria was terminated. Construction of the dam inundated many places that Konkow Maidu people visited and altered the salmon runs, such that they no longer go up the North Fork, West Branch, Middle Fork, or South Fork of the Feather River to spawn.

Today, several federally recognized and unrecognized Maidu Tribes and unaffiliated members of the Native American community reside within the project area. Local traditions and festivals, such as the Feather River First Salmon Ceremony, are indications of the rejuvenation of traditional values, practices, and community involvement, including classes to renew the Konkow language and to teach basketry arts.

Historic Background

On the far northeastern frontier of Spanish California, the Feather River area was first explored by the Spanish in the early nineteenth century and later exploited by fur trappers in the 1820s and 1830s. The Mexican rancho period in northeastern California began in the 1840s, but it was soon interrupted, first by the American acquisition of California in 1848 and then by the Gold Rush.

Three months after gold was discovered at Sutter's Mill near the town of Coloma, John Bidwell found gold on the Feather River at what became known as Bidwell's Bar. The Feather River was a major gold-producing area with all the social, economic, and environmental consequences found elsewhere in mining areas across the West. The earliest settlements along the Feather River were at the sites of gold discoveries at Bidwell Bar, Long Bar, Hamilton, and Thompson's Flat. By 1850, there were 214 mining camps on the Feather River and its tributaries, and more than 6,000 people, mostly men, lived in Butte County. The majority of these men pursued the relatively easily worked surface placer deposits. The miners quickly outnumbered the sparse Mexican population and the much larger indigenous population inhabiting the area and began to reshape the landscape. The Chinese played an important role in mining on the Feather River. The Chinese had a reputation for reworking apparently unsuccessful or played-out digging and finding gold. They specialized in placer mining and were skilled at water management. For a 10-year period from 1872 to 1882, the largest Chinese mining settlement in the United States existed a few miles south of Oroville. At the height of this period, there were 5,000 to 8,000 Chinese living in several mining camps in the area known locally as the lava beds. By the 1880s, as hydraulic mining activities decreased, mining towns were abandoned. Butte County maps of 1877, 1886, and 1901 show only the small communities of Springtown and Enterprise, in addition to the towns in the project area, Bidwell Bar and Oroville, which became the county seat in 1856. Where other towns disappeared, Oroville's gradual development as a trading center first for mining and then for lumbering and agriculture, along with arrival of the railroad in 1864, reinforced its position. Oroville had a large Chinese population as well.

As mining operations became more complex and costly, mining corporations began to dominate the local industry, with the construction of reservoirs, dams, and extensive ditches. In 1898, a form of

mining newly developed in New Zealand was first used successfully in California on the Feather River. Dredge mining left vast fields of cobble tailings that still dominate the landscape of the Feather River south of Oroville. About 8,000 acres of the project area within the OWA is a dredge field. These tailings provided much of the material used to construct Oroville dam. Mining remained an important part of the economy along the Feather River well into the twentieth century, a fact that is reflected in the local archaeology as one-quarter of the historic era sites identified during cultural resource surveys involve mining. More than 17 miles of ditches were recorded in the Oroville project area, demonstrating the importance of water supply to the mining operations and illustrating the grand scale of the industry.

The influx of miners also saw the development of trails and mule trains in the early years followed rapidly by ferries at Hamilton and Long Bar in 1850 and then at Oroville and Bidwell Bar, and county road plans in 1853. However the high flows of the Feather River made both ferry and road crossing dangerous. To provide safe passage over the Feather River, the suspension bridge at Bidwell Bar was built in 1856. By 1886, there were bridges at Oroville, Bidwell Bar, Springtown, and on the West Branch northeast of Cherokee. The arrival of the railroad in the 1860s improved the Feather River's area connection to the larger state and national transportation network. The California Northern Railroad, the first in the area, was completed from Marysville to Oroville in 1864. The coming of the railroad also increased the development of roads in the area.

Following the influx of miners to the region and the construction of railroads, the foothills and valleys along the Feather River and between the Feather and Sacramento rivers soon became a center for ranching and agriculture—first cattle, then wheat, and later fruit, rice, and other crops. Timber harvesting in the nearby forests was conducted first locally to support the mining industry, then on a more regional scale to provide lumber for residential and commercial use. The rise of agriculture to a preeminent position in the local economy was tied to the establishment of irrigation, including the adaptation of water-delivery systems from mining to agriculture, and the establishment of more robust and reliable transportation systems. In the twentieth century, the area became an important source of hydroelectric power and a vital source of water for California. During the first decade of the twentieth century, there was considerable interest in the rights to the waters of the Feather River, especially the North Fork, for hydropower use. Mines had been among the first users of hydropower. Frank McLaughlin's Big Bend Tunnel Project used a water-generating plant to provide electric power for the pumps and hoist. The Spring Valley Mine used electric power to provide light for its around-the-clock operations. The dredges also used electric power. Great Western Power, comprising a powerful group of California and New York investors, was engaged in developing hydropower in the area, once they acquired the rights to Big Meadow in Plumas County on the North Fork, which they would flood to create Lake Almanor. Great Western Power remained the dominant hydropower company in northern California until it was acquired by PG&E in 1930, which then took over the Big Bend powerhouse and Las Plumas. Both the powerhouse and the community of Las Plumas were razed for the creation of Lake Oroville.

In 1951, the state proposed the construction of a dam across the Feather River above Oroville to control floods, collect run-off for delivery along a 750-mile route, and generate hydropower. Construction of the Oroville dam as part of the State Water Project began in 1962 and was completed in 1967, creating Lake Oroville. Oroville dam, at 770 feet, is the highest dam in the United States. The construction of Oroville Facilities and the reservoir created many recreational opportunities.

Cultural Resources Identified within the Project's Area of Potential Effect

The cultural resources inventories involved extensive background research, the collection of oral histories, and a five-part field strategy. The multi-phase field strategy included the following: (1) the re-recording of 276 previously identified prehistoric and historic archaeological sites in the APE; (2) a complete prehistoric and historic archaeological inventory of the Lake Oroville 9,554-acre fluctuation zone between 690 and 900 feet above msl that was accessible in 2002 and 2003; (3) a probabilistic sample survey of about 4,800 acres above the maximum pool elevations; (4) a focused inventory of 58

historically sensitive areas; and (5) the inventory of about 2,000 acres associated with existing and proposed recreational facilities.

A cultural resources record search was conducted at the Northeast Information Center for sites within a 5-mile radius beyond the project boundary. This research identified 276 previously recorded sites within the project area. The previously recorded sites include 182 prehistoric sites, 35 historic era sites, 54 multi-component sites, and 5 ethnographic sites.

The prehistoric and historic archaeological inventory covered about one-half of the 31,000 accessible (i.e., non-inundated or steeply sloped) acres within the fluctuation zone and above the maximum pool elevations within the APE. This inventory included the review of historic maps, previously completed archaeological surveys and site records, literature on the history and natural environment of the project area, and other resources such as census records, 67 homestead proofs, and 21 mining claims within or adjacent to the project area. Oral interviews were conducted to gather more specific information on certain historic-era resources. This extensive background research was followed by re-visits to previously recorded sites and preparation of updated inventory forms.

The intensive archaeological survey of the accessible portion of the fluctuation zone around Lake Oroville (between about 690 and 900 feet msl) was conducted in 2002 and 2003 to examine the area subject to regular inundation and exposure from fluctuations in reservoir levels. The goal of this survey was to completely cover the 9,554-acre area to ensure that no sites that might be affected by the project were inadvertently overlooked. Despite the lower than usual reservoir levels during the field season, parts of the fluctuation zone remained submerged throughout the year and only about 7,500 acres were inventoried. DWR remains committed to inventorying outstanding parts of the fluctuation zone as future conditions allow. The field techniques and site-recording procedures within the fluctuation zone were identical to those used in upland archaeology survey.

The remaining portions of the APE located above the maximum pool elevation were sampled based on a probabilistic model using three natural habitat zones to gather information that could be used to portray the area as a whole. These zones included grasslands (2,096 acres surveyed), oak woodland (1,793 acres surveyed), and coniferous forests (918 acres surveyed). The total area surveyed as part of the probabilistic inventory (4,807 acres) represents approximately 22 percent of the accessible acreage. Areas that were too steep to survey safely were examined but were not subject to an intensive pedestrian survey. Dense vegetation and occasionally thick forest duff made it difficult to see the ground surface within the area above the maximum reservoir elevation, and additional sites are almost certainly present in these areas. Furthermore, historic-era disturbances, such as mining along stream courses and the intensive gold dredging within the present-day OWA, have so heavily modified the ground surface that prehistoric sites have been either obliterated or obscured. For example, only one prehistoric bedrock mortar site was encountered within the 2,100 acres surveyed within the OWA, while the density of prehistoric sites in the remainder of the surveyed area is about one site for every 40 acres examined.

The prehistoric and historic archaeological inventory, which was conducted with the participation of trainees representing each of three federally recognized Maidu Tribes from the Mooretown, Berry Creek, and Enterprise Rancherias, involved about 15,500 acres of land. Surveyors adhered to California standards and accepted professional standards in defining prehistoric sites as three or more artifacts or other cultural items in direct association and/or any isolated feature, such as bedrock mortars, house depressions, hearths, or hunting blinds that reflects an intensive level of cultural activity. The survey resulted in the recording of 803 archaeological and historic resources and 391 isolated finds consisting of 341 prehistoric, 48 historic-era, and 2 multi-component isolated finds. Table 58 presents the survey results by strategy. The survey report (DWR, 2005f) includes a complete listing of all the sites and isolated finds recorded during the survey. All archaeological and historic resources were recorded using the appropriate DPR forms.

Table 58. Survey results by strategy. (Source: DWR, 2005f, as modified by staff)

Strategy	Acres	Percent of APE	Number of Sites Recorded
Re-record 276 known sites in APE	--	--	129 ^a
Fluctuation zone (9,554 acres between 640 and 900 feet msl)	7,492	18	293 ^b
Probabilistic sample	4,807	12	223
Targeted HSAs	1,104	3	33
Management-specific parcels	2,073	5	125
Subtotals for acres surveyed	15,476	38	803
Total for APE	41,540	100	897 ^c

^a Excludes 34 sites not relocated; 27 known sites subsumed within 8 large sites.

^b Includes 43 sites that extend above maximum pool.

^c Includes 94 known sites below the year-2002 minimum reservoir elevations.

Surface collection protocols were developed with the understanding that all collected materials would be permanently curated at a facility in the Oroville area, preferably managed by interested tribal groups or under the joint control of the Maidu Tribes and appropriate agencies (DPR and/or DWR). Under these protocols, surveyors retrieved any and all time-sensitive (diagnostic) artifacts, retrieved a small number of artifacts at each site for dating and provenance (source) purposes, and, for the fluctuation zone survey, retrieved samples of other artifacts (e.g., bifaces, pestles, stone bowls) that are subject to loss from shoreline erosion or looting.

The probabilistic survey was intended to provide information on the general density and distribution of the full range of potential cultural resources rather than focusing on specific historic era remains that often occur in particular kinds of settings. To ensure that historical resources were not inadvertently overlooked, a separate investigation was undertaken of specially targeted locations that appeared to have particular historical interest based on the archival research, including places on which homestead or mining claims had been filed. A total of 58 additional historically sensitive locations, including 42 homesteads and 16 mining patents, that had a reasonable possibility of containing historic-era resources were assessed and any historic sites identified were recorded.

Finally, the inventory strategy included inspecting 15 management-specific parcels where campground, recreational, and marina improvements; access and trail development; habitat restoration; project maintenance; and future land use practices might affect significant cultural resources. Locations included Lime Saddle recreation area; the multiple utility and road networks at the confluence of the West Branch and North Fork, including Dark Canyon; Goat Ranch recreation area; Bloomer boat-in campgrounds; Bidwell Canyon recreation area; Loafer Creek recreation area; the canal and road system located on the south side of the South Fork, from McCabe Creek to Ponderosa dam; facilities directly downstream of Oroville dam, including parking, roads, the sewage treatment plant, and the substation; the road system along the south side of the Thermalito division pool; the Feather River Fish Hatchery; North Thermalito forebay recreation area; South Thermalito forebay recreation area and nearby generating station; Wilbur Road boat launch; Rabe Road shooting range and Monument Hill day-use area; and Larkin Road boat launch.⁹⁵ Surveys of these parcels included buffer areas ranging from 500 to 2,000 feet, depending on the extent of development and the relation to surrounding topography and the APE.

⁹⁵ The Enterprise boat ramp and Foreman Creek recreation area were also inventoried along with other boat-in campgrounds and are discussed in greater detail under Ethnographic Resources.

Prehistoric Archaeological Sites

The inventory identified 325 archaeological sites containing materials from the prehistoric past—93 of which are multi-component sites. This total includes 94 sites that were previously recorded in areas that were inundated and could not be revisited. The prehistoric archaeological sites were assigned to one of seven site categories, based on the limited information available from surface inventories. The site categories include bedrock milling sites, open-air residential sites, limited lithic scatters, caves and rock shelters, rock art, quarries and workshops, and cemetery areas.

Sites assigned to the open-air residential category often contain several different types of tools and other artifacts, as well as evidence of semi-subterranean house features and/or midden deposits.⁹⁶

Bedrock milling sites are generally associated with oaks or other seed-producing trees, both in association with occupation sites and in isolation. These sites are ubiquitous throughout northern California and can occur as single cups or outcrops with 50 mortar holes or more. Open-air residential sites are also sometimes referred to as villages or base camps. The larger versions are more commonly called villages, smaller ones, temporary camps. Typically, these sites may include communal ceremonial structures, midden deposits, houses, or storage pits, cooking features, groundstone, and a generally wide variety of artifacts. These sites tend to be located near creeks and streams; many open-air residential sites lie within the inundated portions of Lake Oroville. Limited lithic scatter sites are those sites that contain a sparse deposit of flakes that may be from one or more parent material. Frequently, these have been identified as temporary camps or secondary workshop areas. Because of their nature (i.e., small and sparse), these sites can be easily overlooked during archaeological field surveys. The majority of sites were assigned to these three categories.

Cave and rock shelter sites are occupation sites protected by a cave or rock overhang. Preservation of organic materials is more likely at these protected sites. These types of sites also lend themselves to the creation of rock art. Rock art sites are locations where a suitable outcrop surface has been decorated with one or more petroglyphs. These sites are frequently associated with larger occupation areas and near water courses. Quarry and workshop sites are locations where raw lithic materials, such as chert, basalt, or steatite, have been extracted and, frequently, processed to some degree before transportation to another location. Cemetery areas, locations containing evidence of multiple human burials, are generally located within or in proximity to residential sites, but can occur as isolated resources. Native American cemeteries are unmarked and therefore are difficult to locate unless they are exposed during planned excavations, by erosion, or by the activities of looters. Far fewer sites were assigned to these four categories.

Table 59 summarizes the number and approximate percentage of each of the main site categories identified during the inventory.

Table 59. Number and percentage of prehistoric archaeological sites by categories within the APE. (Source: DWR, 2005f, as modified by staff)

Site Category	Number and Percentage of Total Prehistoric Sites
Bedrock milling	150 sites; 36 percent
Open-air residential	135 sites; 33 percent
Limited lithic scatters	125 sites; 30 percent
Caves and rock shelter	2 sites; less than 1 percent

⁹⁶ The definitions of the archaeological and historical site categories are taken from the draft historic properties management plan (DWR, 2006b).

Site Category	Number and Percentage of Total Prehistoric Sites
Rock art	2 sites; less than 1 percent
Quarries and workshops	2 sites; less than 1 percent
Cemetery areas	2 sites; less than 1 percent
Total	418 sites; 100 percent

Historic-Era Archaeological Sites

The archaeological inventory resulted in the recording of 572 historic-era archaeological sites within the APE that were assigned to one of six site categories. The historic era archaeological sites categories include transportation, settlement, mining, water conveyance systems, industry and commerce (e.g., logging), and agricultural development. Some historical-era archaeological resources are representative of more than one of these major themes, such as a ditch that was constructed for mining purposes and later used for agricultural pursuits. Ninety-three of the sites include both historic era and prehistoric-era components.

Transportation properties, such as trail systems, road systems, and railroads, all have left marks on the landscape. More ephemeral locations, such as ferry crossings, may be identified through documentary sources, but stone walls, tracks, watering troughs, bridges, trestles, tunnels, and the like could mark portions of a transportation system. Settlement properties are those sites containing the remains of residences, shelters, other structures, or refuse deposits containing domestic debris. Other evidence of settlement can include features, such as fences, or landscaped elements, such as gardens and orchards. Mining properties include a wide range of features and structures left behind by exploration, extraction, or processing activities. Physical indications of mining activity could include exploration pits, trenches, claim markers, historic artifact deposits, camp remains, adits, shafts, waste material piles, mining tools, ditches or flumes, or milling equipment. Miners and settlers moving into the area established water systems. The collection, storage, and transportation of water began on a small scale to meet the needs of individuals, were enlarged for subsequent mining and agricultural operations, and grew to become the hydroelectric generation facilities that are a large part of the landscape today. Wells, pumps, cisterns, ponds, reservoirs, ditches, flumes, gates, dams, and transmission lines are all features associated with the collection and use of water. The vast majority of sites were assigned to these four categories.

Industrial/commercial properties might include commercial quarries, mills, kilns, smithies, or other processing structures. Sites containing evidence of commercial timber harvesting also are within this category. Remnants of telephone and telegraph lines can be found connecting these locations. Agricultural properties were operated on a small scale in the project area until the 1880s, after which more developed commercial practices were instituted. Examples of agricultural properties include houses (or their remains) and outbuildings, harvesting machinery, storage buildings, walls or fences, orchards, corrals, water systems, and refuse dumps.

Based on information obtained from the 572 resources documented, table 60 indicates the number and approximate percentages of the dominant historical themes represented in the APE.

Table 60. Historic-era archaeological sites within the area of potential effects.
(Source: DWR, 2005f, as modified by staff)

Primary Historic Theme	Number and Percentage of Total Historic-era Sites
Transportation	184 sites; 32 percent
Settlement	166 sites; 28 percent
Mining	125 sites; 22 percent
Water systems	75 sites; 11 percent
Industry and commerce	11 sites; 2 percent
Agricultural development	4 sites; 1 percent
Other	7 sites; 2 percent
Total	572 sites; 100 percent

DWR has initiated, but not reported any results for the resource evaluations to determine which of prehistoric and historic-era archaeological sites, including trails, meet the National Register criteria.

Ethnographic Resources

The investigation into ethnographic and ethno-historic resources for this project was conducted in consultation and collaboration with the Maidu Advisory Council and members of local Konkow Maidu Tribal groups. The inventory was based on published and unpublished archival materials and 88 interviews with knowledgeable local Native Americans from the fall of 2002 through the fall of 2004. These interviews were held with numerous local tribal elders who were born and raised in the project area, including members from the Oroville-based Berry Creek Rancheria (Tyme Maidu), Enterprise Rancheria (Estom Yumeka Maidu), and Mooretown Rancheria, and the KonKow Valley Band of Maidu as well as the Mechoopda Indian Tribe of Chico Rancheria. Many of the elders participated in multiple interviews, and field visits were used regularly in combination with oral interviews to assist in the data-gathering process.

The library and archival phase of work involved the review of extensive materials at local and regional repositories, including the Butte County Public Library; the Meriam Library at California State University, Chico; and the California State Archives. This literature was supplemented by the review of historic maps and federal census records, which provided critical information to help develop and understand the history of the Native American community in this area.

The ethnographic and ethno-historic inventory led to the identification of 144 locations in or close to the APE for ethnographic resources. These locations of ethnographic and/or ethno-historic importance have been organized into 14 site categories, based on the uses that were most commonly undertaken at these locations. The most common of these site categories, villages and fishing grounds, reflect the intensive settlement of the various forks of the Feather River in the project area, as well as the value of the fisheries that occurred in this area.

Although many locations served multiple purposes for the local Native American community, each of the 144 documented sites has been placed into one of the 14 categories, as shown in table 61.

Table 61. Ethnographic and ethno-historic site categories within the APE.
(Source: DWR, 2004n)

Site Category	Number of Locations
Village	30
Cemetery	3
Camp	3
Fishing ground	29
Spawning ground	13
Hunting ground	2
Gathering area	7
Swimming hole/picnic area	7
Ceremonial site	2
Mythological site	12
Petroglyph	2
Historic event/battle site	2
Trail	11
Place name	21
Total	144

The ethnographic sites also were assigned to one of six zones in the project area: West Branch, North Fork, Main Reservoir, Middle Fork, South Fork, and downstream of the dam. These zones contain from 15 to 30 sites. Zone 5 (South Fork) includes more locations not only because the APE includes more land above the maximum pool elevation than other zones but also because it includes the significant early settlement at Enterprise, a major focus of the Konkow Maidu community.

Zones 3 (Main Reservoir) and 4 (Middle Fork) contain slightly fewer locations than Zone 5, but they are very different from each other. The Forman Complex in Zone 3 is of particular importance because of the large cemetery, a sacred place for the Maidu Tribes, which has been and continues to be vulnerable to vandalism. The Foreman Complex was an important residential base and ceremonial location and displays more site categories than any other zone. Zone 4 is an essential area to the Konkow Maidu because of its concentrated and unique mythological values not available at any other area and the number and location of fishing sites. The number, geographic distribution, and the variety of locations reveal the importance of the project area to the local Maidu peoples. DWR has initiated but not reported any results for the resource evaluations to determine which of the 144 ethnographic locations meet the National Register criteria.

Historic Properties within the Project's Area of Potential Effects

DWR conducted an evaluation of the Oroville Facilities in 2004 (DWR, 2004o). Historic structures associated with the Oroville Facilities that may be eligible for listing in the National Register include the dams, power plants, reservoirs, and canals associated with the hydroelectric facilities, along with the Lake Oroville Visitor Center, the Feather River Fish Hatchery, and the DWR Oroville Field Division facility on Glen Drive. While all of these structures are less than 50 years old, the regulations implementing Section 106 of the National Historic Preservation Act (36 CFR 800) require the

consideration of more recent properties that may have “exceptional” importance to the nation’s history (36 CFR 60.4[g]).

The inventory and evaluation of the buildings, structures, and objects associated with the Oroville Facilities began with a field reconnaissance, followed by extensive research into DWR records, photographs, and historic maps to help ascertain specific dates of construction for each feature. Published literature and unpublished archival information were used to help develop the historic context for these resources. Each of the involved historic structures was then inspected in the field, photographed, and documented on standard DPR forms. Elements of the built environment not directly associated with the hydroelectric facilities, such as campgrounds, marinas, roads, and trails, were not included in the investigation of the Oroville facilities because these features were built following construction of the hydroelectric system, and are not considered to possess “exceptional” significance as defined at 36 CFR 60.4(g).

As indicated in table 62, a total of 16 historical structures associated with the Oroville Facilities were documented and evaluated against the National Register criteria (36 CFR 60.4). Two of these resources, Oroville dam and the Hyatt pumping-generating plant, appear to be eligible for inclusion in the National Register as individual properties under the “exceptional importance” criterion (36 CFR 60.4[g]). These two structures, along with 12 additional facilities, are all considered contributing elements to the proposed Oroville Field Division Historic District under National Register criteria A and C at the state level of significance because of the historical significance of the Oroville Facilities and the importance of many of these facilities within the field of engineering and design.

Table 62. Historical structures within the area of potential effects. (Source: DWR, 2004o)

Resource	Date Built	Individually Eligible	Contributing Element to the Historic District
Lake Oroville Visitor Center	1972–1974	No	Yes
Oroville dam	1961–1968	Yes	Yes
Oroville peripheral dams: Parish Creek and Bidwell Bar Canyon	1966–1968	No	Yes
Hyatt pumping-generating plant and intake structure	1963–1969	Yes	Yes
Oroville area control center and switchyard		No	Yes
DWR Field Division facility	1968–1969	No	Yes
Fish barrier dam	1962–1964	No	Yes
Visitor viewing platform	1966–1968	No	Yes
Feather River Fish Hatchery	1966–1967	No	Yes
Thermalito fish hatchery annex	1989	No	No
Thermalito diversion dam	1962–1968	No	Yes
Thermalito diversion dam power plant	1984–1989	No	No
Thermalito power canal	1965–1967	No	Yes
Thermalito power plant	1964–1969	No	Yes
Thermalito forebay	1965–1968	No	Yes
Thermalito afterbay	1965–1968	No	Yes

A district derives its importance from being a unified entity, even though it is often composed of a wide variety of resources. The identity of a district results from the interrelationship of its resources, which can convey a visual sense of the overall historic environment or be an arrangement of historically or functionally related purposes. As a significant component of the State Water Project, the proposed Oroville Field Division Historic District, with contributing elements listed in table 62, appears to meet this definition and is recommended as eligible to the National Register under Criteria A, C, and G (DWR, 2004o).

The Oroville Facilities appear to be eligible under Criterion A for their contribution to broad patterns of our history as part of the State Water Project to water resource development within California and as a rare example of a popularly supported and approved state public works project. The State Water Project is the largest state-built, multi-purpose water project in the nation. The first of its kind, the State Water Project has been a major factor in profoundly altering the distribution of scarce water resources across California. The State Water Project also served as the model for future state water development in the arid west.

The Oroville Facilities appear to be eligible under Criterion C as a project of almost unprecedented scale for the state of California. Although the Oroville Facilities did not employ any radically new technologies, some aspects of the project were quite innovative. Among these were the following: (1) the ability of operators to control the temperature of water entering the intake structure through an innovative intake design; (2) the design and construction of an embankment dam to unprecedented height; (3) inclusion of a level of scientific instrumentation not previously employed in such projects; and (4) development and use of a sophisticated, highly efficient materials handling program for use during construction that handled in excess of 77,000,000 cubic yards of fill needed to build the massive dam.

In addition, the project was built to conform to architectural guidelines developed for the State Water Project. DWR, in consultation with the State Offices of Architecture and Construction, instituted guidelines for the architectural stylistic unification of the State Water Project facilities in 1964. Design motifs include aluminum pipe railings used at a variety of support facilities throughout the system; uniform color schemes of grays, blacks, and whites contrasted with accent colors of turquoise and red; simplified tower designs using welded structural shapes and landscaping emphasizing the control of dust; and the use of low-maintenance plantings compatible with local vegetation and trees for windscreens and living fences. As such, it embodies a specific type, period, and method of construction. It is noteworthy that the American Society of Civil Engineers has named the Oroville Facilities one of the 100 greatest American engineering achievements in the last century and in 2001 named the State Water Project a “Civil Engineering Monument of the Millennium.”

Two resources, the Thermalito fish hatchery annex and the Thermalito diversion dam power plant, were built in the 1980s and are not considered eligible either as individual resources or as elements of the proposed historic district.

Existing Threats to the Integrity of Historic Properties

The cultural resources surveys documented the effects of reservoir level fluctuations, O&M activities, and public use on the condition and integrity of the archaeological and historic resources, ethnographic and ethno-historic resources, and historic structures within the APE. During these surveys, archaeological crews used site management data to record their observations on various activities that have affected cultural resources. The categories of activities include development, public use, vandalism, looting, OHV use, cyclical inundation, sheet erosion, and shoreline erosion. Forms were completed for 721 of the 897 sites (90 percent) identified through the five inventory strategies.

Archaeological sites and ethnographic resources located within the fluctuation zone of Lake Oroville (i.e., at elevations between 640 and 900 feet msl) have been periodically subjected to inundation,

exposure to the air, and the effects of water movement, including waves from wind or boats since the construction of the project. Water-level fluctuations have caused sheet erosion, shoreline erosion, siltation, and the decomposition of exposed organic remains contained in some archaeological sites.

Depending on soil conditions, the degree of slope, and the location of a resource relative to wave action and river currents, archaeological sites may be experiencing substantial erosion, mild erosion, or siltation. The location of the resource within the fluctuation zone determines how frequently the site is inundated, exposed, or subject to both inundation and exposure on an annual basis. Archaeological sites at higher elevations are inundated only when the reservoir is near capacity. Archaeological sites at lower elevations are exposed only when the reservoir is drawn down below normal levels, while those at middle elevations are often inundated and exposed during the same year. Archaeological sites containing organic material are highly susceptible to the effects of inundation, exposure, and wave action, whereas sites containing isolated bedrock mortars remain reasonably intact in spite of regular inundation. At lower elevations, some archaeological sites have probably been buried under silt accumulating in the reservoir. Forty-three and forty percent of the observed sites are affected by sheet erosion and shoreline erosion, respectively. The fluctuation of Lake Oroville also continues to affect the ability of the Native American community to pursue traditional practices, such as plant gathering, fishing, and other river-based activities.

Activities associated with the routine operation and maintenance of the Oroville Facilities, the recreational facilities in the Lake Oroville State Recreation Area, and wildlife management within the OWA and elsewhere have affected cultural resources. These activities include the removal of rock from the historic dredge mining site in the OWA, the collection and removal of woody debris from the McCabe Creek area, the installation of certain wildlife enhancement structures, and the maintenance of recreational facilities that overlap with archaeological sites. These development activities have affected, to some degree, nearly 39 percent of the observed sites.

Public use of the facilities and the lands within the APE has affected cultural resources. These activities include the use of OHVs, the use of motorized boats (discussed under reservoir level fluctuations), looting, and vandalism. Overall, public use has affected greater than 50 percent of the observed sites. Specifically, OHV use has affected almost 20 percent of the documented resources and continues to be a threat to archaeological sites at or near places that provide easy vehicular access. Five of the eleven sites where field crews observed effects of OHV use on archaeological sites are located within the vicinity of Foreman Creek. Surveys documented evidence of looting and vandalism at about 20 percent of the recorded archaeological sites, also concentrated at locations readily accessible to the public.

3.3.8.2 Environmental Effects

Continued operation of the Oroville Facilities without protective measures could adversely affect both known and yet-to-be-identified historic properties. Many of the known archaeological sites are within the Lake Oroville fluctuation zone, where they can be affected by the rise and fall of pool levels as well as by the erosive effects of waves. Archaeological sites near campgrounds, fishing access spots, and other areas of public use are vulnerable to the erosive effects of human traffic, pedestrian or vehicular, as well as the effects of unauthorized artifact collectors. Although project operations could beneficially affect historic project facilities through continued use and maintenance, upgrades and major modifications to existing structures could diminish the character-defining attributes that qualify these structures for inclusion in the National Register. The presence and expansion of recreational facilities, including campgrounds, would continue to affect sites and plant resources of significance to Indians and would continue to affect the ability of Indian people to use these resources.

Historic Properties Management Plan

As described under Proposed Article A128, *Historic Properties Management Plan*, DWR would implement the HPMP as approved by the Commission. DWR's proposal is consistent with Interior's recommendation to implement the HPMP. Forest Service's preliminary 4(e) condition no. 16 stipulates that DWR file a final HPMP within 1 year following the issuance of any license for the project. DWR filed a draft HPMP with the Commission in April 2006. The HPMP was developed in consultation with the SHPO; Forest Service; BLM; DPR; the Enterprise, Berry Creek, and Mooretown Rancherias; Maidu Advisory Council (which included members of the three aforementioned rancherias, as well as members of the Mechoopda Indian Tribe of Chico Rancheria, KonKow Valley Band of Maidu, and others associated with the local Maidu community); and other members of the Cultural Resources Work Group.

The four federally recognized Tribes (Enterprise Rancheria, Mooretown Rancheria, Berry Creek Rancheria, and the Mechoopda Tribe of Chico Rancheria) in comments on the Settlement Agreement request that DWR pay the costs associated with restoring and re-burying the artifacts and remains previously removed from the area.

In the draft HPMP, DWR would:

- Implement measures to protect historic properties (once evaluations are completed) including: (1) a tiered program of routine site monitoring, assisted by the members of the California Archaeological Site Stewardship Program, consisting of 15-year cycles for sites where no effects have been identified, 5- to 10-year cycles for monitoring sites where effects have been identified, and more frequent supplemental monitoring by DWR where site-specific monitoring requirements have been developed as a component of a treatment plan; (2) effect avoidance involving revising existing management direction (modifying maintenance procedures, altering public access) to avoid or reduce ongoing effects on cultural resources; (3) protection and stabilization where effect avoidance is not feasible through the use of physical measures to protect historic properties, including placement of restrictive or protective signage, installation of fencing, berms, plants, barriers, or otherwise physically blocking access, moving or modifying facilities, such as boat ramps or access roads, and stabilizing eroding surfaces within archaeological sites using protective covers, vegetative plantings, or engineering modification to slopes; and (4) recovery of data where ongoing substantial effects on historic properties cannot be adequately reduced through effect avoidance, site protection, or stabilization measures, based on DWR's determination that loss is imminent and consisting of removal of sufficient information relevant to scientific research values in the case of sites, or photo documentation and detailed recordation in case of structures.
- Establish a local curation facility that meets federal guidelines (36 CFR 79) to house archaeological materials collected in conjunction with data recovery or resource evaluations and consult with federal agencies on the curation of artifacts collected from federally managed lands.
- Implement protocols for future actions involving exempt actions as described in appendix D to the draft HPMP and four classes of non-exempt actions updated annually in consultation with appropriate agencies and entities based the status of the inventory, occurrence of historic properties, and effects.
- Complete the cultural resources inventory of about 15,000 acres of other lands in the APE within 5 years (about 3,000 acres per year), and the inventory of about 2,000 acres of lands within Lake Oroville (lands below elevation 690 to 640 feet msl) subject to accessibility.
- Complete formal National Register evaluations the 144 ethnographic sites, for sites subject to ongoing project-related effects and for 20 percent of the prehistoric archaeological sites

identified within the APE within 3 years of approval of the HPMP, if not accomplished before that time.

- Focus resource evaluations to address the ongoing project-related effects in high priority areas, including McCabe Creek, Foreman Creek, Enterprise, and boat-in campgrounds.
- Develop a public interpretation plan in consultation with appropriate agencies and entities within 1 year of approval of the HPMP and implement the plan within 2 and 5 years of approval of the HPMP.
- Consider opportunities to set aside, enhance, or develop areas suitable for the collection of traditionally used plants by the Native American community.
- Implement protocols for inadvertent discoveries, the treatment of human remains, and emergency situations.
- Provide annual project view lists and annual reports on HPMP activities through the term of any license issued, conduct annual project review meeting during the first 10 years, and provide a formal HPMP review meeting at 5-year intervals for the first 10 years and every 10 years thereafter.
- Employ a cultural resources administrator with the primary responsibility at the license coordination unit level (DWR) for implementation of the HPMP and meeting any other cultural resource-related license conditions and employ a cultural resources coordinator with professional qualifications standards established by Interior to coordinate with the administrator and oversee technical components of HPMP implementation.
- Establish a Cultural Resources Consultation Group to allow for continued coordination with agencies responsible for cultural resources management and local federally recognized and unrecognized Maidu Tribes.

The Forest Service specifies that the final HPMP be developed in consultation with itself, the SHPO, Native American Tribes, and other applicable agencies and communities and that the HPMP: (1) accurately define the APE including the effects of implementing section 4(e) final conditions, Native American traditional values, and project-induced recreational effects on archaeological properties on or affecting National Forest System lands; (2) include measures to mitigate the identified effects, including a monitoring program and management protocols for the ongoing protection of archaeological properties; and (3) provision to immediately cease work if prior to or during ground-disturbing activities or as a result of project operations, items of potential cultural, historical, archaeological, or paleontological value are reported or discovered or a known deposit of such items is disturbed on National Forest System lands.

Staff Analysis

The APE provided in the draft HPMP is consistent with the APEs adopted in the cultural resource inventory and appears to include all lands that would be affected by the continued operation of the project.

DWR's proposes measures to (1) complete the inventory within 5 years of license issuance, (2) address the ongoing effects of project operations on high priority sensitive locations, (3) complete resource evaluations, and (4) implement management protocols for the routine and non-routine management of cultural resources, with appropriate staff. Reporting would be implemented under the purview of the Cultural Resources Consultation Group. These measures would preserve and protect the majority of historic properties and as yet-to-be identified historic properties within the project's APE.

DWR indicates in the draft HPMP that resource evaluations of the 144 ethnographic and ethno-historic locations, a 10-percent sample of the historic-era archaeological sites, and a limited number of

prehistoric archaeological sites subject to ongoing project effects are underway, but DWR does not provide a list of the resources to be evaluated or a timetable for the completion of these evaluations. DWR's proposal to complete formal resource evaluations of about 20 percent of the prehistoric sites located in the APE leaves open the question of when and whether the remaining 80 percent of the sites would be evaluated and whether this percentage includes the sites in the Lake Oroville fluctuation zone.

The survey observations show that about 40 percent of the sites are currently affected by project-induced shoreline fluctuation. The draft HPMP does not provide for resource evaluations of all the sites within the fluctuation zone that are subject to project-related effects. As discussed in the Affected Environment section above, public uses, vandalism, looting, and OHV use affect about 40 percent of the 721 sites. We would expect that a majority of the sites affected by various public uses could be protected through DWR's proposed the impact avoidance and protection protocols.

The draft HPMP lists McCabe Creek, Foreman Creek, Enterprise, and boat-in-campgrounds as four high priority areas for resource evaluations and the implementation of measures to address project-related effects, but it is unstated how many identified sites within these four high priority areas would be evaluated for National Register eligibility. The draft HPMP does not include site management recommendations and resource evaluation (National Register) status or a timetable for the completion of resource evaluations for sites on federally managed land.

Establishment of a curation facility meeting federal curation facility standards to house cultural materials from studies associated with relicensing studies and from resource evaluations and data recovery associated with implementation of the HPMP would protect this information. DWR's ability to return the cultural materials to the federally recognized and unrecognized Maidu Tribes if such a facility is not built, as a proposed contingency, would depend on whether these entities have appropriate depositories for cultural materials. DWR is currently negotiating with the federally recognized Tribes to identify lands for reburial of remains previously removed from the area. DWR would develop site-specific treatment plans in consultation with the agencies and Tribes that would specify the treatment and disposition of human remains encountered during archaeology inventory and excavation efforts. The requirements of the Native American Graves Protection and Repatriation Act would be followed if human remains or objects of cultural patrimony were discovered on federally managed lands.

Maidu people continue to reside in the project area and carry on traditional practices that include the use of traditional plants. Efforts to protect locations where traditional plants occur and to provide access to these locations to members of the recognized and unrecognized Maidu Tribes and the local Maidu community would enable the continuation of traditional practices over the term of any license issued for the project.

Public information programs would help to inform the public about the culture history of the project area as well as the importance of protecting sites from vandalism and looting.

Finalizing and implementing DWR's HPMP (in consultation with the SHPO, federally recognized and unrecognized Maidu Tribes and other members of the local Maidu community, Forest Service, and BLM) and including site-specific management recommendations and the schedule for site-specific resource evaluations would ensure that adverse effects on historic properties arising from project operations or project-related activities over the term of the license would be avoided or satisfactorily resolved. Proposed Article A128, *Historic Properties Management Plan*, is consistent with Forest Service preliminary 4(e) no. 16.

In the event of relicensing and pursuant to the National Historic Preservation Act, the Commission would execute a programmatic agreement with the SHPO and the Advisory Council on Historic Preservation (should they chose to participate) to implement a final HPMP within 1 year of license issuance as a condition of any license for this project. DWR, the federally recognized and

unrecognized Maidu Tribes, and the Forest Service would be invited to participate in this programmatic agreement as consulting parties.

Foreman Creek

As described under Proposed Article A129, *Improve and Redirect Recreation Usage to Specific Areas at Foreman Creek*, and consistent with Interior's recommendation 10(a) no. 6, DWR would develop and file with the Commission within 1 year of the issuance of any license for the project a plan to protect cultural resources at Foreman Creek while continuing to provide recreation at that location. DWR would consult with the federally recognized Native American Tribes located in Butte County, the KonKow Valley Band of Maidu, and the Recreation Advisory Committee (consultees) in developing the plan. The plan would include measures to restrict the usage of the existing car-top boat ramp and develop facility improvements to encourage recreational use at Foreman Creek in designated areas, including the installation of a restroom and picnic tables. DWR would review the plan with the consultees annually over the first 5 years and as necessary thereafter.

The Enterprise Rancheria (Estom Yumeka Maidu Tribe), Mooretown Rancheria (Concow Maidu), and Berry Creek Rancheria (Tyme Maidu Tribe), in comments filed on the Settlement Agreement all state that DWR's Proposed Action does not provide the necessary protection of cultural resources in the Foreman Creek area. They point to the high concentration of cultural resources in an area that constitutes only one percent of the total project area. They request that DWR: (1) protect and set aside the Foreman Creek area from public use, including recreation and any other use that is inconsistent with protection of cultural resources and unnecessary for the operation and management of the project; and (2) grant a cultural resources protection easement over the Foreman Creek area to Berry Creek Rancheria, who along with other local, federally recognized Maidu Tribes, would have the primary management authority over the cultural resources in that area. The Mechoopda Indian Tribe of Chico Rancheria in comments filed on the Settlement Agreement also request that a culturally appropriate and accepted mitigation plan is adopted for the protection of Foreman Creek.

Staff Analysis

Based on both the archaeological and ethnographic survey results, Foreman Creek is a locus of Maidu culture and is currently subject to vandalism, looting, and damage from public use, including the use of OHVs. The Foreman Creek recreation area is a large, isolated, relatively flat and open area that attracts OHV users. OHV is characterized in the survey reports as one of the most destructive public activities that occur in the project's APE. Unregulated OHV use has damaged and continues to damage areas (including tribal burial grounds) that contain cultural material of significance to the Maidu Tribes. DWR recognizes the project-related effects and has included Foreman Creek among the high priority locations for the implementation of resource evaluations and management protocols. DWR's proposed plan and protective strategies may help to separate public use from the locations identified sites, but adding new facilities would likely increase use and opportunities to damage sites of concern to the Maidu Tribes. Although the plans for recreational development are very specific, the plans for how best to protect significant cultural material are not well developed. In the draft HPMP and in reply comments to the Maidu Tribe, DWR indicates that impact avoidance is a priority, and one means of protecting an historic property is to modify management direction and restrict public access to threatened sites. As discussed in section 3.3.6, *Recreational Resources*, the recreational facilities at Foreman are 1 of 35 developments available for public recreational use in the project area. Only about 4 percent of the recreational use at the Oroville Facilities occurs at Foreman Creek. A short-term, or even long-term, closure would affect people who use the facility for recreation, especially those who live close to the facility. Nevertheless, we recommend that Foreman Creek be temporarily closed until a detailed site plan for recreation has been developed. However, we conclude it is premature for DWR to grant a cultural resource protection easement over the Foreman Creek area until a detailed site plan has been developed.

3.3.8.3 Cumulative Effects

The Oroville Facilities is one component in the State Water Project and only one of several other hydroelectric projects in central California that affect prehistoric and historic archaeological resources located along the Feather River and its tributaries. These projects attract recreational use around the reservoirs. The increased recreational use resulting from the availability of large lakes has contributed to the inadvertent or intentional destruction of prehistoric and historic archaeological resources. While continued erosion and recreational use of the Feather River area would be expected to continue to affect prehistoric and historic archaeological resources, the measures included in HPMPs being developed or implemented at the Upper North Fork Feather River Project and the Poe Project, among others, taken in combination with the measures included in the HPMP for the Oroville Facilities would cumulatively reduce the rate of destruction of these cultural resources.

3.3.8.4 Unavoidable Adverse Effects

Under the Proposed Action, the continued operation of the project would continue to adversely affect some archaeological sites in the fluctuation zone. The execution of the programmatic agreement and implementation of the final HPMP would ensure proper protection and management of significant cultural resources within the project's APE and would also provide satisfactory resolution of any project-related adverse effects.

3.3.9 Aesthetic Resources

3.3.9.1 Affected Environment

Lake Oroville is located in the eastern portion of Butte County; the Oroville Facilities are located in Butte County. The eastern half of the county begins near the foothills of the Sierra Nevada Mountains and continues east to the range's upper slopes. This part of the county is largely undeveloped and retains much of its natural character, with scattered. Scattered rural residences and small communities are located throughout this the area. Vegetative cover in the foothills area includes chaparral, oak woodland, and mixed coniferous forest. Lake Oroville is located in the eastern portion of Butte County.

The western half of Butte County is situated along the eastern edge of the Sacramento Valley. This part of the county is primarily flat, and land use is largely agricultural with scattered areas of development ranging in intensity from scattered rural residential, to suburban, to urban. The aesthetic environment of this part of the county is influenced by human development activities; however, it retains a rural character. The agricultural areas in this part of the county generally include irrigated row crops and orchards in the flatter areas and grazing in the foothills. Thermalito forebay and afterbay are located in the western portion of Butte County.

Overview

The Oroville Facilities can be placed into five aesthetically distinct geographic areas: Lake Oroville, the Thermalito diversion pool and Thermalito forebay, the Thermalito afterbay, the low flow channel, and the OWA. DWR identified key observation points within and near the FERC boundary to represent views of the aesthetic environment of the Oroville Facilities and assess the aesthetic resources of the project. The aesthetic environment encompasses visual resources, noise, and odor. During the scoping process, DWR identified only visual resource issues associated with the Oroville Facilities and determined that there are currently no concerns with noise or odors.

Lake Oroville

Lake Oroville is impounded by Oroville dam, a massive earthfill structure that rises 770 feet above the floor of the Feather River Canyon and is about 1.3 miles in length. Oroville dam is a major

visible feature in the Oroville area. Its scale, shape, texture, and color contrast with the surrounding landscape. The face of the dam is composed of gravel and rock, and supports some plant material such as annual grasses, forbs, and small shrubs. Recently, California poppy seeds were broadcast across the downstream face of Oroville dam. During most of the year the face of the dam is brownish in color. The dam's concrete and metal spillway, spillway control gates, and emergency spillway weir are located at the north end and are visually important elements of the Oroville dam complex that contrast with the earth-filled portion of the dam. The visually prominent 178-foot wide concrete spillway chute extends from the top of the slope more than 3,000 feet down the spillway headworks and into the plunge pool at the canyon bottom. When the dam is spilling water into the spillway, mist from the water crashing into the spillway's base creates a spectacle that attracts viewers and media attention.

Because of the sheer size of Oroville dam and its southwest orientation toward the city of Oroville and the Sacramento Valley, it is a prominent visual landmark. The most imposing views of the dam are from its crest. The two lane paved road and walking areas along the crest are used by people for driving, walking, and bicycling. People participating in these activities can look down upon the sloping face of the dam and out at the extensive vista. Other areas that offer viewers relatively close foreground and middleground views of the face of the dam include Oroville Dam Boulevard in the Feather River canyon and portions of the reservoir upstream from the dam. Areas within and near the city of Oroville and some areas along State Route 70 have background views of the dam. From these locations, the dam is seen as a large, linear feature on the face of the hills, whose horizontal lines and bare, light gray-brown surface contrast with the darker colors and more undulating lines of the vegetated foothill backdrop. The duration of viewing Oroville dam from these areas ranges from very brief for motorists, to extended periods for people viewing the dam from their homes.

The dam's ancillary facilities (substation, equipment yards, roads, etc.) are somewhat visible and have a moderate degree of contrast with the landscape. The Edward Hyatt power plant is located in a cavern constructed underneath the reservoir and is not visible from around the dam. However, several of the features that are ancillary to the power plant, such as the switching station located at the base of the dam, and a storage yard, located on land west of the power plant and above the river, have some degree of visibility, particularly when viewed from the crest of the dam. Other components that are visible to the public include the penstock (and its cleared right-of-way), the siphon, and the two blue cylindrical structures that are part of the temperature control intake structure. The penstock has been painted a dark green and is briefly visible to drivers on the winding portion of Oroville Dam Boulevard. The siphon, which is located on a hill, has also been painted a dark green and is visible to people driving either Canyon Drive or Royal Oaks Drive and from some nearby Kelly Ridge residences. Painting both structures a dark green has reduced their visibility from some vantage points, although the siphon can be clearly seen rising above nearby vegetation. The temperature control intake structure is located along the shore of the reservoir and is quite visible from the crest of the dam, and the portion of the reservoir near the dam.

Three 230-kV overhead transmission lines extend about 9 miles from the Hyatt power plant switchyard to PG&E's Table Mountain substation. The lines are located on the hillsides above and to the north of the upper portion of the Thermalito diversion pool. The transmission lines have three visible components that affect the visual environment. They are the support towers, the conductors (which are cables that are commonly referred to as "lines"), and the cleared rights-of-way underneath transmission lines. The most visible components of the transmission lines that connect the Hyatt power plant switchyard to the Table Mountain substation are the steel support towers. Support towers introduce strong vertical elements into the landscape that, depending on the screening by topography and vegetation, can be highly visible. Some of the project support towers are located so that they are silhouetted against the sky and introduce contrasting shape, form, and color into the viewed landscape, making these towers very visible. Other towers are "in front" of the hillsides they cross and are not silhouetted against the skyline. These towers do not contrast as much as the towers that are silhouetted,

but still contrast in color, texture, and shape with their surroundings. Conductors are also visible, but to a lesser extent than the towers. The transmission line is quite visible from the Thermalito diversion pool area and Cherokee Road. About 2.5 miles of the transmission line can readily be seen in this part of the project before it disappears from sight as it goes over nearby hills on its way to the Table Mountain substation. Cleared rights-of-way are often the most visible component of transmission facilities. However, this is not the case along most of the transmission lines at the Oroville Facilities. In addition to the project transmission lines, there are other visible transmission lines in the project vicinity. Although these other transmission lines are not part of the Oroville Facilities, they may be perceived by some members of the public as being project facilities.

Lake Oroville is a major regional aesthetic resource. At maximum operating storage capacity (elevation 900 feet msl), the reservoir's surface area is about 15,810 acres in size with about 167 miles of shoreline. Lake Oroville comprises five main "arms" and the large, centrally located main basin of the reservoir, which gives the lake a spider-like configuration formed by the four main tributaries to the reservoir. These portions of the reservoir are the West Branch and Upper North Fork arms, which come together to form the lower North Fork arm, the Middle Fork arm, and the South Fork arm. These arms range in width from as much as 1 mile in the lower portions of the North Fork arm, to less than 100 feet at their upstream ends. The terrain adjacent to the arms is typically steep, and the arms become narrow and canyon-like toward their upstream ends. The straight line distance between Oroville dam and the farthest reaches of both the West Branch and Middle Fork is about 12 miles. Views along the straight parts of the arms can be extensive (about 7 miles in the North Fork), but are restricted in most areas by twisting terrain. In contrast, the main body of the reservoir affords wide open views of the surrounding landscape.

Because of the steep topography and limited road access, much of Lake Oroville is not easily accessible to the public by land. The greatest number of people who view the reservoir up close are recreating on the reservoir or at its major recreational facilities. Some of the individuals surveyed by DWR during the relicensing recreation studies indicated that garbage was a problem at some of the facilities on Lake Oroville. Another large group of people who view Lake Oroville are the motorists who observe it when they drive over the bridges on State Route 70, State Route 162, and Lumpkin Road. A third group of people who view the reservoir are the people who live near the Oroville Facilities. Most of these residents live near Kelly Ridge and have views of the Loafer Creek area, the main body of the reservoir, and the Bidwell Bar Bridge area. Other areas with residential viewers are scattered along the South Fork (primarily near Enterprise), in the main basin near Canyon Creek, and along the west side of the upstream end of the West Branch (see figures 1 and 18).

The water level of Lake Oroville fluctuates throughout the year and influences the aesthetic environment. As drawdown occurs during the course of the summer and fall, an increasingly broad ring of shoreline appears between the vegetated shoreline and the water of the reservoir. Reservoir drawdown has different effects at different locations at Lake Oroville with the upper ends of the arms being the most affected by drawdowns. These shallower areas can have considerable amounts of vertical and horizontal shoreline exposed during drawdowns. The drawdowns also expose shoreline in the main basin of the reservoir, but to a lesser degree than in the upstream ends of the arms where the water is shallow.

DWR examined and photographed three different elevations at Lake Oroville over a 2-year period to evaluate the influence of very different reservoir elevations on the aesthetic environment. The report also used exceedance data to determine the frequency that each elevation could be expected to be reached or exceeded, based on water year history for the years between 1922 and 1994, and based on actual Lake Oroville water usage data from 2001. Looking at start of month elevations since water year 1971, the Lake Oroville levels on October 1, which is the beginning of the water year, ranged from elevation 648 feet msl to 850 feet msl and averaged 793 feet msl.

The exceedance data in table 63 indicate that the three elevations used for this assessment represented a range of reservoir elevations that vary in terms of likeliness to occur at various times of the

year. Reservoir elevations that approach or reach full pool (elevation 900 feet msl) are not common events, whereas an elevation of 830 feet has a good chance of occurring or being exceeded during most water year types (85 to 75 percent). The elevation 710 feet was selected to represent very low elevations. The likelihood of an elevation of 710 feet being met or exceeded throughout the year in any given year is very high, at 95 percent. Conversely, the likelihood of a water surface elevation lower than 710 feet in any given year is 5 percent. Even though this elevation occurs infrequently, it is important to include it in the analysis to have a worst-case scenario example to analyze. The following describes the conditions that exist at the three elevations.

Table 63. Lake Oroville exceedance data at three elevations.^a (Source: DWR, 2005a)

Month	Elevation		
	900 feet msl	830 feet msl	710 feet msl
April	0%	85%	95%
May	30%	80%	95%
June	25%	75%	95%
July	5%	45%	95%
August	5%	30%	95%
September	0%	30%	95%
October	0%	25%	95%

^a Data indicate percentage or likelihood that the elevation is met or exceeded for a particular month. Another way to evaluate the data is to realize that if an elevation has a likelihood of being exceeded of, for example, 95 percent, for example, the likelihood of Lake Oroville being at or below that elevation would be 5 percent.

Elevation 900 feet msl (Full Pool)—Full pool (elevation 900 feet) is not a common occurrence at Lake Oroville and only occurs during wet water year types. The likelihood of an elevation of 900 feet being met or exceeded in May and June is 30 and 25 percent, respectively. The likelihood is lower in other months. At full pool, the water of the reservoir completely covers all of the shoreline of Lake Oroville up to the vegetation line and, in some areas, rises above it. Shoreline debris such as tree stumps, and exposed features such as rock outcroppings that are exposed at lower reservoir elevations, are submerged at this elevation. At full pool, trash and other floating debris that collects along exposed shorelines at lower pool elevations is carried with the rising pool and can be deposited along the high pool elevation shoreline in adjacent vegetation.

Elevation 830 feet msl—Lake Oroville reaches or exceeds this elevation with great regularity during the spring months of most water year types. The likelihood of this elevation being met or exceeded in April, May, or June is about 85, 80, and 75 percent, respectively. During the summer months, the likelihood of this elevation being met or exceeded is less, about 45 percent in July, and 30 percent in August and September. At elevation 830 feet, the exposed shoreline at many locations becomes an apparent part of the scenery but does not dominate the scene. Some parts of the reservoir have less exposed shoreline and may have features (such as marinas) that receive viewer attention and thus lessen the contrast of exposed shorelines. Because of the exposed shoreline, most viewers would be expected to find Lake Oroville less attractive at this elevation than at full pool.

Elevation 710 feet msl—An elevation of 710 feet is almost 200 feet below full pool. Based on exceedance data, the chance of this elevation being reached or exceeded for any month between April and October is 95 percent, which conversely means that the likelihood of this elevation being even lower or met in any given month, between April and October, is about 5 percent. Reservoir elevations that are this low generally only occur during the fall of very dry water years. This elevation would likely be

considered the least attractive of the three elevations by most viewers. During 1991, 1992, and 1993, (1991 and 1992 were dry years), the minimum elevations were 651 feet, 702 feet, and 723 feet, respectively.

Thermalito Diversion Pool and Thermalito Forebay

The 4.5-mile-long Thermalito diversion pool follows the river bed of the Feather River, beginning about 0.5 mile downstream from the Oroville dam and extending to the Thermalito diversion dam. The 50- to 200-foot-wide Thermalito diversion pool has a riverine character as it meanders through thickly vegetated hillsides. Views from within the Thermalito diversion pool are confined and directed by the adjacent steep hillsides.

Only the upstream face (about 15 feet) of the 1,300-foot-long Thermalito diversion dam is visible from the Thermalito diversion pool. The linear form of the Thermalito diversion dam, along with its color and texture, contrasts with the nearby landscape, particularly when viewed from downstream. When viewed from upstream near the Thermalito diversion pool, the dam is much less visible.

From the Thermalito diversion dam, the 10,000-foot-long Thermalito power canal connects the Thermalito diversion pool to the Thermalito forebay. The Thermalito power canal is one of the least visible major project features. The public gets quick glimpses of the canal and the water in it from the Cherokee Road, State Route 70, and Table Mountain Boulevard which cross over the canal.

The Thermalito forebay begins at the west end of the power canal and extends about 3 miles southwest to the Thermalito forebay dam. The downstream edge of the reservoir is formed by a low earthfill dam (91 feet from the base of the dam) that extends for more than 3 miles along the Thermalito forebay's southern edge. With its irregular 10 miles of largely undeveloped shoreline, the forebay has a generally natural appearance and blends in well with the surrounding landscape.

Because the Thermalito diversion pool, power canal, and Thermalito forebay are all designed to share the same operating water level and are essentially the same hydraulic system, the water levels in each of these facilities rise and subside in unison. The system does not fluctuate much on a daily basis. During the summer, it is generally cycled down 2 to 4 feet during the middle of the week and then refilled by the weekend. During the winter, it may fluctuate more for varying reasons.

Thermalito Afterbay

The 4,300-acre Thermalito afterbay is formed by a 39 foot tall (from the base of the dam), "L"-shaped earthfill dam. The afterbay dam is one of the most visible project features. Its linear form, shape, and uniform texture contrast highly with the surrounding landscape. Another conspicuous feature is the Thermalito afterbay outlet which is a 600-foot-long spillway where water is released from the afterbay into the river below.

Thermalito afterbay is a large, shallow, open body of water that has frequent water level fluctuations and a high surface-to-volume ratio. The afterbay has several fluctuation cycles and daily, weekly, and occasional seasonal adjustments. The afterbay generally fluctuates on a daily basis as a result of water releases from Lake Oroville (related to power generation) and releases into the Feather River.

Low Flow Channel

The upper portion of the low flow channel below the Thermalito diversion dam passes through the central part of the city of Oroville. Most of the area adjacent to this portion of the low flow channel is developed and includes project facilities, such as the Feather River Fish Hatchery (which includes a 0.5-mile-long fish ladder, underwater fish viewing area, office, hatchery spawning building, rearing channels, lighted parking areas, and other facilities) and the 91-foot high, 600-foot long concrete fish barrier dam.

The Feather River Fish Hatchery facilities contrast with the nearby landscape in terms of shape, color, and texture. DWR recently planted shade trees and assorted native plants and grasses, and installed picnic facilities at the Feather River Fish hatchery. The fish barrier dam (and its waterfall) and the fish barrier pool are generally visually compatible with their surroundings. Non-project developments include the Feather River Nature Center, the Table Mountain Boulevard Bridge, scattered residences overlooking the low flow channel, and trails along the adjacent levee system. Viewers of the upper part of the low flow channel include passing motorists, recreationists, and visitors to the Feather River Fish Hatchery.

Lands adjacent to the low flow channel downstream of the State Route 70 Bridge are much less developed than those adjacent to the upper part, next to the center of the city of Oroville. Much of the Feather River floodplain adjacent to the low flow channel, particularly along the lower portion, was drastically altered during hydraulic mining activities in the mid 1800s until the early 1900s. It is covered by coarse debris from the hydraulic mining era and mounded remains of dredge tailings, some of which were later used as material for the construction of Oroville dam. The dredge tailings cover large areas and contain sinuous ridges of cobble, boulders, and gravel piles up to 40 feet in height. Various vegetation communities, such as riparian and oak woodlands, have become established in the area.

Views from within and near the low flow channel are variable due to adjacent topography, vegetation, and levels of development. Some areas have extensive open views of the low flow channel and other areas have restricted views. The majority of viewers see the upper portion of the low flow channel from areas near the city of Oroville. These areas include the levee and associated trail system, the Feather River Fish Hatchery complex, and the Feather River Nature Center. A number of people also have views of the low flow channel as they pass over it via bridges such as the Table Mountain Boulevard Bridge and the Table Mountain Bicycle Bridge. People who view the lower portion of the low flow channel do so from within the OWA, from State Route 70, or from the Thermalito afterbay outlet, as well as from other undeveloped access points.

Oroville Wildlife Area

Although the OWA includes the Thermalito afterbay, this description focuses on the main portion of the OWA that is south and east of the Thermalito afterbay. The OWA consists of a series of ponds, levees, mining tailings, and flat and low lying areas. Although the OWA is managed for wildlife, it supports recreation and provides limited camping, a one-lane boat ramp, several unimproved boat ramps, and a number of unpaved roads in varying conditions. Views within the OWA are varied; in some portions, sparse vegetation and flat terrain allow for expansive views, while in other areas, vegetation and dredge tailings limit views considerably. Views within the main part of the Clay Pit State Vehicular Recreation Area, which is outside of the FERC project boundary, are more expansive due to the level topography of the area and the relative scarcity of shrubs and trees. Most use in the OWA and Clay Pit State Vehicular Recreation Area is dispersed, and views of project features occur throughout these areas. Following the relicensing recreation studies, DWR reported that a considerable amount of garbage was strewn about the OWA in 2000 and in 2003.

During scoping, DWR determined that invasive species affect the appearance of project lands. Water primrose is a native and invasive aquatic plant that is currently found along the margins and backwaters of the Feather River both upstream and downstream of the OWA. Water primrose has been increasing in abundance since the mid-1990s and has invaded the areas of standing water to the east of the Feather River. Current mapping indicated that water primrose dominates 398 acres in this area.

Project Area Management

Forest Service

As described in section 3.3.7, *Land Use and Management*, management of all National Forest System lands within the project boundary is guided by several documents including the Plumas National Forest Land and Resource Management Plan. All of the project lands and lands influenced by project operations that are managed under the Plumas National Forest Land and Resource Management Plan fall within one of four management areas designated by the plan: the French Creek, Galen, Kellogg, and Feather Falls Management Areas. The management direction for aesthetics in the French Creek, Galen, and Kellogg Management Areas is to maintain pleasing visual corridors. The Feather Falls management area includes National Forest System lands along the South Fork arm. The management direction for aesthetics in this management area is to protect unique scenic values.

The Plumas National Forest Land and Resource Management Plan provides guidelines for the preferred Visual Quality Objectives of each management area. Visual Quality Objectives are based on the degree of acceptable alteration permitted within the natural characteristic landscapes and are applied to all project proposals and activities on National Forest System lands. The Visual Quality Objectives prescribed by the Plumas National Forest Land and Resource Management Plan for the National Forest System lands within the Oroville Facilities boundary are retention, which provides for a natural-appearing landscape where management activities are not visually evident, and partial retention, which provides for a natural-appearing landscape by assuring that management activities remain visually subordinate to their natural landscape. The Forest Service does not prohibit the occurrence of any specific management activities on lands with prescribed Visual Quality Objectives of retention or partial retention.

In 1998, the Forest Service officially designated a 130-mile segment of State Route 70, beginning about 8 miles north of the city of Oroville, as the Feather River National Scenic Byway. National Forest System lands that the byway passes through and that may be seen from the byway are frequently assigned Visual Quality Objectives such as retention and partial retention to protect the scenic qualities of the byway. The Forest Service may consider adopting aesthetic guidelines including a recommended color palette for development improvements located within the scenic byway viewshed.

Bureau of Land Management

Most of the BLM-managed lands in the project boundary are noncontiguous, scattered parcels, some of which are submerged under Lake Oroville. Visual Resource Management by BLM is based on the agency's Visual Resource Management system, which involves inventorying scenic values and establishing management objectives for those values through the resource management planning process. The Visual Resource Management system assigns one of four visual resource "Inventory Classes" to parcels of land, each of which has objectives that differ in terms of allowable changes to the visual conditions of those parcels of land. BLM lands in the Oroville Facilities area have been designated as Class II lands. The management objective for Class II lands is to retain the existing character of the landscape. BLM administered public lands in the Oroville Facilities area have been given this designation to insure that the visual character of these lands is retained by BLM until potential land transfers are completed. See section 3.3.7, *Land Use and Management*, for more discussion on these potential land transfers.

California Department of Transportation

The California State Scenic Highway Program is part of the California Streets and Highways Code, which is administered by the California Department of Transportation. The goal of the scenic highway program is to preserve and enhance the natural beauty of California. A nominated highway is evaluated by the extent to which the natural landscape is seen by passing motorists and the extent to

which visual intrusions (e.g., buildings, unsightly land uses, and noise barriers) affect the “scenic corridor.” The only eligible state scenic highway in the vicinity of the project is a portion of State Route 70 north of the main basin of Lake Oroville. A designation of “eligible” indicates that the route is shown on the Master Plan of State Scenic Highways but does not mean that it is nominated. While eligible, the segment of State Route 70 crossing the project near Vinton Gulch is not currently protected by a state-approved, county-developed plan.

Butte County

The Oroville Facilities are located entirely in Butte County. The Butte County General Plan was adopted in 1996 by Butte County and the Butte County Association of Governments. The general plan contains 12 elements (such as land use, circulation, housing, etc.), and a Scenic Highways element. The Scenic Highways element has eight policies. They are:

- Policy 1: Protect valuable scenic areas for enjoyment by residents and visitors;
- Policy 2: Delineate scenic corridors with careful consideration of all factors;
- Policy 3: Consider scenic values in the design and improvement of rights-of-way;
- Policy 4: Control access to scenic highways to control safety;
- Policy 5: Locate and design utility structures to minimize visual effect, where economically feasible;
- Policy 6: Encourage compatible land use patterns in scenic corridors;
- Policy 7: Promote Butte County’s scenic highways program; and
- Policy 8: Consider economic effects on property affected by a scenic highway designation.

Butte County has not designated any scenic highways in the project area. However, the Butte County Zoning Plan has assigned the zoning designation of “Scenic Highway” to portions of four roadways in the vicinity of the project. None of these highway segments have been designated as scenic highways by the county, but are considered eligible for designation. The four eligible segments eligible are:

- Pentz Road (located west of the West Branch arm);
- State Route 162 (along the east side of the main basin from the Canyon Creek area to south of the Bidwell Bar Bridge);
- State Route 70 (on the south side of the West Branch arm near Vinton Gulch); and
- Lumpkin Road (located at the east end of the South Fork arm).

3.3.9.2 Environmental Effects

Flow/Temperature to Support Anadromous Fish (Proposed Article A108)

Under Proposed Article A108, *Flow/Temperature to Support Anadromous Fish*, minimum instream flows in the low and high flow channels would increase above current license requirements and contingencies to provide additional flows are also included in this measure to meet temperature objectives. See section 3.3.5, *Threatened and Endangered Species*, for a detailed description of this proposed article.

Staff Analysis

Additional minimum flows would be provided from Lake Oroville and the amount of water that would be necessary to meet these license requirements is considered minimal (see section 3.3.2.2, *Water Quality and Quantity*). Further, minimum instream flows would only be required as long as this would not cause Lake Oroville to be drawn down below elevation 733 feet msl. The effects of this operational measure would not cause a noticeable difference in the expected reservoir elevations at Lake Oroville (see section 3.3.9.1, *Aesthetic Resources*, which describes the reservoir exceedance probabilities).

Screening of Storage Area (Proposed Article A132)

Under Proposed Article A132, *Screening of Material Storage Area*, DWR would plant appropriate vegetation to screen the storage/staging area located northwest of the emergency spillway from view of Oroville Dam Boulevard and maintain the vegetation. DWR would use native plants to the extent practicable.

In their motion to intervene, American Rivers, American Whitewater, and Chico Paddleheads state that they support the Settlement Agreement measures.

Staff Analysis

The storage area is visible from the highly traveled Oro Dam Boulevard and Oroville dam and the facility sharply contrasts with the surrounding landscape. Planting trees and other vegetation to screen material stored at the material storage area located north of the Oroville dam emergency spillway would block views of the storage area when viewed from the walkway on top of the dam and from Oro Dam Boulevard. Screening the storage area would enhance aesthetics at the project by eliminating the view of the storage area.

Seeding the Face of the Oroville Dam (Interim Measure)

The face of Oroville dam is a prominent, contrasting project feature on the landscape that is visible from many locations in the city of Oroville as well as from distant locations such as Highway 70. Sightseeing was the second-most popular day-use activity at the Oroville Facilities. DWR recently broadcast California poppy seeds across the downstream face of the Oroville dam. In its comments on the draft EIS, DWR notes that it has made previous unsuccessful attempts to seed the face of the Oroville dam and has concluded that California poppies are not adequately self-sustaining in this location to produce the desired effect, primarily because much of the face of the dam is rock, and lacks sufficient soil for efficient poppy seed germination. DWR notes that the diversity of wildflowers on the dam was not successfully displaced in 2003; despite aerial distribution of about 800 pounds of California poppy seed, germination and establishment was minimal and unimpressive. DWR states that continued natural reproduction of low numbers of poppies has recurred annually since then and is supplemented by several other species of both weedy and native flowering plants. DWR also states that the cost of this Interim Measure was approximately \$10,000 due to the necessity of using helicopters and other strategies for seeding the dam.

Staff Analysis

Continuing to provide some form of cover on the face of the dam throughout the license term would enhance the view of this project feature for visitors to the area.

3.3.9.3 Unavoidable Adverse Effects

Project operations would continue to draw down Lake Oroville on a seasonal basis, exposing a contrasting, devegetated margin of land encircling the reservoir as it recedes.

3.3.10 Socioeconomics

3.3.10.1 Affected Environment

The Oroville Facilities are located in Butte County, which is situated in the northern portion of California's Central Valley and Sierra Nevada foothills. The economic history of the region is founded on resource extraction industries, including mining and lumber processing, and ancillary industries, such as railroad transportation. Once the local irrigation infrastructure and large-scale water projects (i.e., Central Valley Project and State Water Project) were in place, the agricultural industry became more prominent in Butte County. Currently, the backbone of the regional economy is based on businesses that grow, store, process, and market a diverse range of agricultural commodities and products. In the greater Oroville area, agriculture (primarily orchard and rice production), local and state government, and recreation and tourism-serving businesses dominate the local economy. These businesses are part of the service industry that gained prominence after construction of Oroville dam in the late 1960s.

Several indicators show that the project area is not economically prosperous. Results of the 2000 census indicate that Butte County is above regional, state, and national averages with respect to the percent of its population (19.8 percent) below the federally established poverty level (U.S. Census, 2000). In 2001, the county ranked 40th of 58 California counties in terms of average per capita income (Counting California, 2001). Butte County reports chronic fiscal problems, and has been designated a "Distressed County" by the state of California three times since 1990 (McIntosh, 2006).

Population

The Sacramento Valley region includes the counties of Butte, Colusa, Glenn, Placer, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba. Between 1960 and 2000, the population of Butte County increased from about 82,000 to 207,200, an average annual increase of about 3.8 percent, or a total increase of roughly 150 percent during the period since construction of Oroville dam. Neighboring Sacramento Valley agricultural counties, such as Colusa, Glenn, and Tehama, have all grown more slowly overall than Butte County, although the population of Colusa and Tehama counties grew more rapidly than Butte County between 1980 and 2000 (figure 22). Placer County in the Sacramento metropolitan area has grown very rapidly over the entire period. Shasta County's rapid growth is linked to its strong diversified economic base and the geographically large trade area of Redding.

From 1980 to 2000, the Butte County population grew from 143,851 to 207,200, an increase of 44 percent (about 2.1 percent) annually. Butte County's growth rate has slowed down perceptibly from 1990 to the present; its population grew by 11.3 percent from 1990 to 2000, or about 1 percent per year (U.S. Census, 2000).

During the next 40 to 50 years, the Sacramento Valley population is expected to grow by about 74 percent, or 2.25 million people (California Department of Finance, 2004). At the same time, Butte County is projected to double in population (California Department of Finance, 2002). In comparison, the state of California is projected to grow by 170 percent during the same time frame. Although the population growth rate in Butte County is not projected to be as high as some of its neighboring counties, the population growth rate in Butte County is projected to be higher than the regional average.

The racial makeup of the Butte County population is more uniform than that of the state, with American Indians/Alaska Natives the only minority population that makes up a higher proportion of the local (1.9 percent) than of the state (1.0 percent) population. The proportion of American Indians/Alaska Natives is even higher in the city of Oroville (3.9 percent); nearly four times the state average. Based on survey data collected as part of recreation studies for relicensing, the ethnicity of visitors to the Oroville Facilities is predominantly White/Anglo/non-Hispanic (about 80 percent); Latinos/Hispanics are the second most populous ethnicity (between 3 and 16 percent, depending on recreation resource area).

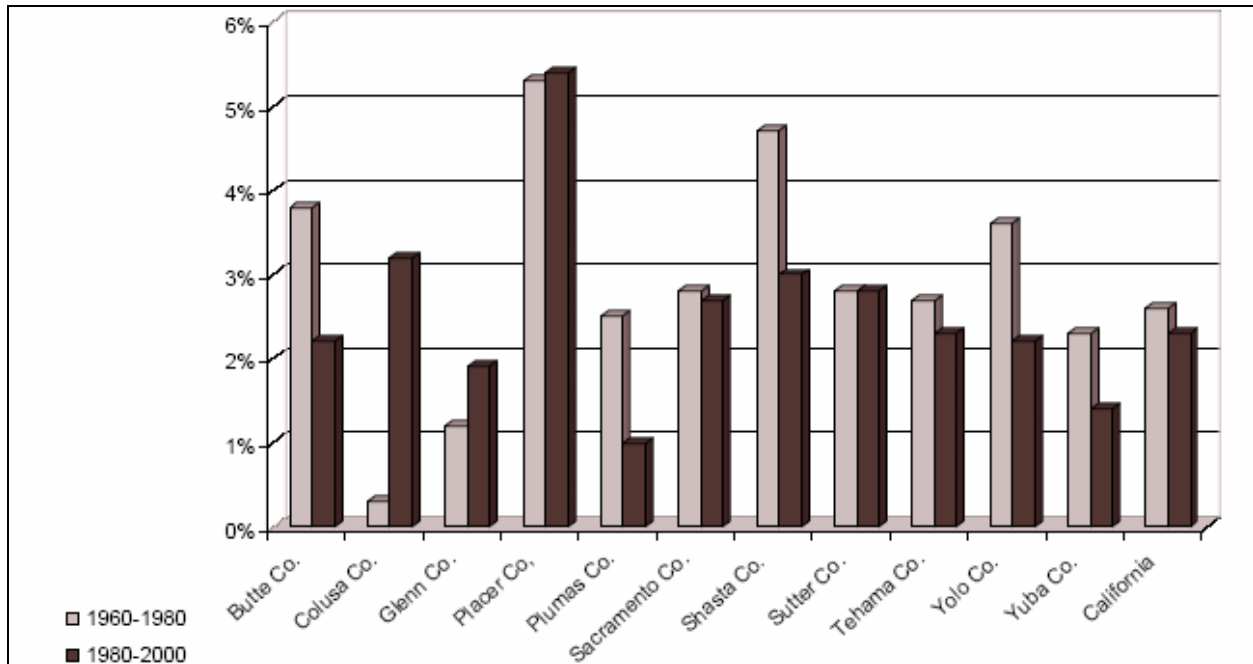


Figure 22. Average annual population growth in the Sacramento Valley region and Plumas County from 1960 through 2000, by county. (Source: DWR, 2005a)

Employment and Economic Base

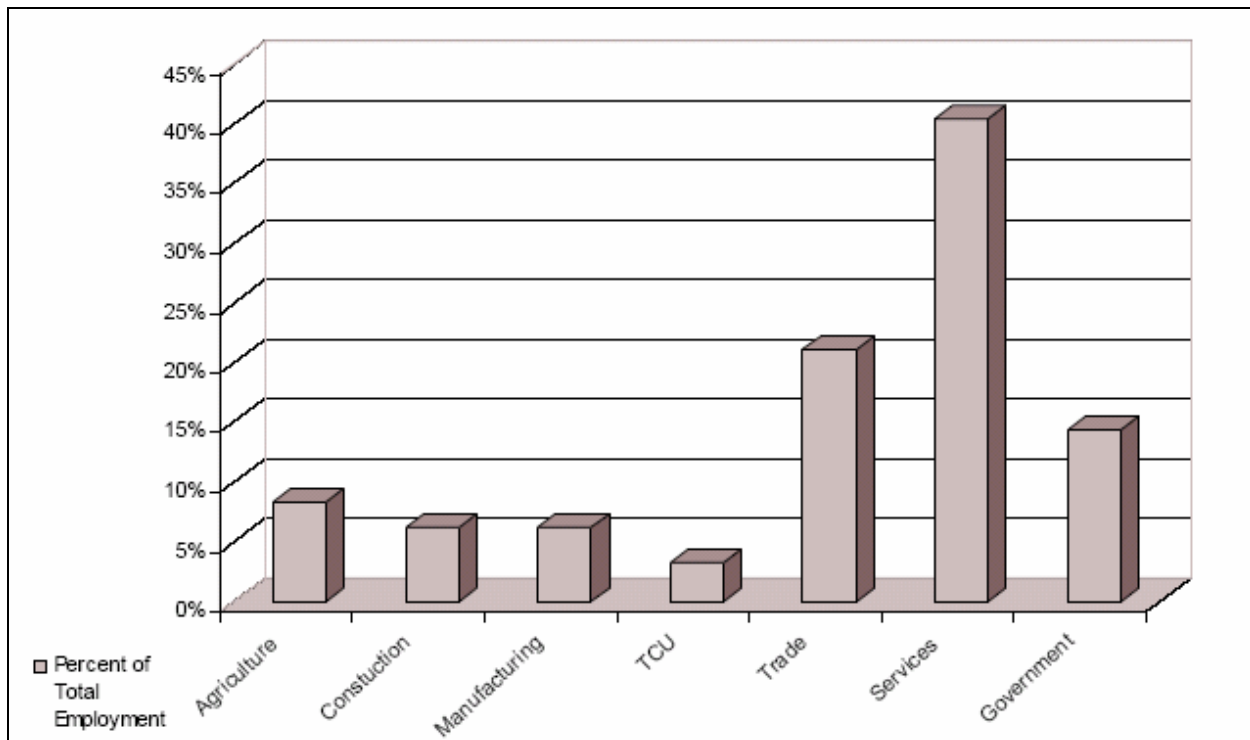
Table 64 shows historical data on key economic indicators for Butte County between 1980 and 2000. As shown, per capita income has increased from \$11,240 in 1980 to \$17,517 in 2000. The unemployment rate decreased from 10.1 percent in 1980 to 7.0 percent in 2000, while the labor force rose from 63,300 in 1980 to 87,933 in 2000.

Table 64. Historical data on economic indicators in Butte County 1980–2000. (Source: U.S. Census, 2000).

	1980	1990	2000
Per Capita Income	\$11,240	\$12,083	\$17,517
Unemployment Rate	10.1%	8.3%	7.0%
Labor Force	63,300	79,100	87,933

The average income of residents of Butte County is significantly below regional, state, and national averages. In 2000, Butte County had the lowest median household income (\$31,924) in the Sacramento Valley region. Its household income level was 67 percent of the California median household income (\$47,493), and also was well below the national median (\$41,994). Based on the survey data, the household income levels for Oroville recreationists are fairly evenly distributed. The majority of visitors (about 75 percent) had a total household income that was higher than median income level for Butte County in 2000.

As shown in figure 23, the largest segment of employment in Butte County is in the services sector, which accounts for 41 percent of total employment countywide. The services sector includes business services, personal services, educational services, and social services. Wage rates are relatively low in Butte County, particularly in Oroville where food service jobs at low wage scales comprise a relatively large share of employment.

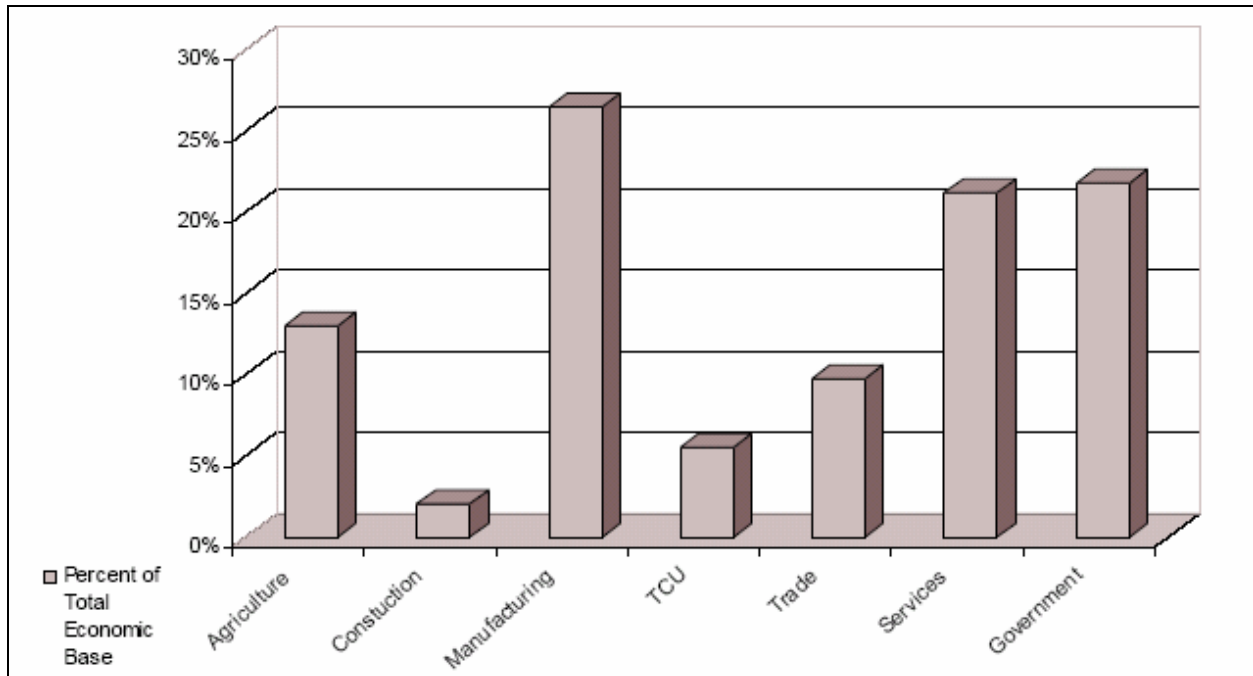


Notes: Agriculture – agriculture and agricultural services sectors
 Construction – new construction and maintenance and repair sectors
 Manufacturing – all manufacturing, including food processing, wood processing, and light industry
 TCU – transportation, communication and utilities sectors
 Trade – retail and wholesale trade sectors
 Services – business, personal, educational, and medical services sectors
 Government – federal, state, and local government sectors

Figure 23. Butte County employment by industry. (Source: DWR, 2005a)

Butte County has a high proportion of employment in educational services (28 percent), which reflects the presence of California State University at Chico and Butte College; the only county in the Sacramento Valley region with a higher proportion is Yolo County, reflecting the presence of the University of California at Davis. Counties that do not have a local college or university typically have less than 20 percent employment in educational services. Butte County is also high in recreation services (lodging, amusement, and associated tourism services), with 9.2 percent of employment servicing the tourism and recreation industries. The only two counties in the region with a higher proportion of employment in recreation services are Shasta County (9.5 percent) and Plumas County (11 percent), reflecting the extensive national forests and reservoirs within those counties. Butte County is close to the regional average in its proportion of employment in business services, with 7.4 percent of its employment in this area. Butte County compares favorably to agricultural counties, such as Colusa and Glenn Counties, but does not have proportionally as much employment in the business services sector as metropolitan counties such as Sacramento County (10.3 percent) or Placer County (10 percent).

The economic base of Butte County includes those industries that bring money into the region. Virtually all manufactured goods produced in the county are exported, and manufacturing accounts for 27 percent of the economic base in Butte County (figure 24). Agriculture and agricultural services is another key component of the economic base (13 percent). The combined trade and services sector also is strong in the county, reflecting Chico’s role as a regional trade center. A small portion of the economic base is in the government sector and reflects the role of California State University at Chico and Butte College in providing services to residents from other parts of the state.



Notes: Agriculture – agriculture and agricultural services sectors
 Construction – new construction and maintenance and repair sectors
 Manufacturing – all manufacturing, including food processing, wood processing, and light industry
 TCU – transportation, communication and utilities sectors
 Trade – retail and wholesale trade sectors
 Services – business, personal, educational, and medical services sectors
 Government – federal, state, and local government sectors

Figure 24. Butte County economic base. (Source: DWR, 2005a)

Income

Butte County is well above regional, state, and national averages with respect to the percent of its population (19.8 percent) below the federally established poverty level (U.S. Census, 2000). In nearby Shasta County, about 15 percent of the population is below the poverty level.

Butte County residents receive roughly 60 percent of their income from wage and salary earnings. The other sources of income for Butte County are interest, dividends, and rent (8 percent); government transfer payments (13 percent); retirement income (8 percent); and self-employment income (10 percent). The percent of income from wages and salaries is low compared to neighboring counties and to the California average. Counties, such as Sacramento and Yolo, with more high-paying jobs rank significantly higher than Butte County on this measure. Conversely, Butte County ranks high in the percent of total income derived from government transfer payments (social security payments, supplemental security payments, and public assistance). These government transfer payments do not include Farm Service Agency payments, which are included as business income.

Butte County also leads other counties in the region in income from other retirement sources, with about 8 percent of all income coming from retirement programs other than social security. When retirement income from all sources is combined, about 25 percent of all income in Butte County is attributable to retirement income (social security, other retirement sources, and property income). Butte and Tehama counties lead the region in this measure of dependence on retirement income.

Fiscal Condition of Butte County

As noted above, income levels in Butte County are much lower than the state average and the number of persons living below the poverty level is higher than average. This condition extends to the County government, which has been determined to be in “acute fiscal distress” three times since 1990. In his comments on the draft EIS, Butte County Chief Administrator Paul McIntosh submitted a copy of the Commission on State Mandates’ latest (June 13, 2005) such finding (Commission on State Mandates, 2005). The finding, which cited \$17.5 million in unmet needs in the public safety department, health and human services, and general government, noted that even with a \$320.9 million budget in FY 2004 -2005, the County had no appreciable flexibility in its discretionary expenditures and had to contend with many factors outside its control, including increasing retirement benefit contributions, increasing CDF contract costs, and reduced reimbursements funded through state mandate claims. Although several California counties filed for this status in the mid-1990s, Butte County is the only California county that has filed for and been granted this finding in recent years (personal communication, N. Patton, Assistant Executive Director of Commission on State Mandates, Sacramento, CA, and E. Hall, Louis Berger, Boise, ID, February 7, 2007).

Sales Tax Revenue of Local Jurisdictions

Levels of sales tax revenues generated within cities and counties over time are influenced by numerous factors, including regional and national economic trends, income growth, local and regional population growth, and the breadth and diversity of a community’s retail trade sector. Spending by visitors, including recreation users, is one factor that may affect levels of sales tax revenues within an area. The current sales tax rate in Butte County and all incorporated areas is 7.25 percent, of which 1 percent is returned to the jurisdiction where taxable sales occur (the 1 percent local share has remained in effect over the fiscal year 1960–61 through fiscal year 1998–99 period). The data reveal several trends, as summarized in the following points:

- During fiscal year 1998–99, Chico and Oroville led all jurisdictions in the region, including Redding, in per capita sales tax revenue. During that year, per capita revenues were as follows: Chico, \$199; Oroville, \$197; Redding, \$178; Gridley, \$142; Paradise, \$50; Butte County, \$34; and Biggs, \$11. Large population centers exist just outside the city boundaries of Oroville and Chico, which contribute to the relatively high per capita sales tax revenue in these communities.
- Oroville’s per capita sales tax revenues have exceeded Redding’s in every year since fiscal year 1976–77, when Redding annexed the unincorporated Enterprise (Shasta County) area. During fiscal year 1998–99, Oroville’s per capita revenue was \$197 compared to \$178 for Redding. Oroville’s ability to maintain relatively strong sales tax revenue levels indicates an ability to capture its share of regional transactions and to pull in taxable sales from people residing outside of its city limits.
- Beyond the above examples, the sales tax revenue data do not provide a clear indication that the development of Lake Oroville facilities had an immediate effect on sales tax revenue levels in nearby communities. Between the fiscal years of 1965–66 and 1975–76, which includes the period during which the dam, forebay, afterbay, and most recreation facilities were completed, Oroville’s real per capita sales tax revenue increased by an average 3.2 percent annually, which exceeded Chico’s 1.6 percent average annual growth but was virtually the same as Redding’s 3.1 percent average annual growth. Real revenue growth over this period, however, was relatively strong in Gridley, unincorporated Butte County, and Biggs, annually averaging 5.8 percent, 5.4 percent, and 4.7 percent, respectively. These figures suggest that factors other than visitation to Lake Oroville and Lake Shasta play important roles in determining levels of sales tax revenues for these communities.

State Agency Expenditures at Oroville Facilities

State agency expenditures on the development, operation, and maintenance of the Oroville Facilities affect both regional economic conditions (such as employment and income levels) and fiscal conditions (such as sales tax revenues). To the extent that these expenditures are made within Butte County and local communities, expenditures made over time serve as an indicator of historical economic activity generated by the Oroville Facilities. The estimates of total expenditures by agency shown in Table 65 are annual averages derived from budget data provided by the state agencies for the period between fiscal years 1995–96 and 2003–04, as reported by DWR (2004p). The allocation of the total agency expenditures to the model areas is based on data obtained from DWR, DPR, and DFG concerning the residency of its employees and on estimates of the percentage of non-payroll expenses that are made within Butte County. Payroll expenditures are the largest component of direct state expenditures associated with the Oroville Facilities. Table 65 indicates that, of an average annual \$15.4 million dollars spent for project-related operation and maintenance, \$9.8 million (63.6 percent) accrues to businesses and employees living in the City of Oroville, with lesser percentages accruing to other communities. About \$3.1 million (20 percent) accrues to people outside the county.

Table 65. Estimates of annual operations and maintenance expenditures by state agencies related to the Oroville Facilities. (Source: DWR, 2004p)

Area	DWR		DPR	DFG	Total
	Recreation-Related	Other			
Oroville	6,965,700	1,030,300	1,529,500	289,500	9,805,900
Paradise	806,600	119,500	145,600	71,600	1,141,200
Biggs-Gridley	347,700	51,400	12,100	214,000	630,000
Chico	493,500	73,000	84,900	60,400	713,600
Out-of-county	2,602,300	384,900	12,100	131,500	3,136,500
Total	11,216,800	1,659,100	1,784,200	767,000	15,427,200

Notes: DFG – California Department of Fish and Game
DPR – California Department of Parks and Recreation
DWR – California Department of Water Resources

Recreation User Spending at the Project

DWR, in consultation with the Recreation & Socioeconomic Work Group, performed surveys and developed an economic model to estimate recreation-related spending by project visitors and potential effects within Butte County. For modeling purposes, the communities where project-related recreational spending might occur were designated as being part of the Oroville, Chico, Paradise, or Biggs-Gridley Model Areas. The Recreation Activity, Spending and Associated Economic Impacts Study (DWR, 2004p) reports that visitor spending is estimated to range from about \$1.4 million annually in the Biggs-Gridley Model Area to about \$20.4 million in the Oroville Model Area (table 66). Countywide, spending associated with current recreational activity at the Oroville Facilities is estimated to total \$30.7 million annually, with \$11.9 million being spent by recreation users who reside outside of Butte County.

Table 66. Summary of current recreation-related spending in Butte County by county residents and out-of-county visitors to the Oroville Facilities (in thousands of nominal dollars). (Source: DWR, 2004p)

Study Impact Area	Butte County Residents ^a		Out-of-County Residents		Total Spending
	Amount	Percent of Total	Amount	Percent of Total	
Oroville	\$10,163.8	54.1	\$10,265.9	86.3	\$20,429.7
Paradise	\$4,182.7	22.3	\$634.2	5.3	\$4,817.0
Biggs-Gridley	\$761.9	4.1	\$597.0	5.0	\$1,358.9
Chico	\$3,674.3	19.6	\$392.4	3.3	\$4,066.6
Butte County Total	\$18,782.7	100.1	\$11,889.5	99.9	\$30,672.2

^a Spending by Butte County residents in each community includes spending by residents of the community and spending by other Butte County residents in that community.

Recreation- and O&M-Related Employment and Earnings

Local project-related economic effects primarily result from recreation activity and O&M spending for the Oroville Facilities. As recreation-related spending levels vary in relation to use, local employment and earnings generated by retail sales, hotel and motel stays, fuel purchases, and other expenditures by visitors also change. Similarly, changes in O&M expenditures by state agencies also generate economic activity in local areas. The Recreation Activity, Spending and Associated Economic Impacts Study (DWR, 2004p) reports that project-related spending annually supports about 1,053 jobs and \$25.8 million in earnings in the county (tables 67 and 68).

Table 67. Summary of jobs generated by recreation-related spending and operation and maintenance of the Oroville Facilities. (Source: DWR, 2004p)

Study Impact Area	Recreation Spending Induced		Operation and Maintenance Induced		Total	
	Number of Jobs ^a	Percent of Total	Number of Jobs	Percent of Total	Number of Jobs	Percent of Total
Oroville	453	68.4	319	64.1	772	66.6
Paradise	37	5.6	37	7.4	74	6.4
Biggs-Gridley	22	3.3	17	3.4	39	3.4
Chico	150	22.7	125	25.1	275	23.7
Butte County Total	555 ^a	100.0	498	100.0	1,053 ^a	100.0

^a Effects on jobs generated by recreation spending reflect spending in community areas by all persons who live outside the community, including persons who live elsewhere in Butte County and those who live outside Butte County. The Butte County total includes only those jobs generated by those living outside the county.

Table 68. Summary of earnings generated by recreation-related spending and operation and maintenance of the Oroville Facilities (in thousands of nominal dollars).
(Source: DWR, 2004p)

Study Impact Area	Recreation Spending Induced		Operation and Maintenance Induced		Total	
	Earnings ^a	Percent of Total	Earnings	Percent of Total	Earnings	Percent of Total
Oroville	8,598.3	67.0	10,600.4	69.9	19,198.7	68.6
Paradise	725.7	5.7	1,138.3	7.5	1,864.0	6.7
Biggs-Gridley	364.4	2.8	505.5	3.3	869.9	3.1
Chico	3,144.6	24.5	2,927.3	19.3	6,071.9	21.7
Butte County Total	10,600.0 ^a	100.0	15,171.5	100.0	25,771.5 ^a	100.0

^a Effects on earnings generated by recreation spending reflect spending in community areas by all persons who live outside the community, including persons who live elsewhere in Butte County and those who live outside Butte County. The Butte County total includes only those earnings generated by those living outside the county.

Combined, recreation and O&M activities account for an estimated 772 jobs in the Oroville Model Area, or 4.2 percent of the area’s total employment. Earnings associated with these activities (\$19.2 million) account for 4.7 percent of the Oroville Model Area’s total earnings. Current levels of recreation activity and O&M expenditures have relatively smaller effects on the economies in the Chico, Paradise, and Biggs-Gridley Model Areas. Although out-of-area visitor spending and O&M expenditures annually support about 275 jobs and \$6.1 million in earnings in the Chico Model Area, this level of economic activity accounts for less than 1 percent of total jobs and earnings in the area. Similarly, the number of jobs and earnings in the Paradise and Biggs-Gridley Model Areas generated by recreation activity of out-of-area visitors and O&M expenditures account for less than 1.0 percent of all jobs and earnings in these areas. For Butte County as a whole, the figures in tables 67 and 68 represent about 1.2 percent of jobs in the county and 1.3 percent of earnings.

Public Services

Project-related public services in the project area are provided by Butte County as well as the City of Oroville and federal and state agencies. The responsibility of service providers is described below by type of service.

Law Enforcement

In California, the Sheriff is the chief law enforcement officer in the county in which he or she is elected. Thus, the Butte County Sheriff’s Office has the overall responsibility for the safety of persons residing in or visiting the county. In the project area, law enforcement duties fall to the Sheriff’s office; the city of Oroville Police Department; DPR (the lead law enforcement agency for the Lake Oroville State Recreation Area); the California Highway Patrol (on non- Lake Oroville State Recreation Area state lands and local roadways); DFG at the OWA and elsewhere within the project area where their statutory Game Warden responsibilities extend; DWR (through private security patrols) at DWR facilities and land-based recreation facilities at Thermalito afterbay; and federal agencies (Forest Service and BLM) on federal

lands located in the FERC project boundary.⁹⁷ In its comments on the draft EIS, DWR indicates that the California Highway Patrol provides regular patrols of Oroville dam and other critical project facilities and that DWR has a special payment arrangement with the Butte County Sheriff's Office to patrol the water surface portion of the Thermalito afterbay. The amount of that payment has been given as \$191,000 annually (Butte County, 2006a), although the amount could vary and could be terminated in the future. In its comments on the draft EIS, Butte County notes that the County provides additional services to the project area related to law enforcement, including services of the coroner; criminal investigators; the District Attorney's office, which is responsible for criminal prosecutions referred by the other agencies; and other criminal justice services related to the probation department, public defender, and county jail.

Fire Protection and Emergency Services

Fire protection and emergency medical services to the greater Oroville area are provided by the Butte County Fire-Rescue Department, Oroville Fire-Rescue Department, and CDF. According to DWR, these agencies cooperatively respond to calls within the project area based on the South County Interagency Fire Protection Agreement. Under this agreement, primary responsibility for fire protection and emergency service calls in the project area is divided among these agencies depending on the location of the incident and the availability of fire units to respond to the call, regardless of primary jurisdictional responsibilities. In its comments on the draft EIS, Butte County indicates that the County has the primary responsibility for most fire protection and emergency services, although the County agrees that the noted agencies cooperatively respond to calls. Butte County notes that the County develops and implements plans each year for providing emergency services for the Fourth of July and other special events, and provides hazardous materials (HazMat) services at the project.

Traffic and Road Maintenance

Maintenance of local roadways in the project area is the responsibility of the Butte County Public Works Department. As described in the Vehicular Access Study, traffic levels in the Oroville area are generally low; however, recreational use during peak holiday periods can result in short-term traffic congestion, particularly near the marinas and high-use recreation areas and parking lots.

Utilities and Service Systems

Various utilities and service systems serve the project area. These services include water, wastewater treatment, power, and solid waste disposal.

3.3.10.2 Environmental Effects

As noted in section 1.3, *Scoping Process*, DWR issued Scoping Document 1 on September 20, 2002. That document identified the following socioeconomic issues related to the Oroville Facilities: (1) effects of project operations and recreation, including recreation developments, on socioeconomic opportunities and economic development; (2) the socioeconomic impacts of the Oroville Facilities and their operation on local governments, residents, agriculture, businesses, and other interests within Butte County; and (3) the economic feasibility of economic development through lower local utility rates and/or

⁹⁷ The Forest Service and DPR have an agreement concerning management of Forest Service lands within the FERC project boundary that are part of the Lake Oroville State Recreation Area. The agreement, dated March 16, 1978, allows DPR to conduct law enforcement activities on National Forest System lands. However, the Forest Service provides law enforcement to address illegal activities that take place on National Forest System lands, such as illegal dumping of trash and hazardous materials, drug production lab debris, and vandalism of cultural resource sites).

other available economic options related to project resources. We address those issues below, and also consider project effects on minority and low income populations.

Socioeconomic Effects of Project Operations

In section 3.3.10.1, *Affected Environment, Recreation- and O&M-Related Employment and Earnings*, we indicate that project-related spending annually supports about 1,053 jobs and \$25.8 million in earnings in Butte County, with 66.6 percent of the jobs and 68.6 percent of the earnings occurring in the City of Oroville (see tables 67 and 68). Those figures derive from average annual spending of \$15.4 million for operation and maintenance of the Oroville Facilities (see table 65) and \$11.9 million in recreational spending by non-county residents (see table 66). Implementing new environmental measures would also have direct and indirect benefits for employment and earnings in Butte County and beyond.

Staff Analysis

Table 72 (see section 4.3.1, *Economic Comparison for the Oroville Facilities*) indicates that either the Proposed Action or the Proposed Action with Staff Modifications would increase the annualized cost of environmental measures at the project by \$11.8 million and \$11.7 million, respectively, which reflects more than about \$180 million in capital costs and more than about \$4 million in annual O&M costs. Capital cost estimates include, for example, an estimated \$60 million for facilities' modification(s) to improve temperature conditions for anadromous fish (Proposed Article A108) and more than \$77 million for recreational facility improvements (Proposed Article A127). Such investments would provide a substantial number of construction-related jobs, many of which could be filled by county residents. The increase in annual O&M expenditures associated with almost all of DWR's proposed measures would also create employment opportunities for county residents. Additionally, improvements in recreation facilities such as campgrounds, boat ramps, day-use areas, and trails would likely lead to increased visitor use and visitor spending, as well as improving the quality of the recreation experience. Increased visitor spending would in turn lead to an increase in local project-related employment and earnings.

Butte County Recommendations

Given that the preponderance of project-related spending occurs in Oroville (see tables 65 and 66), project-related spending has different fiscal effects on Oroville, other communities, and Butte County. In its license application, DWR estimates that the project provides net fiscal benefits (that is, project-related benefits in excess of project-related costs) for the City of Oroville and other local communities. However, DWR also estimates that Butte County experiences a net annual fiscal deficit of \$503,800 because the County's project-related expenditures exceed project-related County revenues. Estimates of fiscal effects on Butte County indicate that the County's costs would exceed revenues associated with all three elements of project-related economic activity, including non-residents of unincorporated Butte County visiting the Oroville Facilities for recreation (-\$149,500), operation and maintenance related to the project (-\$114,200), and indirect growth attributable to the population supported by visitor spending and related economic activity (-\$240,100) (DWR, 2004x).

In its March 30, 2006, filing with the Commission, Butte County recommends that the Commission include in any new license for the Oroville Facilities seven articles related to socioeconomic conditions in Butte County. The recommendations address: (1) a law enforcement and public safety plan; (2) a road construction and maintenance plan; (3) an early warning plan; (4) the Emergency Operations Center; (5) payments in lieu of taxes; (6) a low-cost power allocation; and (7) periodic socioeconomic and recreation measure implementation reports. The County's recommendations encompass most of the socioeconomic topics addressed by any party in this proceeding, and we have used the seven topics to

present our analysis of project effects on Butte County socioeconomics. We include a final section that addresses the net fiscal effect on the County, which summarizes several aspects of our analysis.

Law Enforcement and Public Safety Plan

Butte County, among others, provides a number of services to the Oroville Facilities, including law enforcement, fire protection and rescue, and a communication system relied on by project employees and visitors. Butte County recommends that DWR invite state and local law enforcement personnel to a meeting or meetings for the purpose of developing a law enforcement and public safety plan that would provide a means for coordinating the activities of law enforcement and emergency personnel with jurisdiction in the project area, including the Lake Oroville reservoir area and the OWA. The County recommends that DPR; DFG; the City of Oroville Police Department; and the Butte County Sheriff's Office, Fire Department, and Central Communications Division be invited to participate. As recommended by Butte County, the plan would include provisions for law enforcement presence, fire and rescue services, other types of public contact personnel presence, enhanced emergency communication and response procedures, health and human services, and public safety and security protection measures for facilities, natural resources, recreation resources, and heritage resources in the project area.

Butte County additionally recommends that DWR fund the plan in the following amounts (in 2005\$), at a minimum:

1. \$2,035,416 annually to Butte County to provide for law enforcement and criminal justice services in the project area;
2. \$393,267 annually to Butte County to provide for fire and rescue services in the project area;
3. \$1,837,983 annually to Butte County to provide health and human services related to the project;
4. a one-time payment of \$1,032,000 to Butte County to fund improvements to law enforcement/criminal justice services;
5. a one-time payment of \$351,143 to Butte County to cover upgrades to the county's communication system; and
6. a one-time payment of \$1,309,478 to Butte County to fund improvements to fire and rescue services.

Butte County recommends that any funds not expended in 1 year be carried over to the following year, that the funds be subject to an annual cost of living adjustment, and, in the event a plan is not prepared within the recommended time frame (8 months following license issuance), that DWR place the funds in an interest-bearing reserve fund until the plan is completed.

In its May 26, 2006, filing with the Commission, DWR states its opposition to the county's recommendation (DWR, 2006c). The State Water Contractors (SWC) and the Metropolitan Water Districts of Southern California (Metropolitan) state a similar position in their May 26, 2006, joint filing (SWC and Metropolitan, 2006).

Staff Analysis

There are many ways to conduct economic and fiscal analysis of project effects on local governments and communities. Given the substantive nature of DWR's initial socioeconomic analysis, Butte County's subsequent analyses, and the work of consultants who performed related analyses, we reviewed and verified the information submitted by those parties and looked at other revenue information in the record but not included in table 69. Information on the record includes vastly different estimates of

the Oroville Facilities’ effect on the fiscal circumstances of the Butte County government. Table 69 summarizes the estimates of DWR and Butte County, as well as the staff estimate, indicating net deficit estimates ranging from \$503,800 to \$4.8 million annually. The differences are accounted for by differences in the expense and revenue categories that were considered by each party and differences in the methods that were applied in each category. In each category, the staff estimate represents our conclusion with respect to the appropriateness of including the category in our estimate (that is, whether the cost category is truly related to the project) and the appropriate method for making the estimate.⁹⁸

Law Enforcement, Criminal Justice, and Crucial Asset Protection Expenses—Butte County recommends that DWR fund the county’s project-related law enforcement, criminal justice, and crucial asset protection activities in the sum of \$2,035,416 annually, plus a one-time payment of \$1,032,000. Averaging the one-time payment over a 50-year license and adding it to the annual payment yields an annual estimate of \$2,056,056 (table 69). The County provides detailed calculations supporting its recommendation in a report entitled *Operational Impacts of the Oroville Facilities Project on Butte County* (Butte County, 2006a).

Table 69. Oroville Facilities fiscal effects on Butte County.

Service Sector	Butte County Estimate^a	Applicant’s Original Estimate^b	Applicant’s Revised Estimate^c	Staff Estimate^d
Law Enforcement, Criminal Justice, and Crucial Asset Protection Expenses				
Law enforcement expenses—visitor driven	\$681,670	\$146,600	\$146,600	\$146,600
Law enforcement expenses—indirect (growth-related)	Not estimated	\$334,900	\$334,900	\$334,900
Law enforcement expenses—O&M related	Not estimated	\$228,300	\$228,300	\$228,300
Training and equipping law enforcement personnel—visitor driven	\$10,840 ^e	Not estimated	Not estimated	0
Criminal justice expenses—visitor driven	\$664,585	Not estimated	\$216,400	\$216,400
Lake Oroville dam patrol	\$689,161	Not estimated	Not estimated	0
Hiring and training personnel for Lake Oroville dam patrol	\$9,800 ^e	Not estimated	Not estimated	0
Total law enforcement, criminal justice, and crucial asset protection expenses	\$2,056,056	\$709,800	\$926,200	\$926,200
Fire and Rescue Expenses				
Visitor driven—fire and rescue services	\$393,267	\$202,400	\$202,400	\$202,400

⁹⁸ Our estimate of project-related costs should not be interpreted as a recommendation that DWR reimburse the county for those costs. It is simply an acknowledgement that the County does incur expenses that are related to the project, and indicates our conclusions with respect to appropriate methods for estimating those expenses. Our recommendations appear in section 5, *Comprehensive Development*.

Service Sector	Butte County Estimate^a	Applicant's Original Estimate^b	Applicant's Revised Estimate^c	Staff Estimate^d
Visitor driven—fire station replacement	\$18,430 ^e	Not estimated	\$6,720	\$6,720
Visitor driven—fire and rescue equipment replacement	\$7,760 ^e	Included in estimate of annual expenses	Included in estimate of annual expenses	Included in estimate of annual expenses
Visitor driven—police, fire, and rescue communications	\$35,114 ^e	Not estimated	\$11,800	\$8,200
Indirect (growth-related) expenses	Not estimated	\$81,200	\$81,200	\$81,200
O&M related expenses	Not estimated	\$55,300	\$55,300	\$55,300
Total Fire and Rescue Expenses	\$454,571	\$338,900	\$357,420	\$353,820
Other Expenses				
Health and human services	\$1,837,983	Not estimated	Not estimated	\$0
Other expenses—indirect (growth-related)	Not estimated	\$131,700	\$131,700	\$131,700
Other expenses—O&M related	Not estimated	\$90,000	\$90,000	\$90,000
Total Other Expenses	\$1,837,983	\$221,700	\$221,700	\$221,700
Road Maintenance Expenses				
Road maintenance expenses on county-maintained roads—visitor driven	\$357,714	\$20,900	\$41,900	\$10,010
One-time paving of county-maintained roads—visitor driven	\$106,122 ^e	Not estimated	Not estimated	0
Road maintenance on county-maintained roads—visitor driven	\$433,637	Not estimated	Not estimated	\$8,670
Improvement needs on state-owned and maintained highways	Not estimated	Not estimated	Not estimated	Not estimated
Road maintenance expenses—indirect (growth-related)	Not estimated	\$108,100	\$108,100	\$108,100
Road maintenance expenses—O&M related	Not estimated	\$73,700	\$73,700	\$73,700
Total Road Maintenance Expenses	\$897,473	\$202,700	\$223,700	\$200,480
Move Emergency Operations Center				
Move Emergency Operations Center	\$50,910 ^e	Not estimated	Not estimated	0
Total Expenses	\$5,296,993	\$1,473,100	\$1,729,020	\$1,702,200
County Revenue				

Service Sector	Butte County Estimate^a	Applicant's Original Estimate^b	Applicant's Revised Estimate^c	Staff Estimate^d
Sales tax—visitor driven	\$297,487	\$217,100	\$217,100	\$217,100
Sales tax—O&M related	Not estimated	\$32,900	\$32,900	\$1,000
Lodging tax—visitor driven	\$9,185	\$3,300	\$3,300	\$3,300
Lodging tax—O&M related	Not estimated	\$200	\$200	\$200
Property tax—indirect (growth-related)	Not estimated	\$97,400	\$97,400	\$97,400
Property tax—O&M related	Not estimated	\$104,200	\$104,200	\$104,200
Other—indirect (growth-related)	Not estimated	\$318,400	\$318,400	\$318,400
Other—O&M related	Not estimated	\$195,800	\$195,800	\$195,800
Contract with DWR	\$191,000	Not included in expenses or revenue	Not included in expenses or revenue	\$191,000
Total Revenue	\$497,672	\$969,300	\$969,300	\$1,128,400
Summary				
Total expenses	\$5,296,993	\$1,473,100	\$1,729,020	\$1,702,200
Total revenue	\$497,672	\$969,300	\$969,300	\$1,128,400
Net fiscal effect	-\$4,799,322	-\$503,800	-\$759,720	-\$573,800
FY 2002 to 2003 budget	\$275,124,000	\$275,124,000	\$275,124,000	\$275,124,000
Net effect as % of budget	-1.7%	-0.2%	-0.3%	-0.2%
FY 2002 to 2003 General Fund budget	\$24,709,000	\$24,709,000	\$24,709,000	\$24,709,000
Net effect as % of General Fund budget	-19%	-2%	-3%	-2%

Note: FY – fiscal year

^a Source: FMY Associates, 2006.

^b Source: DWR, 2004x.

^c Source: TCW Economics, 2006.

^d Source: Staff estimate.

^e Staff divided the original estimate of one-time cost by 50 to represent annual cost over a 50-year license.

The County states that it responds to hundreds of calls for service within the project area each year from residents, nonresident visitors, and agencies that include the California Highway Patrol, DPR, and DFG (Butte County, 2006a). The County indicates that from October 2004 to October 2005, County sheriff's deputies responded to more than 40 calls for back-up or other assistance in the project area, in addition to providing regular patrols and responding to visitor calls. The County estimates that approximately 50 percent of the calls that come in to DPR annually are referred to the County Sheriff's Office, with the percentage being higher in the off-season when DPR and other agency staffing is reduced and lower in the peak visitor season when DPR staffing is also at its peak (Butte County, 2006a). Examples of calls for service in the project area include theft; car, watercraft, and aircraft accidents; reports of damaged property; public drunkenness; family disturbances; acts of vandalism; disturbance of

the peace; battery; drunk driving; search and rescue; coroner investigations; criminal assault; trespassing; vehicle recovery; illegal discharge of firearms; burglary; evidence and body recovery; homicide; and explosive ordnance disposal (Butte County, 2006a).

Butte County indicates that the County has to provide significant law enforcement services at the OWA, where there has been a relatively high, ongoing amount of criminal activity that includes four gang rapes in 1997–98; an assault with a deadly weapon in 2005; and numerous drug offenses, assaults, batteries, and other criminal activity. Butte County attributes this situation to the fact that DWR has not provided any funding to DFG to manage the OWA (Butte County, 2006a). Under Measure B111, *Oroville Wildlife Area Funding*, in appendix B of the Settlement Agreement (DWR, 2006a), DWR proposes to provide funding to DFG to manage the OWA. The funding is estimated at \$350,000 annually to support 5.5 full-time positions to address public safety, recreational management, facilities management and protection, and fish and wildlife resource protection; \$232,000 to purchase equipment; and \$82,500 annually to be spent by DFG for expenses related to managing the OWA. We conclude that this proposed measure would reduce this aspect of Butte County’s fiscal issue because the additional funding provided to DFG would likely lead to a reduction in the demand for Butte County law enforcement services at the OWA.

As summarized in table 69, the County’s recommendation includes reimbursement for providing law enforcement services associated with project visitors; training and equipping law enforcement personnel to provide a higher level of service; providing criminal justice services associated with project visitors; providing round-the-clock patrols at Lake Oroville dam to protect the community from any threat to that facility; and hiring and training personnel to perform the Lake Oroville dam patrols.

Citing a study that Metropolitan commissioned by CH2M HILL (2006), SWC and Metropolitan state that the County’s methods for calculating its law enforcement costs overestimate the project’s effects on the County’s law enforcement expenses. CH2M HILL concludes that the overstatement results from (1) using “recreation days” rather than “visitor days” to estimate the visitor population being served; (2) using the average peak number of recreation days (weekend days during the summer) instead of the year-round daily average to estimate the visitor population; (3) using an assumption of above-average lake levels to adjust the visitor population estimate upward; (4) using a level-of-service standard for law enforcement and criminal justice services that is much higher than the County actually provides to the project or the rest of the county; and (5) assuming that the County should provide and be reimbursed for patrol services at the Lake Oroville dam.

DWR commissioned TCW Economics (2006) to evaluate the report relied on by the County in its law enforcement reimbursement recommendation. TCW Economics’ evaluation makes some of the same points raised in the CH2M HILL report (2006), including the issues of using peak rather than average visitor numbers and using higher-than-actual service levels. TCW Economics indicates that the County’s estimate of the nonresident visitor population (5,270) is almost three times as high as the 1,910 figure used in DWR’s license application studies (DWR, 2004x). We conclude that the County’s methods do indeed overstate the cost of providing services to nonresident visitors for the reasons listed above, and for that reason our staff estimate of visitor-related costs (\$146,600) is taken from the applicant’s estimate, which is appropriately based on average visitor numbers.

TCW Economics and Economic Modeling Specialists, Inc. prepared the fiscal impact assessment (DWR, 2004x) that DWR submitted with its license application. As summarized in table 69, the fiscal impact assessment estimated project-related law enforcement expenses by Butte County equaling \$709,800 per year, including the cost to provide law enforcement services to nonresident visitors, the permanent population resulting from nonresident visitor spending in the unincorporated area of the County, and the permanent population resulting from project-related O&M spending in the unincorporated area of the County. The latter two estimates are the products of an input-output model (IMPLAN) that was used to estimate the direct and indirect effects of the project on population,

employment, and fiscal conditions in Butte County, the City of Oroville, and several other local jurisdictions (DWR, 2004x).

Butte County (2005a) has submitted the comments of Dr. Jon Ebeling, stating that the model and/or DWR's use of the model and its output were flawed for several reasons, including (1) providing only a single estimate of project impacts rather than including an upper and lower range; (2) providing a static rather than dynamic estimate that takes into account changing future conditions such as changes in the price of gasoline, increases in population, and changes in population demographics; (3) "cleaning" the data in a way that is not satisfactorily explained; (4) not satisfactorily explaining the way in which indirect population estimates were made; (5) accepting a low response rate to visitor surveys; (6) using potentially biased or counterintuitive estimates of visitor spending; and (7) basing budget estimates on only 1 year of data (Ebeling, 2005). Dr. Ebeling also makes a number of recommendations that would no doubt improve the model's application. However, Dr. Ebeling does not provide evidence that the model was used in a way that would systematically overestimate or underestimate the project's fiscal impacts, and our review of the model did not discern any such systematic bias.⁹⁹ Thus, while we understand that the model's application could be improved upon, we conclude that its application in this case is adequate to the task at hand, and we therefore include the applicant's estimate of annual growth- and O&M-related impacts (\$334,900 and \$228,300, respectively) in our staff estimate.

Based on their review of Butte County's law enforcement cost estimates, TCW Economics (2006) revised its initial estimate of project fiscal effects to include impacts on the criminal justice system, recognizing that any arrest made by the Sheriff's Office in the project area also entails criminal justice services such as intake, jail, prosecution, probation, and sometimes, public defender services (Butte County, 2006a). As shown in table 69, TCW Economics' revised estimate for project-related law enforcement and criminal justice service expenses by Butte County equals \$926,200, including \$216,400 for the criminal justice component (TCW Economics, 2006). Because it appears to be a legitimate project-related cost to the county, we include that component in the staff estimate as well.

In making the staff estimate, we did not include the cost to train and equip additional law enforcement personnel because Butte County's justification for this cost is based on a higher level of service than the Sheriff's Office actually provides throughout the County. We do not include the costs to hire and train additional officers to patrol Lake Oroville dam and conduct those patrols because, as indicated by SWC and Metropolitan, DWR retains a private security contractor to provide that service and the additional services of Butte County have not been requested by DWR or by the state or federal Departments of Homeland Security (SWC and Metropolitan, 2006). Thus, our total estimate of the cost to Butte County to provide project-related law enforcement and criminal justice services is \$926,200 (table 69).

Fire and Rescue Service Expenses—Butte County recommends that DWR fund the county's project-related fire and rescue services in the sum of \$393,267 annually, plus a one-time payment of \$351,143 to upgrade the county's communication system and a one-time payment of \$1,309,478 to fund improvements to fire and rescue services. Averaging the one-time payments over a 50-year license and adding them to the annual payment yields an annual estimate of \$454,571 (table 69).

The County states that it provides emergency medical assistance, rescue, public assistance, and fire protection services; responds to vehicle accidents; and provides specialized rescue services through its hazardous materials, drowning accident, vehicle extraction, and critical incident teams (Butte County, 2006a). Additionally, the County must maintain fire stations, fire trucks, and the infrastructure needed to provide those services. Although DWR states that CDF has the primary responsibility for fire fighting activities at the project (DWR, 2006c), it is nonetheless true that the County incurs costs to provide fire and rescue services to the project and its visitors.

⁹⁹ See appendix A for our review of DWR's socioeconomic model.

Our analysis of the County's estimated costs for providing project-related fire and rescue services is based on the same rationale and the same documents cited above in our analysis of law enforcement costs. Again, we accept the IMPLAN model results for annual growth- and O&M-related expenses (\$81,200 and \$55,300, respectively), and accept the IMPLAN model results for annual visitor-related expenses (\$202,400) rather than the County's estimate because the County figure relies on an overestimate of the nonresident visitor population that must be served. Similarly, we include in our estimate the project-related share of the cost of fire station replacement (\$6,720) and communication system upgrades (\$8,200) based on a lower estimate of nonresident visitors. The County indicated that the communication system serving the public safety agencies in the project area would need to be upgraded every 7 to 10 years, and we assumed a 10-year interval in our estimate. Given these assumptions, we estimate the County's project-related fire and rescue service costs at \$353,820 annually (table 69).

Health and Human Services—Butte County recommends that DWR pay \$1,837,983 annually to Butte County to provide health and human services to a population that the County believes to be related to the project (Butte County, 2006b). That figure represents 5 percent of the County's share of health and human services funding in fiscal year 2004–05 (Butte County, 2006a). The County states that the project has brought and continues to bring a substantial number of low income residents to the County that rely on the County's health and human services department. The County states further that this pattern was established when project construction ended and thousands of construction worker houses were either abandoned or sold at very low prices, attracting low income residents who found few jobs available and became dependent on health and human services. According to the County, this problem is exacerbated by the low-paying and seasonal jobs created by the project and project-related tourism (Butte County, 2006a).

TCW Economics (2006) provides a counterpoint to the County's position, summarizing the project's positive effects on local income and employment. These benefits include project-related recreational spending that supports an estimated 555 jobs and \$10.6 million in earnings, and project-related O&M spending that supports an estimated 498 jobs and \$15.2 million in earnings. We do not find the County's statements to be persuasive in attributing any share of health and human services spending to the project, and do not include any cost for these services in our cost estimate (table 69).

Conclusion—Based on the foregoing analysis, plus DWR's estimate of growth-related and O&M-related road maintenance expenses (\$108,100 and \$73,700, respectively; see table 69), we estimate the County's project-related expenses for law enforcement, criminal justice, and fire and rescue services at \$1,280,020 annually. This amount may be wholly or partially offset by project-related revenue accruing to the County, which we discuss below under the heading *Net Fiscal Effects*.

Road Construction and Maintenance Plan

The Butte County Public Works Department has identified three types of project-related impacts on the local transportation infrastructure, including increased road maintenance required on county roads due to project-generated vehicle trips, air quality and water quality degradation associated with project-generated vehicle trips on dirt and gravel roads owned by the County but used exclusively by project visitors, and inadequate capacity and maintenance of certain state-owned highways that lead to the project (Butte County, 2006a). DWR does not propose any measures designed to address road management or to compensate the County for its road management expenses.

Butte County (2006b) recommends that DWR:

1. prepare a road construction and maintenance plan, in consultation with the Butte County Public Works Department, to identify capital improvements and a construction and maintenance schedule for roads within an area that Butte County refers to as the project's Area of Highest Use;

2. Establish a road construction and maintenance fund of \$5,306,136 and disburse those funds to Butte County in years 2 through 6 following license issuance to provide for the construction of roads in the Area of Highest Use; and
3. Provide \$791,351 to Butte County annually to fund road maintenance within the Area of Highest Use.

Under Butte County's recommendation, the payment amounts would be subject to an annual cost of living adjustment. Averaging the one-time payment of \$5,306,136 over a 50-year license and adding that amount to the recommended annual payment yields an annual estimate of \$897,473 for road construction and maintenance (table 69).

In its May 26, 2006, filing with the Commission, DWR states its opposition to the county's recommendation (DWR, 2006c). SWC and Metropolitan state a similar position in their May 26, 2006, joint filing (SWC and Metropolitan, 2006).

Staff Analysis

In the supporting documentation for its recommendation, Butte County identifies an Area of Highest Use that is defined by the arterial and collector roads that lead to the project area (Butte County, 2006a). Using peak recreation visitor days to estimate the percentage of road maintenance costs attributable to the project (8.52 percent), 293.56 miles of arterial and collector roads in the Area of Highest Use, and average road maintenance costs of \$14,302 per mile, the County estimates the project-related expenses at \$357,714 annually (table 69).

DWR's initial estimate of project-related road maintenance expenses was based on the average, rather than peak, nonresident visitor population; 144 miles of county-maintained roads used by nonresident visitors; and average road maintenance costs of \$6,670 per mile. As shown in table 69, this yields an estimate of project-related road maintenance expenses of just \$20,900 annually (DWR, 2004x). A recently filed DWR estimate (TCW Economics, 2006) revised that figure upward to \$41,900 (table 69), based on the County's road maintenance cost estimate of \$14,302 per mile. Although not reflected in TCW Economics' revised estimate, we note that DWR issued an addenda and errata document in January 2005 that indicates only about 35 miles of county-maintained road in the Area of Highest Use are likely used frequently by non-county residents (DWR, 2005h). Using that mileage estimate, the project-related road maintenance costs in the Area of Highest Use would be reduced to \$10,010 annually. This is the figure we include in the staff estimate.

SWC and Metropolitan also oppose the County's recommendation, stating that compelling DWR to pay the County's road maintenance costs would be contrary to the Commission's long-standing precedent of holding licensees responsible for road maintenance only within the project boundary (SWC and Metropolitan, 2006). We note that road maintenance responsibilities are limited to roads within the project boundary, with the added provision that roads used exclusively for project access must be brought into the project boundary.

The County also recommends that DWR make a one-time payment of \$5,306,136 to cover the cost of paving 30.32 miles of gravel/dirt roads used by project visitors and \$433,637 annually to cover the County's cost of maintaining those roads. While the County states that these roads are used exclusively by project visitors to access the project, we conclude that such is not the case, based on our review of the record and our site visit. Additionally, we find that only about 1.5 miles of the 30.32 miles are currently within the project boundary. Given that most of these road miles are not within the project boundary and none of the roads are used exclusively to access the project, we conclude that responsibility for paving and/or maintaining the roads would not be wholly project-related. Applying the same assumptions we used above to estimate the project-related maintenance costs of county maintained roads in the Area of Highest Use, we estimate the project-related costs of maintaining the 1.5 miles of road in the project

boundary at \$8,670 annually, and we include that cost in our staff estimate (table 69). For the reasons stated above in our analysis of law enforcement costs, we also include the IMPLAN model estimates of growth- and O&M-related road maintenance expenses.

Based on the foregoing analysis, we estimate the County's project-related expenses for road maintenance at \$200,480 annually. This amount may be wholly or partially offset by project-related revenue accruing to the County, which we discuss below under the heading which we discuss below under the heading *Net Fiscal Effects*.

Early Warning Plan

DWR coordinates and communicates with the Corps, BOR, and the California and Butte County Offices of Emergency Services regarding flood events. Proposed Article A131, *Early Warning System*, is proposed to improve communication and coordination among these parties by developing an early warning plan for flood events. The plan would describe how DWR would communicate with the other parties and coordinate project operations before and during flood emergencies. The plan is proposed to be consistent with California's Standardized Emergency Management System, and would describe the measures DWR would take before and during greater-than-normal operational releases and during flood events, including, at a minimum, a listing of the agencies to be consulted, a description of emergency response procedures, including dam operations; and a schedule for implementing and evaluating the plan. Butte County (2006b) makes the same recommendation.

Staff Analysis

SWC and Metropolitan state that the County's recommendation is duplicative of the ongoing requirement imposed on DWR to develop and file for Commission approval an Emergency Action Plan under Part 12 of the Commission's regulations (18 CFR, Part 12, Subpart C). Even though these entities indicate that the County's plan is not needed, we note that this plan is virtually identical to Proposed Article A131 of the Settlement Agreement that was signed by both SWC and Metropolitan. Despite apparent agreement among these parties, we conclude that the appropriate vehicle for this plan is part 12 of the Commission's regulations and not a specific license article.

Emergency Operations Center

Butte County provides an Emergency Operations Center and staff to prepare for and respond to natural disasters in the county, including floods, earthquakes, acts of terrorism/sabotage, and other emergencies (Butte County, 2006a). DWR does not propose any measures associated with the County's Emergency Operations Center or emergency services.

Butte County (2006b) recommends that DWR prepare an Emergency Operations Center relocation plan in consultation with the Butte County Sheriff's Office, and include in the plan designs, specifications, and a construction schedule to accomplish relocation of the Emergency Operations Center. The County also recommends that DWR provide a one-time payment of \$2,545,495 to the County to fund construction of the new Emergency Operations Center. Averaged over a 50-year period, this would equal \$50,910 annually (table 69).

In its May 26, 2006, filing with the Commission, DWR states its opposition to the county's recommendation (DWR, 2006c). SWC and Metropolitan state a similar position in their May 26, 2006, joint filing (SWC and Metropolitan, 2006).

Staff Analysis

The County states that the Emergency Operations Center faces a flood risk: (1) in the event of failure or overflow of the Oroville dam, and (2) from overflow of the Thermalito power canal. In its

comments, DWR notes that the Emergency Operations Center is not in either the 100-year or 500-year floodplain, and the actual risk of complete dam failure is not “even remotely plausible.” SWC and Metropolitan make the same points in their comments. We agree and conclude that there is no appreciable risk to the Emergency Operations Center from dam failure.

With respect to flood risk associated with the power canal, which is located near (about 150 yards) but at a lower elevation than the Emergency Operations Center, the County states that water not sent down the Feather River is diverted via the Thermalito power canal, and that “[d]uring a flood event, excess water from uncontrolled release from the Dam will flow through the canal. Since no flow controls exist on the canal, the Emergency Operations Center faces significant risks in any major flood event” (Edell, 2005, as cited by Butte County, 2006a). Butte County also states that on January 3, 1997, DWR advised the County that the Emergency Operations Center would be under water by the next morning due to flood-related uncontrolled releases from the project. In the end, the flow into the Thermalito power canal did not overtop the canal and the building was not flooded. However, the County indicates that the threat of flooding and the potential need to evacuate the building caused significant operational problems in the Emergency Operations Center and demonstrated to the County that the facility should be relocated.

In support of its position that DWR should provide funds for moving the Emergency Operations Center, Butte County states that when the project was licensed, DWR anticipated constructing the Marysville dam, which would have enabled DWR to lower its water release rate from Lake Oroville during high water or flood events. Marysville dam was never constructed, however, and the County states that DWR must therefore increase release rates at Oroville dam during high water periods such as the 1996 and 1997 floods. It was those floods that made the County aware of the risk exposure of the Emergency Operations Center, a risk exposure that the County believes would not have occurred if the Marysville dam had been constructed as envisioned when the Oroville Facilities were licensed.

DWR’s comments do not mention the County’s statement concerning the 1997 flood events. However, SWC and Metropolitan state that the County is in error concerning a lack of controls on the power canal. SWC and Metropolitan indicate that the inlet to the Thermalito power canal is regulated, and provide a copy of a DWR bulletin indicating that the inlet to the canal can be closed by lowering three radial gates installed for the purpose of keeping flood flows from entering the power canal (DWR, 1974).

We note that DWR uses the emergency spillway to help pass only the major flood events and that the power canal is controlled by gates. Butte County has not established what threat the operation of the power canal poses to the Emergency Operations Center or what the flooding conditions would have been during the 1997 flood without the presence of the Oroville Project. We are not convinced that DWR’s operation of the power canal or that DWR’s operation of the Oroville Project during flood events has increased the flood risk for the Emergency Operations Center. Even during the 1997 flood, a low probability event, the flow into the Thermalito power canal did not overtop the canal and the Emergency Operations Center was not damaged. This low probability, in combination with the fact that the inlet to the Thermalito power canal can be regulated by three radial gates and the fact that the Emergency Operations Center is at a higher elevation than the power canal, suggests that operation of the project helps alleviate downstream flooding and does not increase the flood threat to the Emergency Operations Center.

Payments in Lieu of Taxes

As a state entity, DWR is not required to pay of any state, local, or federal taxes associated with the Oroville Facilities.

In its March 30, 2006, filing with the Commission, Butte County recommends that the Commission include a license article in any new license for the project that would require DWR to establish a reserve fund entitled “Butte County Payment in Lieu of Taxes Fund (PILOT Fund)” in an

amount necessary to provide annual payments to the County and to provide such annual payments in an amount equal to \$6.8 million in 2005 dollars, adjusted annually as specified in appendix B of the County's Operational Impacts Report (Butte County, 2006a).

In its May 26, 2006, filing with the Commission, DWR states its opposition to the county's recommendation (DWR, 2006c). SWC and the Metropolitan state a similar position in their May 26, 2006, joint filing (SWC and Metropolitan, 2006). Butte County reiterates its position in various subsequent filings, including those of June 26, December 18, and December 26, 2006.

Staff Analysis

In providing a description of the Oroville Facilities' background, Butte County (2006b) cites the 1952 application for the project (California Water Project Authority, 1952) as saying that "[p]rovision will be made to make payment for or replace improvements destroyed or injured by the proposed works." Butte County goes on to state that this compensation has not occurred, and that on the contrary, the project has been a source of significant and ongoing negative effects on the County's ability to provide public services both to the project and to the county's 210,000 residents.

Butte County states that it has lost and continues to lose a substantial amount of tax revenue annually because of the inundation of the Big Bend Project, previously operated by PG&E,¹⁰⁰ and the loss of potential tax revenue associated with the developable land that was also inundated by the Oroville Facilities. As noted in section 2.0, *Proposed Action and Alternatives*, the current conditions described in the *Affected Environment* sections of this EIS define the No-action Alternative and serve as the baseline against which the other alternatives are compared. Existing conditions, rather than pre-project conditions, serve as the baseline for considering socioeconomic effects.

The County's Socioeconomic Impacts Report (FMY Associates, 2006) estimates the lost tax revenue (in 2004\$) at \$631,151 annually for the Big Bend Project and \$2,634,337 annually for the remainder of the developable property,¹⁰¹ for a total of \$3,265,488 lost revenue annually or \$268.0 million over the course of a 50-year license, assuming a 2 percent annual escalation in land values (and tax revenue). The same report estimates that if the Oroville Facilities had been developed by a private third party rather than DWR, that party would pay an estimated county tax of \$6,870,535 annually (in 2004\$), or \$343.5 million over a 50-year license term. Of the two estimates of annual tax losses, \$3.3 million and \$6.9 million, the County used the latter annual figure as the basis for its recommended PILOT of \$6.8 million dollars annually.

Citing a study that Metropolitan commissioned by CH2M HILL (2006), SWC and Metropolitan state that FMY Associates' methods for calculating lost tax revenue both overstate the tax revenue that the County would have received if the Oroville Facilities had not been built and understate taxes and other economic benefits that accrue to the County because of the project (SWC and Metropolitan, 2006). The CH2M HILL study does not address FMY Associates' estimate of the potential tax revenue associated with the Big Bend Project if it were still operating (\$631,151 annually) or the potential tax revenue associated with a private owner of the Oroville Facilities (\$6.9 million annually). It does address the estimated foregone tax revenue associated with the land inundated by the Oroville Facilities. CH2M HILL estimates that the assessed value of inundated property would be about \$3,430 per acre rather than \$9,300 per acre because the appropriate assessed value would include land only rather than land plus

¹⁰⁰ PG&E paid property taxes for the Big Bend Project prior to its inundation by the Oroville Facilities. After the site was inundated and became part of DWR's Oroville Facilities, it was no longer subject to property taxation.

¹⁰¹ The estimate for the remainder of the developable property is based on a 1 percent tax rate applied to an average assessed value of \$9,300 per acre for 28,324 acres.

improvements, and because much of the land upstream of Oroville dam is steep, remote, and has poor access, making it less developable than other land throughout the county. The CH2M HILL study also cites 2002 figures from the State Controller indicating that Butte County currently receives property tax revenue equaling only 0.13 percent of the assessed value of property in the county, concluding that FMY Associates' assumption of a 1 percent tax rate significantly overstates the County's lost tax revenue. Applying the lower tax rate to 29,240 acres owned by DWR at the Oroville Facilities, CH2M HILL estimates the County's lost tax revenue at \$368,716 for land and improvements or just \$130,381 annually for the land alone, rather than the \$2,634,337, estimated by FMY Associates.

DWR commissioned TCW Economics (2006) to also evaluate the FMY Associates' report relied on by the County in its PILOT recommendation. TCW Economics' evaluation makes many of the same points raised in the CH2M HILL report (2006), including the less developable nature of the land inundated by the Oroville Facilities and the lower tax rate that would apply to the assessed value of property. TCW offers a rough estimate of \$390,000 as the County's share of lost annual tax revenue.

In our assessment in the draft EIS, we considered the implications of applying the lower tax rate (0.13 percent) to FMY Associates' estimate of \$6.9 million in lost annual revenue associated with a private party owning the Oroville Facilities. Under that assumption, the lost revenue estimate would be \$893,170, and we concluded that an estimate of \$130,381 (CH2M HILL's estimate of taxes associated with land value alone) to \$893,170 offered a likely estimate of tax revenue foregone by the County. In submittals filed in June 2006 (Butte County, 2006c; FMY Associates, 2006b) and in comments on the draft EIS, FMY Associates points out flaws in the CH2M HILL assumptions and in our assessment presented in the draft EIS, in particular indicating that the County would receive the full 1 percent tax rate originally presented in FMY Associates' analysis of foregone revenue associated with the Big Bend Project, because of the particular rules applicable to power plants greater than 50 MW. We took this into account in our assessment for the final EIS, concluding that estimates of lost tax revenue in the range of \$1.0 and \$6.9 million annually are reasonable estimates of the County's foregone tax revenue.

The estimates discussed above are based on various ways of assessing lost property tax revenue attributable to establishment and continued operation of the Oroville Facilities by a state entity that does not pay property taxes. The project may also provide indirect tax benefits that partially offset the tax losses. Because the following benefit estimates have not been thoroughly studied, but are instead based on more cursory evaluations prepared in response to Butte County's filings, we consider them more conjectural than the information presented in the preceding analyses. These indirect benefits may include the following:

- Flood protection provided by the Oroville Facilities has likely led to more development of the protected lands than would have occurred absent the project, increasing the assessed value and tax revenue associated with the protected area. CH2M HILL presents a case based on the Corp's estimate that the project provides flood protection for about 75,000 acres of urban, rural residential, and agricultural lands in Butte County (Corps, 2002, as cited in CH2M HILL, 2006). CH2M HILL (2006) estimates that if the acreage reached its full development potential and was assessed at the County's average assessed value of \$9,300 per acre, as opposed to a lower value of \$3,250 per acre that might be applied to lands subject to frequent flooding, it would increase the County's tax revenues by as much as \$598,000 annually. Other than this hypothetical example, there is no information on the record concerning the actual level of development that has occurred on the protected acreage. Given the rapid agricultural development that occurred along the Feather River floodway after closure of the dam (Corps, 2002, as cited in CH2M HILL, 2006), it is likely that the land has a lower assessed value than the \$9,300 county average for developed parcels, and thus would produce less than \$598,000 in additional tax revenue annually. In its comments on the draft EIS, Butte County reiterated the County's position that the Oroville Facilities do not provide any

protection from routine flooding in the County, but instead affords such protection only to downstream counties.

- TCW Economics (2006) suggested that the reliable water supply provided by the Oroville Facilities may have been a contributing factor in the increased rice production in the county since the project was built (TCW Economics, 2006), which may have increased the assessed value and tax revenue associated with agricultural lands devoted to rice production. FMY Associates, in a report filed with the Commission in June 2006 (2006b) and in its comments on the draft EIS, noted that the rice farmers in the area have water rights senior to the Oroville Facilities, which indicates that the rice farmers would have an equally or even more reliable water supply if the project had not been built, and therefore any increased assessed value would not be attributable to the project.
- One of the studies commissioned as part of relicensing (Harza/EDAW Team and DWR, 2004) found a positive and statistically significant relationship between property values and proximity to Lake Oroville. Thus, Lake Oroville is an amenity that increases the average value of properties nearer the lake compared to properties farther from the lake. Based on these study results, TCW Economics (2006) presumes that Lake Oroville was an important factor in the development of several large residential areas near the lake, and concludes that enhanced property values have contributed to greater property tax revenues to Butte County and other local taxing entities. FMY Associates, in a report filed with the Commission in June 2006 (2006b) and in its comments on the draft EIS, points out that the same Harza/EDAW Team and DWR study also shows that countywide, real estate values have grown little, lagging behind the growth in real estate values in other counties in California.

Given all the information that we have considered in our analysis, we conclude that construction and continued operation of the Oroville Facilities resulted in an on-going loss of tax revenue associated with the Big Bend Project that has not been offset by any project-related gains in Butte County's annual property tax revenues.

Power Allocation

As we describe in section 1.2, *Need for Power*, the primary operating function of the Oroville Facilities power plants is to provide electricity to State Water Project pumps that move water through the State Water Project system. None of the power is made available in the project vicinity. DWR does not propose to change this allocation under a new license. In its March 30, 2006, filing with the Commission, Butte County recommends that the Commission include a license article in any new license for the project that would require DWR to make available 235 million kilowatt-hours (kWh) of firm power and associated energy annually for sale to Butte County or to entities designated by Butte County to receive such power and energy on its behalf.

In its May 26, 2006, filing with the Commission, DWR states its opposition to the county's recommendation (DWR, 2006c). SWC and Metropolitan state a similar position in their May 26, 2006, joint filing (SWC and Metropolitan, 2006).

Staff Analysis

Butte County states that providing the County with an allocation of low cost power from the project would help mitigate for "the long-term adverse impacts of this Project on the community. A power allocation would also assure that one of the poorest communities in the State is finally able to enjoy some of the hundreds of millions of dollars in annual benefits that this Project provides to DWR and others." Butte County cites its Socioeconomic Impacts Report (FMY Associates, Inc., 2006) estimate that local residents lose annual savings of \$30.1 million each year purchasing power from outside the area instead of being able to purchase low cost power from the project. FMY Associates' estimate relies on

the assumption that if low cost power had been made available locally from the outset, then “significant economic development would have occurred.” Given that assumption, the estimate is based on the difference between the wholesale cost of power for the California Independent System Operator from 2002 through 2004 (\$0.0496/kWh) and DWR’s cost of producing power at the Oroville Facilities (\$0.0182), times the number of residential units in the county (85,789), times the average total demand (residential, commercial and industrial loads) for power per residential unit (11,203 kWh) in more developed areas. Using a multiplier of 3.0, FMY Associates estimates that this loss of savings of \$30.1 million annually equals a total annual loss of more than \$90 million annually to the local economy, or more than \$4.5 billion over a 50-year license period.

In its evaluation, CH2M HILL (2006) points out that FMY Associates’ estimate of the economic development that might have taken place if low-cost power had been available from the outset likely overstates the potential effect of lower energy rates. CH2M HILL cites census data indicating that across a wide range of industries, including service industries, the purchase of electricity is a small part of total operating expenses (U.S. Census Bureau, 2002 as cited by CH2M HILL, 2006). The census figures indicate that in manufacturing industries, the purchase of electricity accounts for an average 1.3 percent of costs, which is greatly overshadowed by the cost of materials (67 percent) and labor (24 percent). In the services sector, the purchase of utilities, including electricity, ranges from less than 1 percent to a high of 4.7 percent for accommodation and food services. In contrast, labor accounts for 41.3 to 56.4 percent of costs in trucking, professional services, and accommodation and food services. We conclude that the availability of lower cost power would likely not have led to the amount of development cited in the County’s support for a low-cost power allocation.

FMY Associates provides another estimate of economic losses due to the absence of low-cost power, using most of the same assumptions described above but using a PG&E average demand figure of 4,553 kWh per residential unit per year. This produces an estimate of approximately \$12.2 million in annual losses as a direct result of county residents paying higher electricity rates than they would pay if lower cost power were made available from the project. Using a multiplier of 3.0, FMY Associates estimates a direct and indirect loss to the community of \$36.7 million annually, or \$1.8 billion over a 50-year license period. We conclude that this method likely still overestimates the potential savings to county residents associated with low-cost project power, since it assumes that the power would be provided at cost, and there is no basis for that assumption.

DWR, in its May 26, 2006, filing, states that the County’s recommendation for a low-cost power allocation should be rejected because it would be contrary to established Commission policy, outside the Commission’s authority, and contrary to state law, as well as being infeasible because DWR and the State Water Project are not structured to provide retail-level energy service. SWC and Metropolitan make some of the same points, and estimate that the total cost to DWR of providing energy associated with such a power allocation would be approximately \$350 million over a 50-year license term, not including associated reductions in dependable capacity and ancillary service values. SWC and Metropolitan do not indicate how they calculated the \$350 million figure.

Regardless of the analyses offered by the parties, the allocation of project power is a matter beyond the scope of this EIS.

License Implementation

In its many filings during this relicensing proceeding, Butte County has stated that DWR has not adequately assessed the socioeconomic impacts of the project on the County. DWR has not proposed any additional socioeconomic studies to be undertaken during the term of a new license.

Butte County recommends that DWR prepare a socioeconomic measures implementation report in consultation with Butte County and a recreation measures implementation report in consultation with DFG, DPR, Butte County, the City of Oroville, and the Oroville Recreation Advisory Committee

(collectively, the Consulted Parties) every 10 years following issuance of a new license. The implementation reports would describe the status of the socioeconomic and recreation measures undertaken under the license (Butte County, 2006b).

In its May 26, 2006, filing with the Commission, DWR states its opposition to the county's recommendation (DWR, 2006c). SWC and Metropolitan state a similar position in their May 26, 2006, joint filing (SWC and Metropolitan, 2006).

Staff Analysis

Butte County states that the Commission should establish periodic license reopeners to assess compliance with the license, to determine whether changed conditions require reconsideration of license conditions, and to assure that the public interest continues to be served (Butte County, 2006b).

In their comments, SWC and Metropolitan state that this provision is unnecessary for three reasons: (1) Butte County has not shown that the project has been or is likely to be a socioeconomic detriment to the County over the term of a new license; (2) there is no need for a reopener in this case because the Commission does not require licensees to provide mitigation for socioeconomic impacts; and (3) the Commission is always able to reopen a new license consistent with the standard reopener clause included in all new licenses (SWC and Metropolitan, 2006). DWR also notes the standard reopener clause, stating that the clause makes the County's recommendation unnecessary.

It is not clear what the reports would contain, and we do not see a clear indication of why the data or reports are needed. Furthermore, if changes are needed during the term of the license, the standard reopener clause would be available.

Net Fiscal Effects

The foregoing analyses cover the County's estimates of project-related costs and the estimates of other parties, including the staff. As summarized in table 69, the County's total project-related cost estimate is by far the highest at \$5.3 million annually, while the DWR and staff estimates, including input from TCW Economics (2006), range from \$1.5 to \$1.7 million.

As a final aspect of our analysis, we compared these cost estimates to project-related tax revenue estimates. As shown in table 69, DWR's estimate of project-related tax revenue accruing to the County equals \$969,300 annually, including sales, lodging, property, and other tax revenue associated with visitor spending, project O&M spending, and indirect growth-related impacts. The staff's estimate equals \$1,128,400, because it also includes \$191,000 in annual payments made by DWR to the County for patrol services on the Thermalito afterbay and includes a downward adjustment in tax revenue associated with O&M spending.

Given these revenue estimates, the County's estimate of net fiscal impacts is -\$4.8 million, an amount equaling 1.7 percent of Butte County's fiscal year 2002 to 2003 budget, and 19 percent of its General Fund budget for that year. By contrast, our staff estimate of the net fiscal deficit (-\$573,800) and DWR's revised estimate of net fiscal impacts (-\$759,720 annually) would equal about 0.2 to 0.3 percent of Butte County's fiscal year 2002 to 2003 total budget and 2 to 3 percent of its General Fund budget for that year. These estimates do not take account of the indirect tax revenue estimates discussed above in the section about *Payments in Lieu of Taxes*, which include a possible net tax revenue increase of \$598,000 associated with the land and developments protected from flooding by the project and a possible positive but unquantified change in tax revenue associated with the increased value of property near Lake Oroville. We note that the tax revenue estimates that we do not include in our estimate are based on less rigorous study than the other information on the record, and do not include any assessment of associated costs to the County.

Effects on Minority and Low-income Communities

The demographic information presented in section 3.3.10.1, *Affected Environment*, indicates that the county has a higher percentage of people living below the poverty level than the regional, state, and national averages, and that county residents receive less of their income from wages and salaries and more of their income from government transfer payments than the California average. The increased spending associated with the Settlement Agreement, by creating additional employment opportunities, would likely have a positive effect on low-income persons in the county. Similarly, the increased employment opportunities and increased spending in the Oroville area would likely have a positive effect on the American Indians/Alaska Natives in that community.

3.3.10.3 Cumulative Effects

Construction of the Oroville Facilities led to the direct loss of tax revenue to Butte County through the loss of property taxes previously paid on project lands and the privately owned Big Bend Project. Continued operation of the project by a state entity that does not pay taxes continues that direct effect, although the direct effect may be offset by project-related indirect increases in tax revenues. The absence of tax or other payments to the county adds to the fiscal hardship of the county, which has been designated by the state of California as a “Distressed County” three times since 1990.

The Settlement Agreement does include a number of measures that would provide funding to other parties; these measures are not proposed for inclusion in the FERC license. They include, for example, funding for 5.5 full-time equivalent positions for DFG’s management of the OWA (Measure B111) and \$61.3 million for the Project Supplemental Benefits Fund, which would be used to fund projects selected by a steering committee and would be administered by the City of Oroville (Measure B100, *Project Supplemental Benefits Fund*). The Project Supplemental Benefits Fund was designed to allow the benefits of the Oroville Facilities to be extended into the local communities in the vicinity of the project, such as by funding improvements at Riverbend Park and other facilities outside the project boundary, and working to secure grants and other matching funds to augment DWR’s contribution. These measures, if implemented, would create employment opportunities for local residents.

3.3.10.4 Unavoidable Adverse Effects

Any negative effects on Butte County’s fiscal condition would likely continue.

3.4 NO-ACTION ALTERNATIVE

Under the No-action Alternative, DWR would continue to operate the Oroville Facilities under the terms and conditions of the current license. The environmental measures proposed in the Settlement Agreement would not be implemented, although the existing mitigation and enhancement measures (refer to sections 3.3.3.1, *Affected Environment*, in *Aquatic Resources*, 3.3.4.1, *Affected Environment*, in *Terrestrial Resources*, and 3.3.6.1, *Affected Environment*, in *Recreational Resources*) would continue. Operation of the project under the current license would essentially maintain the natural resources of the Feather River basin in a “status quo” condition with some potential for enhancements in recreational resources as facilities are maintained or improved). The measures associated with the Bald Eagle Nesting sites would still be implemented and some fuel load management actions would still occur, although the benefits of the coordinated approach to fuel load management between various agencies may not occur.

3.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Continued operation of the existing project under any of the alternatives considered, would continue to commit the lands and waters previously developed for energy production. This commitment of resources would not necessarily be irreversible or irretrievable because removal of the project dams

and restoration of disturbed areas could return the project areas to near pre-project conditions. However, given the substantial costs and the loss of energy, recreational, and socioeconomic benefits, removal of the project is unlikely in the foreseeable future.

3.6 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Under all alternatives considered, the project would continue to generate power for DWR's customers and provide recreational and socioeconomic benefits for the duration of any new license. The Proposed Action and staff recommended alternative would provide significant long-term protection and enhancement of biological, cultural, and recreational resources in the Feather River Basin, although energy generation at the project would be somewhat reduced.

COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION
FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE OROVILLE FACILITIES PROJECT
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Section 4
Developmental Analysis
Pages 351 to 358
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4.0 DEVELOPMENTAL ANALYSIS

In this section, we analyze the project’s use of the water resources of the Feather River Basin to generate power, estimate the economic benefits of the Oroville Facilities, and estimate the cost of various environmental measures and the effects of these measures on project operations.

4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT

4.1.1 Economic Assumptions

Under its approach to evaluating the economics of hydropower projects, as articulated in Mead Corporation, Publishing Paper Division (72 FERC ¶61,027, July 13, 1995), the Commission employs an analysis that uses current costs to compare the costs of the project and likely alternative power with no consideration for potential future inflation, escalation, or deflation beyond the license issuance date. The Commission’s economic analysis provides a general estimate of the potential power benefits and costs of a project and reasonable alternatives to project-generated power. The estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license.

For our economic analysis of alternatives, we used the assumptions, values, and sources shown in table 70. DWR provided information updating the assumptions and/or costs in responses to additional information requests in August 2005 (DWR, 2005i).

Table 70. Staff assumptions for economic analysis of the Oroville Facilities.

Assumption	Value	Source
Base year for costs and benefits	2006	Staff
On-peak power value (mills/kWh) ^a	\$35.35	DWR
Off-peak power value (mills/kWh) ^a	\$27.76	DWR
Pump-back power cost (mills/kWh)	\$24.14	DWR
Dependable capacity value (\$/MW)	\$51,600	CEC, 2003 and adjusted by staff
Ancillary benefits value (\$/MW)	\$10,436	Computed from DWR
Period of analysis	30 years	Staff
Term of financing	20 years	Staff
Federal and state tax rate	0 percent	DWR
Local tax rate	0 percent	DWR
Insurance rate ^b	Included in O&M costs	Staff
Discount rate	6.0 percent	DWR
Long-term bond interest rate	6.0 percent	DWR

^a We computed peak and off peak energy values in a manner consistent with DWR clarification no. 3 to our additional information request (DWR, 2005i).

^b DWR did not separate insurance costs from other operations and maintenance costs.

4.1.2 Current Annual Costs and Future Capital Costs for the Oroville Facilities under the No-action Alternative

Total annualized current costs for the No-action Alternative amount to \$71,955,100, as table 71 shows.

Table 71. Summary of current annual costs and future capital costs for DWR's Oroville Facilities under the No-action Alternative. (Source: DWR, 2005i)

Cost	Capital and One-Time Costs	Annual Costs, Including O&M	Total Annualized Costs
Temperature criteria/targets	\$12,130,000	\$80,000	\$961,200
Natural salmonid spawning and rearing habitat	\$0	\$556,000	\$556,000
Salmonid genetics	\$0	\$0	\$0
Feather River Fish Hatchery	\$0	\$1,625,000	\$1,625,000
Lower Feather river fishery	\$0	\$985,000	\$985,000
Fishery management	\$0	\$234,000	\$234,000
Thermalito afterbay terrestrial habitat	\$8,000	\$73,000	\$73,600
OWA terrestrial	\$0	\$10,000	\$10,000
Vegetation and wildlife management	\$12,000	\$27,000	\$27,900
Water quality	\$0	\$50,000	\$50,000
Recreation—General including trails, restrooms, wildfire evacuation plan, law enforcement, final Recreation Management Plan, and monitoring ^a	\$244,000	\$210,000	\$227,700
Bidwell Canyon boat ramp/campground/day-use area/marina	\$0	\$550,000	\$550,000
Loafer Creek boat ramp /day-use area/campground/group campground/equestrian campground ^a	\$10,000	\$675,000	\$675,700
Lime Saddle boat ramp/day-use area/campground/marina	\$0	\$425,000	\$425,000
Spillway boat ramp/day-use area ^a	\$164,000	\$575,000	\$586,900
Enterprise boat ramp	\$0	\$125,000	\$125,000
Vinton Gulch car-top boat ramp	\$0	\$30,000	\$30,000
Dark Canyon car-top boat ramp	\$0	\$40,000	\$40,000
Foreman Creek car-top boat ramp	\$0	\$170,000	\$170,000
Stringtown car-top boat ramp	\$0	\$50,000	\$50,000
Lake Oroville Visitor Center	\$0	\$340,000	\$340,000
Saddle dam equestrian facilities and trailhead access ^a	\$38,000	\$25,000	\$27,800
Bloomer area boat-in campground	\$0	\$40,000	\$40,000

Cost	Capital and One-Time Costs	Annual Costs, Including O&M	Total Annualized Costs
Goat Ranch boat-in campground	\$0	\$40,000	\$40,000
Foreman Creek boat-in campground	\$0	\$40,000	\$40,000
Craig Saddle boat-in campground	\$0	\$40,000	\$40,000
Oroville Dam Overlook day-use area ^a	\$0	\$25,000	\$25,000
Floating Campsites and Floating Restrooms	\$0	\$385,000	\$385,000
Diversion pool day-use area (Northwest side)	\$0	\$25,000	\$25,000
Lakeland Boulevard ^a	\$71,000	\$10,000	\$15,200
Recreation—low flow channel/Feather River Fish Hatchery landscape improvements ^a	\$30,000	\$25,000	\$27,200
North Thermalito forebay	\$0	\$475,000	\$475,000
South Thermalito forebay	\$0	\$80,000	\$80,000
Thermalito afterbay—Wilbur Road boat ramp ^a	\$7,000	\$25,000	\$25,500
Thermalito afterbay—Larkin Road car-top boat ramp	\$0	\$25,000	\$25,000
Thermalito afterbay—Monument Hill boat ramp/day-use area	\$0	\$100,000	\$100,000
Model aircraft flying area ^a	\$27,000	\$25,000	\$27,000
OWA—Thermalito afterbay outlet boat ramp/day-use area campground	\$0	\$25,000	\$25,000
OWA dispersed river and pond access sites	\$0	\$10,000	\$10,000
Land use, management, and aesthetics	\$0	\$40,000	\$40,000
Annual estimate of future recreation capital improvements and replacements	\$0	\$800,000	\$800,000
Subtotal current environmental and recreational costs	\$12,741,000	\$9,090,000	\$10,015,700
O&M cost		\$26,431,000	\$26,431,000
FERC fees		Included in O&M costs	
Total original net investment	\$231,871,326		\$16,845,200
Relicensing process costs	\$65,000,000		\$4,722,200
Future plant costs and replacements	\$62,313,391		\$4,527,000
Subtotal			\$62,541,100
Cost of pump-back energy		\$9,414,000	\$9,414,000
Total annualized costs			\$71,955,100

^a Interim recreational projects implemented prior to receiving a potential new license. Note items listed in section 3.1.2 of DWR (2005a) did not correlate well with the measures listed for the No-action Alternative in section 6.6.2 of DWR (2005a).

4.2 COST OF ENVIRONMENTAL MEASURES

As proposed under the Settlement Agreement and as recommended by staff, the Oroville Facilities would experience reduced generation and incur higher annual O&M costs and capital costs associated with the implementation of environmental measures. No effect on dependable capacity is anticipated.

4.2.1 Cost of Environmental Measures for Oroville Facilities

DWR provided costs for environmental measures in current dollars. Costs are taken from DWR's additional information request response, the Settlement Agreement Recreation Plan filed in March 2006, and a cost update to the additional information request response reflecting the Settlement Agreement submitted on June 28, 2006 (DWR, 2006d). Where cost information was either missing or incomplete, staff estimated costs. Table 72 summarizes the costs by major resource area for both the Proposed Action and Proposed Action with staff modifications. Our detailed costs are provided in appendix B.

4.2.2 Effect of Proposed Operations on Oroville Facilities

The minimum instream flows in the low flow channel under Proposed Article 108, *Flow/Temperature to Support Anadromous Fish*, are higher than currently required. These higher flows would reduce the amount of flow available for generation at the Thermalito powerhouse. Additional effects on generation, which have been preliminarily quantified by DWR, could occur if additional flows (up to 1,500 cfs) are ultimately needed to meet temperature objectives. The minimum instream flow schedule is as follows:

- September 9–March 31: 800 cfs
- April 1–September 8: 700 cfs

DWR indicates that additional energy loss would occur owing to change in bypass flow and estimate the effect on gross energy generation would be 8,500MWh. An additional reduction of 35,000 MWh would result from flows needed for flow and temperature requirements identified in Proposed Articles A108.3 and A108.4. This results in a drop in gross energy generation from 2,708,000 MWh under the No-action Alternative to 2,664,500 MWh under the Proposed Action.

DWR also computed the effect on pump back energy, resulting in an estimated reduction in pump-back energy required under the Proposed Action compared to the No-action Alternative reduction of 1,450 MWh. The energy required for pump back operation would be reduced from 389,900 MWh under the No-action Alternative to 388,450 MWh under the Proposed Action. Staff does not recommend measures beyond the Proposed Action that would affect energy generation.

Table 72. Summary of annualized costs for measures included in the Proposed Action and Proposed Action with Staff Modifications for the Oroville Facilities. (Source: Staff)

Resource Area	Proposed Action			Proposed Action with Staff Modifications		
	Capital Cost	Annualized O&M Cost	Total Annualized Cost	Capital Cost	Annualized O&M Cost	Total Annualized Cost
Geology and soils	\$15,000	\$321,600	\$322,700	\$15,000	\$251,600	\$252,700
Water quality	\$26,000	\$247,700	\$249,600	\$26,000	\$247,700	\$249,600
Aquatic resources	\$86,360,000	\$1,001,200	\$5,404,000	\$86,185,000	\$983,700	\$5,379,200
Terrestrial resources	\$1,832,000	\$984,200	\$1,117,500	\$1,832,000	\$984,200	\$1,117,500
Recreation	\$77,890,000	\$1,535,900	\$4,404,600	\$77,920,000	\$1,330,900	\$4,201,800
Land use and aesthetics	\$750,000	\$35,000	\$89,500	\$761,000	\$35,700	\$91,000
Cultural	\$19,600,000	\$360,000	\$1,783,900	\$19,600,000	\$360,000	\$1,783,900
Socioeconomics	--	--	--	--	--	--
Total	\$186,473,000	\$4,485,600	\$13,371,800	\$186,339,000	\$4,193,800	\$13,075,700

^a Note that in its June 28, 2006, cost update, DWR combined several individual elements of various environmental measures. This required staff to estimate costs of individual measures and elements within certain individual measures both with respect to cash flow and implementation schedule.

4.3 COMPARISON OF ALTERNATIVES

Table 73 compares the power value, annual costs, and net benefits of the No-action Alternative, Proposed Action, and the Proposed Action with Staff Modifications for the Oroville Facilities. In section 5, *Comprehensive Development and Recommended Alternative*, we discuss our reasons for recommending the Proposed Action, as well as any staff modifications, and explain why we conclude the environmental benefits are worth these costs. The decrease in net benefits from 14.95 to 9.74 mills/kWh for the Proposed Action with Staff Modifications represents a decrease of 35.87 percent relative to the No-action Alternative. However, the Proposed Action with Staff Modifications has minimal effects on net benefits when compared to the Proposed Action because staff modifications result in only modest increases in project costs associated with new environmental measures.

Table 73. Summary of annual net benefits for the No-action, Proposed Action, and Proposed Action with Staff Modifications for the Oroville Facilities.
(Source: Staff)

	No Action	Proposed Action	Proposed Action With Staff Modifications
Dependable capacity (MW)	300.0	300.0	300.0
Value dependable capacity (\$)	15,480,000	15,480,000	15,480,000
Value ancillary benefits (\$)	5,218,000	5,218,000	5,218,000
Lost on-peak gross energy generation (MWh) ^a	--	35,873	35,873
Lost off peak gross energy generation (MWh) ^a	--	7,627	7,627
Total gross energy generation (MWh)	2,708,000	2,664,500	2,664,500
Annual energy value (\$)	91,734,000	90,254,000	90,254,000
Annual power value (\$)	112,432,000	110,952,000	110,952,000
Annual power value (mills/kWh)	41.52	41.64	41.64
Pump back energy requirements (MWh)	389,900	388,450	388,450
Annual cost pump back energy (\$)	9,414,000	9,379,000	9,379,000
Annualized cost of plant and current environmental measures(\$)	62,541,100	62,541,100	62,541,100
Annualized cost of new environmental measures(\$)	0	13,371,800	13,075,700
Annualized cost (\$)	71,955,100	85,291,900	84,995,800
Annual cost (mills/kWh)	\$26.57	\$32.01	\$31.90
Annual net benefit (\$)	40,476,900	25,660,100	25,956,200
Annual net benefit (mills/kWh)	14.95	9.63	9.74

^a DWR did not update the distribution of peak and off peak energy in its June 28, 2006, filing; however, we were able to solve for those values using the peak and off-peak energy values from table 70.

4.4 OTHER ECONOMIC CONSIDERATIONS

In addition to the cost evaluated in sections 4.2 and 4.3, DWR would incur costs associated with measures listed in appendix B of the Settlement Agreement that are not part of a potential Commission license. Costs associated with these measures are external to our developmental analysis.

4.5 EFFECT OF ALERNATIVES ON GREENHOUSE GASES

By producing hydroelectricity, the Oroville Facilities displaces the need for other power plants, primarily fossil-fueled facilities, to operate, thereby avoiding some power plant emissions and creating an environmental benefit. We summarize the effect of the project, off-peak pumping energy, and the overall net effect on carbon emission reduction in table 74.

Table 74. Summary of the effect of greenhouse gases on the No-action, Proposed Action, and Proposed Action with Staff Modifications for the Oroville Facilities
(Source: Staff)

	No Action	Proposed Action	Proposed Action with Staff Modifications
Oroville Facilities avoided Carbon emissions (metric tons/year) ^a	418,531	411,808	411,808
Generation source for off-peak pumping energy (metric tons/year) ^b	60,260	60,036	60,036
Net effect on avoided carbon emissions (metric tons/year) ^c	358,270	351,771	351,771

^a This row only accounts for avoided emissions due to hydro turbine generation. Avoided carbon emission estimates are based on a carbon intensity factor of 155 kilograms per MWh, which is consistent with Department of Energy values for the WECC region of the U.S. Estimates are obtained by multiplying the gross energy generation values in table 73 by the carbon intensity factor and converting from kilograms to metric tons.

^b This row accounts for emissions that would occur due to the generation source that would provide off-peak pumping energy. We assume that off-peak generation would have a carbon intensity factor of 155 kilograms per MWh. Estimates are obtained by multiplying the pump-back energy requirements in table 73 by the carbon intensity factor and converting kilograms to metric tons.

^c This row computes net avoided emissions and is equal to row 1 minus row 2.

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**Section 5
Staff's Conclusions
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5.0 STAFF'S CONCLUSIONS

5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Section 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When we review a proposed project, we equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Accordingly, any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

This section contains the basis for and a summary of our recommendations to the Commission for relicensing the Oroville Facilities. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review and evaluation of the Proposed Action and the No-action Alternative, we select the Staff Alternative (the Proposed Action as modified by staff), as the preferred alternative. We recommend this option because (1) issuance of a new hydropower license by the Commission would allow DWR to operate the project as an economically beneficial and dependable source of electrical energy for the State Water Project; (2) the 762-MW project would eliminate the need for an equivalent amount of fossil-fueled derived energy and capacity, which helps conserve these nonrenewable resources and limits atmospheric pollution; (3) the public benefits of this alternative would exceed those of the No-action Alternative; and (4) the recommended measures would protect and enhance fish, wildlife, and cultural resources and would improve socioeconomic conditions and recreational opportunities at the project. We also recommend that many of the plans and specific measures for implementation be filed with the Commission for approval. This would allow Commission staff to monitor compliance with the conditions of the license and review the result of many of the studies and measures to be implemented by DWR.

We recommend that most of the terms of the Settlement Agreement¹⁰² be made conditions of the license to be issued for the Oroville Facilities, although we do not recommend the following:

- Providing funding associated with the July 4th fireworks displays at Lake Oroville (part of Proposed Article 127, *Recreation Management Plan*)

The measure to provide funding for fireworks does not appear to have a clear project nexus. In addition, we do not analyze the proposed 50-year license term because the Commission will address this license term in any order issued for the project.

Some minor revisions we recommend to the terms of the Settlement Agreement include increasing monitoring activities or accelerating the implementation schedules. We also recommend that the proposed Recreation Management Plan be revised to include the development of trail maintenance standards, completion of a trail condition inventory before recommending any changes to existing trail use, and inclusion of trail users in the recreational monitoring program. Staff's revised and additional recommended measures are described below in section 5.1.1, *Staff Alternative*.

By letter dated March 29, 2006, the Forest Service filed preliminary terms and conditions, under section 4(e) of the FPA. Because the preliminary terms and conditions are consistent with some of the provisions of the Settlement Agreement, we discuss them in the context of our discussions of the Settlement Agreement measures throughout this EIS. We recommend including all preliminary section 4(e) conditions provided by the Forest Service.

¹⁰² The Settlement Agreement is available on the Commission's web site from the eLibrary feature at <http://www.ferc.gov/docs-filing/elibrary.asp>. Accession number 20060330-0215.

5.1.1 Staff Alternative (DWR's Proposal with Staff Modifications)

We evaluate numerous recommendations in the resource sections of this EIS and given the environmental benefits, we recommend including the following measures that DWR proposes in any license issued by the Commission for the project. The measures we recommend incorporate both minor and substantive changes to the proposed license articles (noted in italics).

1. Establish and convene an Ecological Committee to provide consultation, review (e.g., plans and monitoring reports), and advice for specific programs. (Proposed Article A100)
2. Coordinate implementation of and reporting on various aquatic and terrestrial programs in the Feather River. (Proposed Article A101)
3. Supplement gravel in the Feather River to increase suitable spawning habitat for Chinook salmon and steelhead. Monitor at least 10 of the 15 riffles every 5 years *on a rotating basis or after a high flow event. Develop a common definition of median size ranges of gravels to benefit Chinook salmon and steelhead.* (Proposed Article A102)
4. Modify Moe's Ditch, Hatchery Ditch, and five additional channels to improve spawning and rearing habitat primarily for steelhead and secondarily Chinook salmon. (Proposed Article A103)
5. Place LWD, boulders or other structures in the Feather River to create additional cover, edge, and channel complexity for salmonid rearing habitat. (Proposed Article A104)
6. Install 1 fish monitoring weir and 1 fish segregation weir to decrease genetic introgression between spring- and fall-run Chinook salmon and dedicate spawning habitat for spring-run Chinook salmon. (Proposed Article A105)
7. Identify potential actions and implement a phased program to enhance the riparian corridor and connect the Feather River to its floodplain, including how flood/pulse flows may contribute to floodplain values and benefit fish and wildlife species. *DWR's evaluation of potential actions should include the potential for flood/pulse flows to increase the risk of IHN transmission. Delineate specific on-the-ground actions, or provide a quantified benchmark by which success and compliance of the measures can be assessed.* (Proposed Article A106)
8. Develop and implement a Feather River Fish Hatchery Improvement Program that describes hatchery operations, disease management, genetics, fish tagging and reporting practices. (Proposed Article A107)
9. Meet specified water temperature objectives at the fish hatchery according to a two-phase approach. A set of water temperature objectives would be targets up until 10 years after license issuance or completion of facility modifications, after which they would become license requirements. Alternative water temperature objectives at least as restrictive as DWR's proposal could be developed as part of this program *and submitted to the Commission for approval.* (Proposed Article A107)
10. Install a water supply disinfection system at the fish hatchery if fish are passed upstream of the fish barrier dam. (Proposed Article A107)
11. Maintain at least 700 cfs in the low flow channel except from September 9 to March 31 when the requirement is 800 cfs to provide suitable conditions for spawning anadromous fish. *Obtain Commission approval prior to implementing any modification to instream flows.* (Proposed Article A108)

12. Maintain minimum instream flows in the high flow channel based on water year types (Proposed Article A108)
 - At or greater than 55 percent of normal runoff:
 - October 1 to March 31—1,700 cfs; and
 - April 1 to September 30—1,000 cfs.
 - At less than 55 percent of normal runoff:
 - October 1 to the end of February—1,200 cfs; and
 - March 1 to September 30—1,000 cfs.
13. Meet specified water temperature objectives in the low flow and high flow channels according to a two-phase approach. A set of water temperature objectives would be targets up until 10 years after license issuance or completion of facility modifications after which they would become license requirements. Alternative water temperature objectives that are at least as restrictive as DWR's proposal could be developed as part of this program *and submitted to the Commission for approval.* (Proposed Article A108)
14. Investigate and report on the feasibility of, including a recommended alternative and schedule for, modifying a valve at Oroville dam to provide water that improves water temperature for spawning, egg incubation rearing and holding habitat for anadromous fish. Implement facility modifications as approved by the Commission. (Proposed Article A108)
15. Install and monitor habitat structures in Lake Oroville to provide warmwater fish habitat. (Proposed Article A110)
16. Develop a cold water fishery improvement program that includes stocking 170,000 yearling salmon or equivalent, per year, and other management elements. (Proposed Article A111)
17. Develop a comprehensive water quality monitoring program to monitor organic and inorganic constituent and physical parameter levels that may affect beneficial uses for surface waters of the project. (Proposed Article A112)
18. Monitor bacteria levels at 8 public swimming areas and provide public notice and/or education, as appropriate. (Proposed Article A113)
19. Provide public education regarding the risk of consuming fish from project waters that may contain elevated levels of metals. (Proposed Article A114)
20. Develop a management plan for the OWA that sets management objectives for recreational use and managing terrestrial and aquatic resources. *Include Butte County as a consulted party.* (Proposed Article A115)
21. Implement conservation measures (e.g., restrict public access on land and waters) and prepare bald eagle management plans for newly located nests and update the existing plans. (Proposed Article A118)
22. Implement conservation measures (e.g., restrict means of access, pesticide use) to protect vernal pool invertebrate habitat, giant garter snake, valley elderberry longhorn beetle and red-legged frog. (Proposed Article A117, A119, A120, and A121)
23. Construct four additional brood ponds for waterfowl and giant garter snake habitat. Recharge and maintain water elevations in the new and existing brood ponds, at specified intervals, to protect these species from predation. (Proposed Article A122)

24. Provide 60 to 70 acres of upland food for upland game birds and wintering waterfowl within the Thermalito afterbay portion of the OWA. (Proposed Article A123)
25. Manage 240 acres for waterfowl nest cover within the Thermalito afterbay portion of the OWA. (Proposed Article A124)
26. Install and maintain 100 wildlife nesting boxes in the OWA. (Proposed Article A125)
27. Develop an invasive plant management plan to reduce the populations of harmful plants. Include identification of locations, treatment methods, monitoring and reporting. (Proposed Article A126)
28. Implement the Recreation Monitoring Plan, *as modified by staff (see staff measure 31)*. (Proposed Article A127)
29. Continue to operate and maintain the following existing recreational developments (see section 3.3.6, *Recreational Resources*, for detailed descriptions) (Proposed Article A127):
 - Lake Oroville—developments at Lime Saddle, Goat Ranch, Bloomer Hill, Foreman Creek, Nelson Bar, Dark Canyon, Vinton Gulch, Craig Saddle, Lake Oroville scenic overlook, Enterprise, Stringtown, Loafer Creek, Bidwell Canyon, Spillway, Oroville dam, Lake Oroville Visitor Center (including interpretation and education program), floating campsites and restrooms.
 - Thermalito Complex—North Thermalito forebay, Thermalito diversion pool, South Thermalito forebay, Feather River day-use area, Feather River Fish Hatchery, Monument Hill, Thermalito afterbay, Wilbur Road, Larkin Road, and OWA unimproved boat launches.
 - Trails—90 miles of trails including the Dan Beebe, Roy Rodgers, Brad B. Freeman, Loafer Creek Loop, Potter’s Ravine, and Wyk Island trails.
30. Provide recreation improvements at Lake Oroville and Thermalito diversion pool within 10 years of license issuance as summarized in section 2.2.3 (table 6). *Include reconstruction of the boat-in campgrounds (Bloomer, Goat Ranch, and Craig Saddle) within the first 10-years of the license.* (Proposed Article A127)
31. *Include in the Recreation Management Plan a provision to (1) establish standards for maintaining developed recreation facilities, including trails; (2) conduct a trail condition inventory using the established standards developed for project trails prior to recommending changes, if necessary, to any trail use designation ; (3) monitor and report on trail condition throughout the license term; (4) expand the recreation monitoring program to include non-trail users to detect latent demand and unmet user needs related to trails; and (5) finalize the draft Comprehensive Non-Motorized Trails Program and include a detailed implementation schedule, after completion of a trail condition inventory, visitor use surveys, collection of trail use data and proposed feasibility investigations.* (revision to Proposed Article A127)
32. Revise and resubmit the draft HPMP for Commission approval. *Provide rationale for proposing to evaluate only 20 percent of the sites, provide for evaluating all sites within the fluctuation zone. Modify the appended table of archaeological and historic resources.*¹⁰³ (revision to Proposed Article A128)

¹⁰³ Include columns (1) indicating the site management recommendations and resource evaluation (National Register) status, and (2) a timetable for the completing resource evaluations.

33. *Close Foreman Creek to recreational use* until DWR develops a plan to protect cultural resources and install recreational facilities. *Develop the plan within 6 months of license issuance.* (revision to Proposed Article A129)
34. Continue to operate the project in accordance with rules and regulations of the Corps flood control purposes. (Proposed Article A130)
35. Plant vegetation to screen the project storage area below Oroville dam. (Proposed Article A132)

In addition to the applicant-proposed project-related environmental measures listed above, we recommend including the following staff-recommended environmental measures in any license issued for the project:

36. Prepare a fuel management plan for National Forest System lands within the project boundary.
37. Develop a plan to continue reseeded, as necessary, the downstream face of Oroville dam.
38. Prepare a biological evaluation of the effects of any proposed project construction activities on Forest Service special status species or their habitat.
39. Develop a threatened and endangered species implementation plan that would describe how DWR would comply with its proposed conservation measures and the terms and conditions contained in the FWS's biological opinion.

5.1.2 Rationale for Staff Recommendations

This section describes the rationale for some of our recommendations on measures that we conclude should be included as conditions of any license issued for the project as well as any measures that we do not recommend as license conditions. This section is arranged by major resource topic, and within each topic we provide our rationale for recommending or not recommending specific measures. In general, even though we recommend settlement measures with specific dollar limitations (i.e., Riparian and Floodplain Improvement Program), it is important for all entities involved to know that we consider the licensees' obligation is to complete the measures required by license articles, in the absence of authorization from the Commission to the contrary. Dollar figures agreed to by the parties are not absolute limitations.

5.1.2.1 Geology and Soils

The goal of the Settlement Agreement measures related to this resource area are intended to enhance the riparian corridor and reconnect the Feather River to its floodplain to improve terrestrial and anadromous fish habitat. We discuss the DWR's proposed Lower Feather River Habitat Improvement Plan and Riparian and Floodplain Improvement Program in this section.

Lower Feather River Habitat Improvement Plan (Proposed Article A101)

DWR proposes to develop and file a plan with the Commission that includes an overall strategy for implementing, monitoring and reporting on multiple resource programs that would be implemented in the Feather River.

Altered flows in the Feather River have reduced riparian vegetation, and restricted natural geomorphologic processes resulting in degraded channel conditions that directly affect aquatic and

terrestrial habitat availability and suitability. There are nine different programs¹⁰⁴ where projects would be implemented within and adjacent to the Feather River channel to achieve improved habitat conditions.

We recommend including this plan because it would provide the following benefits: (1) a framework to ensure actions under nine different programs are scheduled and implemented in an interdisciplinary and synergistic manner within the Feather River, (2) take advantage of economies of scale for monitoring efforts (e.g., avoid individual resource monitoring efforts, where practical), and (3) provide one consolidated report for many measures. The greatest improvement would occur if efforts under the nine programs were coordinated and monitoring results were evaluated in a comprehensive manner to ensure that actions under one program are not creating unintended effects on another program. We note that this consolidated report, including recommended changes, would be provided to the Commission once every 5 years for information only and we consider this is appropriate since the specific proposed measures covered by this plan specify that DWR would secure Commission approval, as required, before implementing any changes to a project plan or operation.

We estimate the total annualized cost of this measure would be about \$2,900. This is a reasonable cost to ensure that nine different programs are coordinated to provide overall habitat benefits in the Feather River.

Riparian and Floodplain Improvement Program (Proposed Article A106)

DWR proposes to initiate a 4-phase program to connect portions of the Feather River to its floodplain within the OWA. DWR proposes to do a screening level analysis of potential projects, evaluate alternative projects, and implement two selected projects within 8 and 25 years, respectively, of license issuance.

The Feather River floodplain provides an important interface where riparian vegetation provides habitat for aquatic and terrestrial species. Based on our review of DWR's study results we determined the Oroville Facilities disrupt natural geomorphic processes involving the floodplain by blocking sediment transport and altering flows,¹⁰⁵ which has negatively affected riparian vegetation along the Feather River and in the OWA. Dredger piles cover about 615 acres and these areas are all located within the floodplain of the Feather River and provide significant gravel resources for projects throughout the surrounding area in the county, including the Oroville Facilities. We also note that study conclusions repeatedly note the positive role of bankfull flows in creating conditions conducive for cottonwood recruitment, maintaining channel complexity, recruiting LWD, and enhancing spawning and rearing habitat.

We recommend including this program because DWR would investigate potential actions and implement projects, including implementing flood/pulse flows, to encourage geomorphic processes that are not occurring at the present time. Activities undertaken as part of this program would enhance the Feather River riparian corridor by providing conditions where riparian vegetation could thrive and improve fish habitat by creating high flow refugia for juvenile salmonids. DWR's evaluation of potential actions should include the potential for flood/pulse flows to increase the risk of transmitting the fish disease IHN.

¹⁰⁴ These programs include: (1) Gravel Supplementation and Improvement Program; (2) Channel Improvement Program; (3) Structural Habitat Supplementation and Improvement Program; (4) Fish Weir Program; (5) Riparian and Floodplain Improvement Program; (6) Feather River Fish Hatchery Improvement Program; (7) Comprehensive Water Quality Monitoring Program; (8) Oroville Wildlife Area Management Plan; and (9) Instream Flow and Temperature Improvement for Anadromous Fish.

¹⁰⁵ The project has changed high flow frequency, altered peak flows, decreased winter flows, increased summer flows, and changed ramping rates.

We conclude that the degraded riparian corridor (e.g., steep, cobble banks that inhibit vegetation establishment and narrow riparian corridor width), lack of cover, and lack of connection between the Feather River and its floodplain contribute to low habitat suitability. In the draft EIS, we recommended that DWR implement 50 percent of selected projects within 10 years of license issuance and the remaining within 12 years. Based on the draft EIS comments, we now agree with DWR that more time is needed, through an adaptive management approach, to gain a full understanding of the relationship of the selected projects with all components of the Lower River Habitat Improvement Program to ensure the selected projects' long-term success. Therefore, we recommend the plan for a four-phase program to enhance riparian and other floodplain habitats as outlined in proposed article A106. However, we note that current floodplain conditions could remain degraded in the short-term because, even after the measure is carried out, there would be a lag time between project implementation and the time required for riparian vegetation to mature. We also recommend DWR delineate specific, on-the-ground actions, or provide a quantified benchmark by which success and compliance of the measure can be assessed.

We estimate the total annualized cost of DWR's proposed measure would be about \$269,100 and would improve the riparian corridor once the measures are in place.

Recommendations of Others

The Anglers Committee et al. recommend DWR study the effects of silt deposition and remove silt from locations in Lake Oroville. Based on bathymetric mapping and estimated rate of sediment deposition we determined that about 470 acre-feet of sediment would accumulate annually in the reservoir. Given that Oroville Reservoir has approximately 3.5 million acre-feet of useable storage, an annual average displacement of 470 acre-feet of water would result in a de-minimus reduction in production.

As reservoir elevations decrease, the former riverbed re-emerges. While the character of that riverbed is oftentimes heavily altered by the sediment deposited on it during times of inundation, there is no feasible way to alleviate this phenomenon. Further, as the river migrates through the deposited sediment it sorts the sediment, establishing an equilibrium channel for the sediment load and discharge available at that time. Based on this information we determined that there are no perceptible adverse effects on navigation resulting from silt deposition.

Even if silt removal could be accomplished economically, the potential exists that removal could increase the incidence of IHN and other fish diseases by releasing pathogens stored in the sediments.

Considering the minimal beneficial effects silt removal would have on power production and navigation and the potential adverse effects on fisheries, we do not recommend including this measure in the project license.

5.1.2.2 Water Quality

The goal of the Settlement Agreement measures related to this resource area are intended to protect and improve water quality at the project and provide for public safety by collecting water quality data and using it to inform decisions to implement management actions. We discuss the DWR's proposed Comprehensive Water Quality Monitoring Program (Proposed Article A112), Monitoring Bacteria Levels and Public Education (Proposed Article A113) and Public Education Regarding Risks of Fish Consumption (Proposed Article A114) in this section.

These proposed measures relate to investigating and responding to water quality issues. DWR proposes to develop a program consisting of plans to monitor water chemistry, fish tissue, petroleum product concentrations, water temperatures, bioassays, and aquatic macroinvertebrate monitoring (Proposed Article 111). DWR also proposes monitoring and reporting on bacteria at recreation sites and, if necessary, providing public education and posting notices of unsafe conditions (Proposed Article 113).

Finally, DWR proposes to provide public education regarding the risks of consuming fish taken from project waters (Proposed Article 114).

Water quality at the project waters is influenced by project operations (e.g., releases, water level management) and project recreational use. Our review of DWR's water quality data, detailed in section 3.3.2.2, *Water Quality*, indicates that project waters typically comply with the applicable federal and state standards for most water quality parameters. However, several water samples exceeded the Basin Plan objectives in Lake Oroville and in the Feather River downstream of the dam. Additionally, results from the DWR fish tissue sampling study indicate that metal concentrations in tissue samples are occasionally elevated based on comparison to recommended guidelines from various regulatory agencies. DWR study results from the summer recreation site monitoring effort revealed that several recreation sites in Lake Oroville and the Thermalito Complex had elevated bacteria densities requiring occasional beach closures.

Although other water quality parameters appear to be within acceptable levels, it would be reasonable to implement a water quality monitoring program that includes the parameters that relate to the designated beneficial uses of the project waters because DWR proposes to develop new recreational facilities, modify existing facilities, change the minimum instream flows, possibly modify a river outlet, and institute water temperature objectives at the fish hatchery, low flow and high flow channels. These actions could potentially affect water quality. A comprehensive water quality monitoring plan would provide information to detect future problems that may develop over the term of the license. This information would be used to determine whether the project is a contributing factor to any future decrease in water quality and any appropriate future measures that should be taken. We recommend including these water quality monitoring measures in the project license in order to provide DWR and the Ecological Committee with sufficient data to adaptively manage project-related operations and programs to protect water quality for public health and beneficial uses.

We estimate the total annualized cost of these measures would be about \$249,600. Considering the importance of public health and safety, this would be a reasonable cost to monitor water quality at the project.

Recommendations of Others

We do not recommend any additional measures to address the Anglers Committee et al. concern for elevated bacteria levels at the Bedrock Park swimming area. We determined this condition is caused by the dike, constructed by the Feather River Recreation District, that isolates this area from the flowing water of the Feather River and is therefore not an effect of the project. The dike was installed by the Feather River Parks and Recreation Department to create the swimming area. Water enters the swimming area from the downstream end, but the dike blocks the swimming area from the flowing action of the river.

We do not include Butte County's recommendation that DWR investigate options to circulate water at Thermalito forebay to improve water quality at the swimming area. Public safety concerns related to water quality would be addressed by implementing the proposed programs: Comprehensive Water Quality Monitoring Program (Proposed Article A112), Monitoring Bacteria Levels and Public Education (Proposed Article A113), and Public Education Regarding Risks of Fish Consumption (Proposed Article A114). Water quality data would provide the basis for taking management actions to prevent public exposure to elevated bacteria and/or heavy metal levels.

5.1.2.3 Aquatic Resources

The primary purpose of the aquatic measures is to increase populations of ESA-listed species, spring-run Chinook salmon and steelhead, in the Feather River. These measures are particularly important because the Feather River is designated critical habitat for these species. We determined that many factors affect anadromous fish populations including, available and suitable habitat, competition for

spawning habitat, genetic introgression, disease, and pre-spawn mortality. Individual and overlapping measures are included to address these effects. Secondly the measures provide for improving warm and cold water fish populations at Lake Oroville, which has a recreationally important fishery. In this section we discuss DWR's proposed Gravel Supplementation and Improvement Program (Proposed Article A102), Channel Improvement Program (Proposed Article A103), Fish Weir Program (Proposed Article A105), Feather River Fish Hatchery Improvement Program (Proposed Article A107), Flow/Temperature to Support Anadromous Fish (Proposed Article A108), Lake Oroville Warm Water Fishery Habitat Improvement Program (Proposed Article A110), and Lake Oroville Cold Water Fishery Improvement Program (Proposed Article A111).

Gravel Supplementation and Improvement Program (Proposed Article A102)

DWR proposes to develop and file a plan to manage gravel in the Feather River throughout the term of the license. Actions under this program would include placing gravel, replacing, or rehabilitating existing riffle habitat, monitoring, and developing a gravel budget.

Based on our review of DWR's study results we determined that spawning habitat has deteriorated because of a lack of suitable spawning gravel. Measures under this program are intended to increase and enhance suitable spawning habitat for anadromous fish. Gravel supplementation in the low flow and high flow channels would increase and enhance anadromous spawning habitat and ensure that it remains suitable and available over the term of the license. As proposed, placing a minimum of 8,300 cubic yards of gravel over 5 years would improve habitat over the current conditions. As proposed, the Licensee would randomly monitor and maintain a minimum of 10 of the 15 riffles at 5-year intervals. In the draft EIS, we recommended that, if certain criteria were not met, DWR should monitor and assess all 15 riffles. However, based on comments on the draft EIS, we now understand that DWR is proposing to randomly monitor at least 10 of the 15 riffles on a rotating basis, which addresses our concern regarding monitoring of all sites.

Gravel retention and transport will be water year and site specific (e.g., side channels versus the main channel). Therefore, we recommend that DWR monitor the sites if a high flow event occurs in addition to the proposed schedule.¹⁰⁶ We also recommend that a common definition of the "median size range" of optimum spawning gravel for Chinook and steelhead be developed in consultation with FWS, DFG, and NMFS (as is proposed for the stockpiling of spawning gravel under this article). These modifications would ensure that the program creates and maintains additional spawning habitat that provide timely and continuous anadromous fish benefits.

Gravel supplementation may take place in both channels; however, DWR proposes to prepare a gravel budget for only the low flow channel. We expect gravel would be retained in the high flow channel, but gravel retention in the low flow channel is less certain because it is somewhat more confined than the high-flow channel. Accordingly, the Proposed Action would provide a sufficient level of detail to enable decision-makers to make informed decisions about gravel supplementation and site rehabilitation frequency.

We estimate the total annualized cost of DWR's proposed measure, and this measure as modified by staff, would be about \$800,800. Gravel supplementation in the high and low flow channels and the associated benefits to populations of Chinook salmon and steelhead are worth this additional cost.

Channel Improvement Program (Proposed Article A103)

DWR proposes to develop a plan to improve at least 3,260 linear feet of side channels for spawning and rearing anadromous fish habitat within 10 years of license issuance.

¹⁰⁶ The 5-year monitoring period would restart if a high flow event were to occur.

Anadromous fish returning to spawn in the Feather River drainage currently cannot reach spawning habitat above the fish barrier dam and Oroville dam. Recent observations indicate steelhead are using existing side channels as primary spawning and rearing areas. We recommend including this measure primarily because it would create channels for steelhead where base flows and other environmental conditions improve existing habitat and secondarily because it would also improve habitat for spring run Chinook salmon.

We estimate the total annualized cost of this measure would be about \$302,800. We consider the cost of this measure to be worth the benefits that would accrue to anadromous fish, including endangered species, resulting from providing enhanced spawning habitat.

Structural Habitat Supplementation and Improvement Program (Proposed Article A104)

DWR proposes to develop a plan to provide additional salmonid rearing habitat in the Feather River by creating and maintaining additional cover, edge, and channel complexity with LWD and boulders and placing other objects in the channel.

We determined the Oroville dam prevents LWD from reaching the Feather River resulting in a lack of channel complexity and shortage of cover for fish rearing. The proposed measure would enhance fish habitat by placing structures that would cause localized scour (forming pools used by holding adult salmonids); create complex channel hydraulics associated with sediment sorting and deposition; and create juvenile velocity refugia in their lee during flood events.

Boulders would provide similar hydraulic function and provide much of the same benefits of LWD; however, the river downstream of the fish barrier dam does not appear to have historically contained boulders as hydraulic elements and they do not fit the river's stream type through much of this area. DWR should take the physical characteristics of individual stream reaches into account when developing the specific projects under this program.

We estimate the total annualized cost of DWR's proposed measure would be about \$318,400. This would be a reasonable cost to enhance structural habitat for fish species.

Fish Weir Program (Proposed Article A105)

DWR proposes to initiate a two-phase program for the installation and operation of two fish weirs in the low flow channel in the Feather River. During Phase 1, the first weir would be installed to provide a single monitored point in the river channel that fish would need to pass through in their attempt to travel upstream and would be used to monitor abundance of and run timing for Chinook salmon and steelhead. Phase 2 of the program includes installing a second weir, which would consist of a physical barrier that could be operated to block or redirect upstream fish passage, as needed, to spatially separate spring-run and fall-run Chinook salmon in the low flow channel. The second weir would create a dedicated spawning preserve to protect spring-run Chinook salmon and would possibly include an egg-taking station to collect fall-run Chinook salmon eggs for use in the Feather River Fish Hatchery. Measures under this proposed article are intended to address the effects of the project on spring-run Chinook salmon that include interbreeding, redd superimposition and pre-spawning mortality.

Spring-run Chinook salmon, a federally and state-listed threatened species, are negatively affected by the project because the project dam blocks passage causing them to share spawning habitat with fall-run Chinook salmon. We recommend including this proposed article in the project license because implementation of the Fish Weir Program would reduce the potential for continued genetic introgression between spring-run and fall-run Chinook salmon and reduce egg and alevin mortality from redd superimposition by dedicating adequate spawning habitat in the low flow channel for spring-run Chinook salmon. It is appropriate to take a phased approach to the implementation of these

enhancements measures recognizing the lack of existing fish population data and the importance of determining the best location for the Phase 2 weir. However, we conclude the existing competition for spawning habitat and associated genetic introgression and mortality support the need to complete enhancement projects sooner than 8 years from license issuance, as proposed, to achieve the intended benefits. We recommend installing the first weir within 3 years, as proposed, and the second weir within 6 years of license issuance. We find this would allow sufficient time to collect and analyze data and determine the proper location for, design and install the second weir. Water quality-related effects could occur during the building of the weirs. We recommend best management practices be carried out to minimize these potential effects.

We estimate the total annualized cost of DWR's proposed measure would be about \$248,400. We consider the cost associated with this measure to be commensurate with the benefits to be derived from maintaining genetic integrity of spring-run Chinook salmon.

Feather River Fish Hatchery Improvement Program (Proposed Article A107)

DWR proposes to establish and implement a program to continue operating the Feather River Fish Hatchery in cooperation with DFG to produce anadromous salmonids. The program establishes hatchery water temperature objectives, and addresses hatchery production and monitoring, genetics, disease management and facility operation and maintenance.

The Oroville Facilities block access to spawning and rearing habitat for anadromous fish thereby reducing productivity. Additionally, although the existing water temperature objectives have allowed the hatchery to meet production goals, we note that IHN outbreaks at the Feather River resulted in significant mortality at the Feather River Fish Hatchery, and in 1998, 2000, 2001, and 2002; several million juvenile Chinook salmon died or had to be destroyed because of IHN. DFG attributed the source of the disease to Lake Oroville salmonids contaminating the water that enters the hatchery. The outbreaks prompted DFG to halt stocking Chinook salmon and brown trout in Lake Oroville because of their susceptibility to IHN.

We recommend including this proposed measure in the project license because, the new temperature requirements would provide water that is cooler than that currently provided to the hatchery, which would reduce risk of some diseases (e.g. ceratomyxosis) and produce healthy fish for stocking (recreational angling) and releasing (simulating natural production). We recognize, however, that warmer water temperatures at the hatchery annex are used to control IHN outbreaks.

Non-native coho salmon were recently stocked in Lake Oroville in an effort to meet stocking goals because they are less susceptible to diseases. Although we expressed some reservation in the draft EIS about stocking non-native coho salmon, we understand the circumstances relating to fish diseases that lead to this decision, but note if fish diseases are controlled in the future, DWR stocking objectives should return to stocking native salmonids in Lake Oroville. We find the need to produce healthy hatchery fish that can enhance anadromous fish populations and provide the appropriate species for stocking in Lake Oroville, which has an important recreational fishery, support the \$739,800 estimated annualized cost associated with this part of the proposed measure.

The proposed article also includes a contingency for installation of a water sterilization system if future conditions allow fish passage above the fish hatchery. Recognizing the devastating effects of disease outbreaks at the hatchery that could occur as a result of fish passing upstream into the hatchery water supply, the estimated annualized cost for this part of the proposed measure, \$566,100, is commensurate with the protection it would provide.

Although we recommend including this proposed article in the project license, we find the text is, in some cases, unclear, unstructured, or more appropriately included in the plan that the parties would develop to implement the Feather River Fish Hatchery Improvement Program. For example, it is unclear how a "methodology evaluates" a release and what would happen to the remaining 75 percent of the fall-

run production that is not released (see Proposed Article A107.3(c)(9), *Feather River Fish Hatchery Improvement Program*).

Flow/Temperature to Support Anadromous Fish (Proposed Article A108)

DWR proposes to release a minimum instream flow of 800 cfs in the low flow channel during anadromous spawning season (September 9 through March 31) and 700 cfs for the remainder of the year. Flows in the high flow channel would remain unchanged from the current license requirements. This proposed article establishes temperature objectives for the low flow and high flow channels and initiates an investigation of potential facility modifications to provide cooler water to the Feather River to benefit anadromous fish.

We determined that the existing flow regime causes warmer water and low flows, in the Feather River. These conditions reduce the quality and quantity of anadromous fish habitat for spawning, egg incubation, rearing, and holding. The water temperature objectives in the proposed article meet the terms of the NMFS Biological Opinion (October 2004) that specify mean daily water temperatures not exceed 65°F from June 1 to September 30 in the low flow channel at Robinson Riffle. The increase in minimum flow, curtailing pumpback operation, drawing flow release from lower reservoir elevation and/or other facility modifications included in the proposed measure would result in even lower water temperatures (58 to 63°F) in the Feather River thereby reducing a known stressor of anadromous fish. In terms of the quantity of habitat, the proposed flows maximize the weighted usable area for Chinook salmon and steelhead spawning (see figure 17).

We understand there are actions included in the proposed measure to investigate options to overcome the operational challenges that result from blending water with dynamic temperatures from the low flow channel and Thermalito afterbay and the time delay between action implementation and water temperature change in the high flow channel. DWR has proposed a reasonable time frame for investigating, reporting, and possibly modifying facilities to allow operational flexibility that would ensure release of colder water in the Feather River. We note that even if DWR does not modify their facilities, the lower water temperatures would become requirements thereby helping to ensure that colder water temperatures would exist in the Feather River.

Despite uncertainties related to the Proposed Action and climatic conditions, staff expects that overall, water in Thermalito afterbay (where irrigation withdrawals are made) would be the same or slightly warmer than what currently exists and would, therefore, not increase adverse affects on rice farmers.

We recommend including this proposed article in the project license because this program would improve habitat suitability in terms of lower water temperatures and providing the maximum weighted usable area for anadromous fish in the low flow and high flow channels.¹⁰⁷ We note that the measure would allow DWR to implement different minimum instream flows, without Commission approval, if DWR receives a notice from the fish and wildlife agencies that such flows substantially meet the needs of anadromous fish. We recommend including a provision for the Commission to approve any changes to the minimum instream flows. This recommendation is necessary to make the article consistent with the Commission's authority to approve operational changes of the project. We also recommend that if temperature objectives are not met, DWR submit a report to the Commission outlining what actions were taken and why temperature objectives were not met.

There are substantial costs associated with Proposed Articles A107 and A108 and we view these measures collectively in order to assess their combined benefits. Each of these measures responds to an

¹⁰⁷ The current minimum instream flows provide less than the maximum weighted usable area (see figure 15).

overall need to comply with the ESA by protecting or enhancing populations of and habitat for spring-run Chinook salmon and steelhead. Accordingly, implementation of the enhancement measures at the Feather River, which is designated critical habitat for these species, as opposed to other locations where these species are found, would create the greatest benefit for these threatened species. As a whole, these measures would work synergistically to increase the abundance of threatened fish species. Hatchery operation measures increase the number and physical condition of fish whereas the flow and temperature measures as well as the channel and habitat measures increase the amount and quality of available habitat to threatened spring-run and steelhead for spawning, rearing and holding. Habitat improvements for these species would also benefit other aquatic species, including green sturgeon and lamprey.

We estimate the total annualized cost of DWR's Proposed Articles A107 and A108 would be about \$1,305,900 and \$2,427,700, respectively. Furthermore, these measures would reduce generation by 43,500 MWh relative to the No-action Alternative, and this would reduce power benefits by about \$1,480,000, although the annual cost of pump back energy would drop by about \$35,000. We consider the benefits of increasing anadromous fish populations and improving critical habitat for threatened aquatic species to be worth these costs.

Lake Oroville Warm Water Fishery Habitat Improvement Program (Proposed Article A110)

Under this proposed article DWR would continue the existing program to create and maintain habitat structures for increasing warmwater fish populations (e.g., black bass, channel catfish) in Lake Oroville.

The project creates suitable habitat for warmwater fish with abundant angling opportunities, particularly in Lake Oroville. We recommend including this proposed measure in the project license. DWR's studies indicate warmwater fish species are self-sustaining and DWR's past implementation efforts appear to have been effective. We note that this proposed article supports part of a DFG-stated objective¹⁰⁸ by protecting fish and providing for compatible recreational use. We also note that DWR's studies indicate important socioeconomic and recreational benefits associated with warmwater angling in Lake Oroville. These benefits provide substantial rationale to justify our recommendation to include this proposed measure in the project license.

We estimate the total annualized cost of DWR's proposed measure would be about \$40,000¹⁰⁹. We consider the cost of this measure to be reasonable in light of with the benefits that would continue to accrue to the important warm water fishery in Lake Oroville.

Lake Oroville Cold Water Fishery Improvement Program (Proposed Article A111)

Under this proposed article DWR proposes to continue the existing program, with improvements,¹¹⁰ to stock approximately 170,000 yearling salmon, or their equivalent, in Lake Oroville and develop a coldwater fisheries management plan.

¹⁰⁸ The entire objective states, "Protect and restore fish and wildlife resources and their associated habitats within the Project boundary, while providing for compatible recreation."

¹⁰⁹ This cost appears in cost for the No-action Alternative because it is an ongoing program that would continue.

¹¹⁰ DWR states the proposed action is an improvement over the existing similar program, however we cannot discern the difference based on the description of the program as presented in the Settlement Agreement and final license application.

The project creates coldwater fish habitat in Lake Oroville; but a shortage of suitable spawning habitat and high fishing pressure limit “natural” populations to levels below angler expectations. The current stocking program provides important recreational angling opportunities that support tourism and provide economic benefit to the local community. We conclude there would be insufficient populations of naturally reproducing coldwater fish to provide recreational benefits at Lake Oroville and economic benefits to the local communities if the lake were not stocked. We also recognize the dynamic nature of hatchery management and agree that this program should include an opportunity to make changes to the program based on new information. Consequently, we recommend including this proposed article in the project license.

We estimate the total annualized cost of DWR’s proposed measure would be about \$75,000¹¹¹. We consider the cost of this measure to be reasonable in light of the benefits that would accrue to the important coldwater fishery in Lake Oroville.

5.1.2.4 Terrestrial Resources

The purpose of the terrestrial measures is primarily to protect special status species and their habitat and secondarily to enhance habitat for other terrestrial species. In this section we discuss DWR’s proposed Oroville Wildlife Management Plan (Proposed Article A115), Protection of Vernal Pools (Proposed Article A117), Minimization of Disturbance to Nesting Bald Eagles (Proposed Article A118), Protection of Giant Garter Snake (Proposed Article A119), Protection of Valley Elderberry Longhorn Beetle (Proposed Article A120), Protection of Red-Legged Frogs (Proposed Article A121) and Construction and Recharge of Brood Ponds (Proposed Article A122).

Oroville Wildlife Area Management Plan (Proposed Article A115)

DWR proposes to develop a plan to manage the OWA in accordance with identified wildlife and recreation management goals while minimizing current and future conflicts between wildlife management and recreational use. The management plan would establish management objectives, include monitoring and reporting, identify agency management and funding responsibilities and allow for periodic plan revisions. Butte County recommends that it be included as a consulting party in developing this plan.

Based on DWR’s study results we determine the 11,000-acre OWA contains important habitat for waterfowl, special-status plants and wildlife, and a wide-variety of other species and that water level fluctuations, recreational use, and maintenance activities have the potential to affect OWA vegetation and wildlife. Overlapping land management jurisdictions for the OWA have resulted in poor management of this area due to conflicting land management objectives. While DWR’s has ultimate responsibility for managing project lands, we recognize that DFG also has an interest in managing the state’s fish and wildlife resources. We recommend including this proposed article in the project license because it would make clear DWR’s responsibility to protect resources on project lands, provide adequate recreational access to project lands, develop a set of consistent management objectives for this area in coordination and consultation with DFG, and identify roles and responsibilities for area management. We note that Butte County’s recommendation is a matter beyond the scope of the EIS and will be addressed in any license order for the project.

Butte County also recommends that it be included as a consulting party in the development of the OWA Management Plan. Since the management would be located in Butte County and has the potential to affect issues important to the County, it would be better to address these issues early in the planning process. Therefore, we recommend that Butte County be included as a consulted party on the management plan.

¹¹¹ This cost appears in cost for the No-action Alternative because it is an ongoing program that would continue.

We estimate the total annualized cost of DWR's proposed measure would be about \$723,400. The environmental and recreational benefits that would be provided by this plan would be worth the cost.

Oroville Wildlife Area Access (Proposed Article A116)

Under this measure DWR proposes to allow reasonable access to the OWA for hunting and fishing. We recognize the importance of retaining public access to the OWA and recommend that DWR provide reasonable access to project lands for recreational purposes. Additionally, any concerns regarding public access could be addressed in the OWA Management Plan (Proposed Article A115).

Protection of Vernal Pools (Proposed Article A117), Minimization of Disturbance to Nesting Bald Eagles (Proposed Article A118), Protection of Giant Garter Snake (Proposed Article A119), Protection of Valley Elderberry Longhorn Beetle (Proposed Article A120), Protection of Red-Legged Frogs (Proposed Article A121) and Construction and Recharge of Brood Ponds (Proposed Article A122)

We recommend including these proposed articles in the project license because these measures would reduce (1) water level fluctuations in brood ponds, (2) human disturbance to special status species and their habitat, and (3) unmanaged OHV use on project lands. The required measures would also establish appropriate project facility maintenance practices (e.g., pest control) that would avoid effects to special status species and their habitat. DWR's studies indicated that each of these activities contributes to reducing the quantity or quality of terrestrial habitat and it would be appropriate to include measures to minimize project-related effects of these activities on individual species and their habitat.

In addition, we also recommend DWR develop a threatened and endangered species implementation plan, in consultation with FWS and DFG, within 1 year of license issuance to describe how DWR would comply with its proposed measures to protect threatened and endangered species and terms and conditions contained within FWS's April 9, 2007, biological opinion.

We estimate the total annualized cost of these measures would be about \$183,400. We conclude that the benefits that would accrue from protecting and improving populations of and habitat for special status species would be worth the cost.

Provision of Upland Food for Nesting Waterfowl (Proposed Article A123), Provision of Nest Cover for Upland Waterfowl (Proposed Article A124) and Installation of Wildlife Nesting Boxes (Proposed Article A125)

DWR proposes to plant and manage cover/forage crops and install wildlife boxes for nesting. Waterfowl nest and brood in the wetland margins and require emergent wetland cover that is close to aquatic habitat. Grebes' nests float on top of the water in shallow water areas. DWR's study results indicate project operations cause water level fluctuations up to 12 feet to occur on a weekly basis in the Thermalito afterbay. Sudden or periodic increases in water levels can flood waterfowl nests resulting in the loss of eggs and forcing nesting hens to rebuild their nests in upland locations. Although the fluctuations expose mudflats which provide habitat to a variety of migratory shorebirds, nesting and brooding waterfowl and nesting grebes can be negatively affected. The existing upland nesting habitat has less nesting cover than what exists within the wetland margin, resulting in increased predation of nesting waterfowl that have been forced to use this habitat because of flooding. We recognize that project operations will continue to cause water fluctuations at the Thermalito afterbay that will, in turn, affect habitat availability and suitability for waterfowl. We recommend including these three proposed articles in the project license to enhance suitable habitat for waterfowl at Thermalito afterbay.

We estimate the total annualized cost of DWR's proposed measure would be about \$88,700. This would be a reasonable cost to improve waterfowl habitat.

Invasive Plant Management (Proposed Article A126 and Forest Service 4(e) Condition No. 18)

DWR proposes to develop an invasive plant management plan to manage and reduce target noxious non-native and native plant species within the project boundary.

A total of 219 species of non-native plants, not all of which are classified as noxious or invasive weeds, were identified within the project boundary during surveys conducted in 2002 and 2003. Thirty-nine of these species are target species identified as noxious or invasive plants by the California Department of Food and Agriculture, CIPC, and the Plumas National Forest. Although noxious and invasive weed species are found throughout the project boundary, they are most concentrated in the OWA. We determined that fluctuating water levels in the Thermalito Complex, Lake Oroville and in the low flow channel promote proliferation of noxious plant species along the wetland margins, river banks, and adjacent floodplain. Project maintenance activities also contribute to this condition by spreading invasive species seeds on maintenance vehicles and equipment in the upland and wetland/riparian areas of the project.

Butte County recommends that the plan include additional treatment areas designated by the county agricultural commissioner for aquatic plants that originate within the project boundaries and then invade downstream irrigation canals and agricultural lands that are outside of the project boundaries. They also recommend that they be included in the list of consulted parties in developing the plan.

We recommend including DWR's proposed measure in the project license because it would arrest the spread of invasive plant species caused by the project and infested locations within the project boundary would be renegotiated with appropriate native vegetation. Additionally, one of the goals of the proposed invasive species plan is to eradicate and/or control invasive and noxious species to reduce the number of seeds and/or plants that are flushed into downstream irrigation canals, the Feather River channel, and ultimately the San Francisco Bay delta that have the potential to invade other sensitive resources and habitats as well as downstream agricultural lands. As such, the proposed invasive species plan appears to satisfy Butte County's recommendation to add treatment areas. Review by the Ecological Committee would include a public comment opportunity that Butte County could use to provide their input to plan development.

We estimate the total annualized cost of DWR's proposed measure would be about \$122,000. This amount would be reasonable to locate and control invasive weeds within this agriculturally based region and to prevent their spread.

5.1.2.5 Recreation

Recreation Management Plan (Proposed Article 127)

DWR proposes to implement a project recreation management plan that includes constructing, reconstructing operating and maintaining recreation facilities, and implementing a comprehensive trails program.

The Oroville Facilities create settings for reservoir-, river- and land-based activities providing 3 reservoirs, 17 campgrounds, 5 day-use areas, 16 boat ramps, 90 miles of trails and interpretive and information centers at a visitor center and the fish hatchery. Developed overnight capacity includes more than 400 family campsites and group overnight capacity for 273 people-at-one-time. Recreational use is at or approaching the capacity of some of the developed recreation facilities.

The excellent fishery at Lake Oroville, one of the largest reservoirs in the state, draws anglers from throughout the region. Downstream of Oroville dam, the Feather River is also popular for angling during annual salmon and steelhead runs. Lake Oroville and other project facilities receive considerable local use throughout the year and any of the project recreation areas are within a few minutes drive of the

city of Oroville. Lake Oroville is also the closest reservoir for other Butte County residents living in Paradise and Chico. Over one-half of those surveyed in DWR's studies were Butte County residents. Most of the recreational activity occurs at Lake Oroville where DWR estimated annual recreational use at more than 1.6 million recreation-days with more than 900,000 recreation-days attributed to the main project reservoir, Lake Oroville where boating and angling accounted for more than 411,000 recreation-days. Recreational use is projected to be more than 2.2 million recreation-days by 2020. Project lands and water also provide settings for hiking, bicycling, hunting, equestrian use, sightseeing, and whitewater boating.

The above information demonstrates the importance of recreational resources associated with the project. Additionally, most of the comments filed with the Commission in this proceeding related to recreational resources. Accordingly, DWR has proposed an extensive Recreation Management Plan that sets forth the DWR's plan to manage recreational resources at the project. We recognize that DWR developed this plan and reached consensus on the content of the Recreation Management Plan in collaboration with many affected agencies, NGOs, and individuals. As evidenced by the many Commission filings, there are entities that disagree with the Recreation Management Plan content, and we gave particular attention to these matters in addition to public health and safety as we analyzed the content of the Recreation Management Plan.

As proposed, DWR would provide operation and maintenance of new and existing developed recreation facilities; construct new facilities to increase developed capacity, solve site specific problems (e.g., extending boat ramps) and provide accessible opportunities; and conduct monitoring, including reporting to the Recreation Advisory Committee and the Commission. We evaluated the Recreation Management Plan, and we recommend approval and implementation of the plan subject to staff revisions. We explain the recommended changes and the basis for these modifications in the following text.

Foreman Creek

DWR plans to develop additional facilities at Foreman Creek as provided in Proposed Article 129, *Improve and Redirect Recreation Usage to Specific Areas at Foreman Creek*. We recommend revising the development proposed in the Recreation Management Plan to reflect our recommendations listed in section 5.1.2.7, *Cultural Resources*, for Proposed Article A129. Our revision would not entail any additional cost.

Proposed Recreation Facilities and Improvements at Lake Oroville (Within 10 Years of License Issuance)

As proposed, the recreation improvements and actions scheduled for completion within the first 10 years at Lake Oroville would reduce identified environmental, health and safety concerns, improve access to project waters, increase accessibility, and respond to the need for additional day and overnight developed capacity. For the most part, DWR's prioritization seems to accurately reflect: (1) facility and site condition survey results; (2) the need for providing adequate access to project lands and waters;¹¹² (3) the need to meet the existing and future recreational demand; (4) the need to accommodate existing and potential types of project-related recreational uses at the project; (5) a commitment to provide accessible recreational opportunities; and (6) a demonstrated nexus between the proposed development and the project. DWR would improve boat launches; install restrooms; and construct new trails, campgrounds, and day-use areas (see table 48 in section 3.3.6.2, *Recreational Resources, Environmental Effects*). However, we note that none of the existing facilities are scheduled for replacement or refurbishment during this 10-year time frame. Specifically, during our 2005 staff site visit we observed

¹¹² Specifically, many boat launches would be improved (e.g., resurfaced, additional boarding docks) and boat ramps extended to accommodate access at low reservoir levels.

erosion, deteriorating infrastructure, non-functioning water distributions systems and areas that could be improved to reduce wildland fire potential at the Bloomer, Goat Ranch and Craig Saddle boat-in campgrounds. We recommend including these facilities in the first 10-year planning cycle to arrest ongoing effects on natural resources and provide safe and suitable project recreational facilities for the public.

Trail Condition Inventory

DWR did not report on the condition of project trails in its application and monitoring trail condition during the license term is not a component of the proposed Recreation Management Plan.¹¹³ However, DWR did file a 2-year progress report on January 27, 2007, that provides detailed information on trail conditions. We recommend including a monitoring program in the plan because it would ensure project trails are not contributing sediment to project waters and they are suitable for their designated uses (e.g., sufficient trail width and clearing). DWR proposes to change trail designations and we consider this information is essential prior to making such changes as well as for monitoring purposes. The Recreation Management Plan should provide for subsequent trail condition inventories similar to reporting on visitor use and capacity. The Comprehensive Water Quality Monitoring Program would require monitoring trails for erosion and it may be efficient to collect information for both programs at the same time.

Trail and Developed Recreational Facility Standards

The executive summary of the Recreation Management Plan states that the Recreation and Operations Program in section 7.2, "...discusses general facility and use area maintenance standards to be used"; however, we cannot find any such standards or reference thereto provided anywhere in the Recreation Management Plan.¹¹⁴

We recommend DWR review and update the existing project trail maintenance standards, as necessary, and include these standards in the Recreation Management Plan. We make this recommendation for the following reasons. First, the trail maintenance standards should be explicitly apparent with an identified connection to the project trails. Second, if the trails are being maintained to the standards we found reference to, these standards are more than 10 years old and, according to the DPR, are currently being updated. Accordingly, it would be an appropriate time to update the standards to reflect state-of-the-art trail maintenance principles. Third, we consider that changing the designations creates a need to monitor trails for proper maintenance to ensure they remain suitable for their designated use and these standards would provide a basis for monitoring.

Similarly, we could not find maintenance standards for developed recreation facilities (e.g., campgrounds, day-use areas, boat launches, and education and interpretive centers) and believe these standards are necessary for informational and monitoring purposes. We recommend DWR locate, review, update, these standards, as necessary and incorporate or append them to the Recreation Management Plan.

Monitoring Trail Use

We recognize changing use patterns in the future may create the need to adjust trail use designations. Surveying the existing trail users would provide information about existing use, needs, and user conflicts. However, this methodology would not capture unmet demand and reveal the reasons why

¹¹³ The Recreation monitoring indicators and standards listed in table 7.3-1 of the Recreation Management Plan include monitoring trail *use* but do not include monitoring trail *conditions*.

¹¹⁴ We found reference to trail standards in the record of DWR's 2001 application to amend the project license and we presume these are the standards being used to maintain project trails.

some potential users may not be using the project trails. We recommend the recreation monitoring effort be expanded to include surveys of potential trail users (e.g., user groups or organizations, mail back surveys) to provide this information for adaptively managing recreational resources.

Fourth of July Fireworks

Under the Recreation Management Plan operation and maintenance program, DWR proposes to provide \$210,000 annually to support the Fourth of July fireworks display at Lake Oroville. In section 3.3.6, *Recreational Resources*, we determined there is not an identified effect of the project that creates a need for this costly measure. We recommend removing this program from the Recreation Management Plan. However, we recognize the value of this event to the local community and DWR may choose to continue to support this effort outside of the project license.

We estimate the total annualized cost of DWR's proposed Recreation Management Plan and, as modified by staff, would be about \$4,404,600 and \$4,201,800, respectively. The need to provide safe and accessible facilities for project-related recreational activities and access to project lands and waters justify the estimated cost to develop and implement the Recreation Management Plan.

Recommendations of Others

Recreation Development and Accessibility—Butte County recommends that DWR: (1) provide reasonable swimming facilities at the project, (2) develop water skiing facilities, and (3) consider the feasibility and socioeconomic impacts of a whitewater park to offset the loss of whitewater opportunities at the project due to development of the project.

Anglers Committee et al. recommend that DWR: (1) develop a plan to provide sandy beaches at the Oroville Facilities campgrounds located adjacent to a reservoir to address public safety and provide obstacle-free wading opportunities, (2) prepare a plan addressing accessibility pursuant to the ADA for all public facilities at the Oroville Facilities, (3) modify all facilities available to the public to be ADA accessible including restrooms, campgrounds, day-use areas, parking areas, boat ramps, and boat piers, (4) maintain an ADA-compliant daily shuttle service at the Lime Saddle marina and Spillway boat ramps (service between the parking areas and ramps), (5) prepare a detailed recreation plan addressing short term and long term recreation planning needs and submit it to the Commission, and (6) comply with the needs of the community of Oroville when funding recreational facilities in the future.

We determined that under the Recreation Management Plan DWR would investigate additional beach and swim area improvements and, incorporate ADA compliance measures when improving, and expanding recreation facilities. Accessibility is included in DWR's proposal to upgrade several trails to meet ADA accessibility standards for slope and surface, which would result in approximately 12 miles of ADA accessible trails within the project boundary. In addition all new facility construction proposed in the Recreation Management Plan would be ADA-compliant. Therefore, we conclude that the Recreation Management Plan adequately addresses both Butte County and Anglers Committee et al. recommendations relative to recreation development, accessibility, and swimming areas.

We do not recommend including a water-skiing facility as Butte County recommends. Providing this type of facility is not necessary in order for visitors to water ski on the reservoir. We do not find that the need for this facility corresponds to any identified need regarding public access or recreational use related to the project.

We do not recommend mitigating for any effects associated with whitewater boating opportunities affected by the original project as Butte County recommends.

And finally, we find that the Anglers Committee et al. recommendation to consider the needs of the Oroville community in managing recreational resources at the project would be addressed through the

opportunity for community input to recreation management through the Ecological Committee, Recreation Advisory Committee, and License Coordination Unit.

Recreational Access—The Anglers Committee et al. recommend that if DWR continues to charge launch fees to boaters, it should hold annual public meetings to develop and finalize the boating fee schedule and that the fees should be approved by the Commission. The Anglers Committee et al. recommend that any documents supporting DWR’s fee schedule at the Spillway and Lime Saddle boat launches should be provided to the public. Butte County also expresses its concerns with the current user fees at Lake Oroville and recommends DWR consider the benefits it derives from the project when calculating user fees on project lands.

The Anglers Committee et al. also assert that DWR has a duty and responsibility to protect boaters from navigation and public safety problems at Lake Oroville, such as floating debris. They recommend that DWR prepare and implement a management plan for removing dangerous debris from the reservoir and that DWR be held liable for harm and damage to private boats and equipment by securing a bond of one billion dollars or a feasible amount for the entire recreation season.

DWR proposes to continue removing floating debris on Lake Oroville, which incorporates part of the Anglers Committee et al. recommendation. We do not recommend that DWR be required to secure a bond for liability because they propose to continue removing debris from the reservoir surface. Boaters using the lake must assume a reasonable amount of risk normally associated with this recreational activity.

We do not recommend including any measures that relate to user fees at the project because the Commission’s regulations state in 18 CFR §2.7 that the “Commission will not object to licensees and operators of recreational facilities within the boundaries of a project, charging reasonable fees to users of such facilities in order to help defray the cost of constructing, operating, and maintaining such facilities.” DWR’s current practices related to charging user fees (indirectly collected through DPR) are consistent with this regulation. The reasonableness of the fees charged is not within the scope of this analysis and not a decision that will be made during this relicensing proceeding. We also note that there are developed recreation facilities at the project that do not have user fees.

Recreation Monitoring—Butte County recommends that DWR conduct comprehensive recreational use surveys every 5 years beginning October 1, 2007. Butte County recommends that DWR develop a plan for conducting recreational use surveys in consultation with the Recreation Advisory Committee and that in its surveys DWR use a sample size twice the size as the one used in its 2002-2003 recreation surveys.¹¹⁵ Butte County also contends that even though the description of monitoring protocols and standards (triggers) is comprehensive and the carrying capacity standards are well defined, the monitoring and trigger provisions are hopelessly vague, providing so many management options that it seems highly unlikely that new facilities would be built when existing recreation facilities become overcrowded.

Whereas Butte County recommends visitor surveys every 5 years, the Recreation Management Plan indicates visitor surveys would be conducted every 10 to 12 years. We find that DWR’s proposed survey frequency is adequate because DWR would collect and report other user information on a biennial and 6-year frequency (see table 7.3-1 of the Recreation Management Plan). This interim information would provide a basis for determining trends in the level of recreation use and facility conditions and any recreational use effects on natural resources. Considering visitor surveys are not the only source of information that informs recreation management decisions, surveying visitors once every 10 to 12 years would be sufficient and this information would be reported in every other Form 80 filed with the Commission. Periodic assessment reports on the results of recreation monitoring would allow the

¹¹⁵ DWR conducted 2,583 onsite surveys and collected 1,071 mailback surveys (2002 to 2003).

Commission to review the condition and use of the proposed recreation facilities as they are planned or as modifications are required over the license term.

Regarding Butte County's assertion that the monitoring and trigger mechanisms are vague, we recommend modifying the Recreation Management Plan to clearly identify, and update, as necessary, maintenance standards for developed recreation facilities, including trails and incorporate these into the Recreation Management Plan (see *Trail and Developed Recreational Facility Standards* above). These would provide a consistent well-defined basis for monitoring facility condition. In addition, the Recreation Management Plan includes an interactive approach to decision-making that incorporates feedback mechanisms to evaluate actions and incorporate new information as it becomes available.

Recreation Management Plan Revisions—Butte County recommends DWR institute additional opportunities for review and comment and receiving recommendations from others when periodically updating the Recreation Management Plan. The Anglers Committee et al. recommend that DWR not file any proposed recreation amendments with the Commission until they have been reviewed by and agreed upon by the public.

We note that DWR would consult with the Recreation Advisory Committee in determining the frequency for updating the Recreation Management Plan. Any additional details of participant involvement outlined in other recommendations will be addressed in any license order for the project.

Site-specific Recreation Developments—Butte County states that the facility upgrades DWR proposes at Lake Oroville are not designed to accommodate current and realistic projections of recreation demand during the new license term but will only allow DWR to comply with ADA. Butte County recommends DWR construct more facilities such as campgrounds and marinas and should provide more docking/moorage and improve the facilities and services offered at the Bidwell Canyon and Lime Saddle marinas.

DWR's proposal to expand capacity at boat launches and parking areas, and campgrounds where use levels are at or approaching capacity adequately addresses Butte County's concerns. DWR has proposed increasing capacity at each of these types of facilities throughout the project. Therefore we don't recommend adoption of Butte County's recommendations.

We recognize there may be a shortage of boat moorings, docks, and storage at commercial marinas at Lake Oroville. However, while they facilitate the public's use of project waters, they are not necessary to provide public access to project waters. We do not find that the need for this facility corresponds to any identified issue or concern regarding public access or recreational use related to the project.

George Weir, Vicki Hittson-Weir, and Pathfinder Quarter Horses et al. recommend that DWR purchase land and provide various improvements (e.g., multiple events center, Potter's Ravine Marina) and funding (a detailed description of this recommendation is provided in section 3.3.6.2 *Environmental Effects, Trails and Trail Management*). However, Pathfinder Quarter Horses et al. did not clarify how the multiple-event center would address or resolve specific project effects. Consequently, we do not recommend including this measure because we did not find sufficient information to determine that a multiple-use events center has a nexus to the project or if it would be located within the project boundary. Similarly, we cannot determine how the 83-acre equestrian park is linked to the project or how this facility would address or resolve specific project effects.

We do not recommend developing a marina at Potters Ravine because only 35 to 38 percent of the respondents to DWR's recreation surveys reported the need for additional boat ramps and marinas and over 60 percent thought that the number of marinas at the Oroville Facilities was sufficient. Additionally, we note that DWR implements closures in this area to protect bald eagles during nesting season. The placement of a marina in this location, as Pathfinder Quarter Horses et al. recommend, may conflict with

other resource management objectives. Based on a lack of demonstrated need and potential conflicts with bald eagle management, we do not recommend developing a marina at Potters Ravine.

We determined the site-specific measures recommended at Saddle dam, Loafer Creek, and Lakeland Boulevard are not sufficiently different from DWR's proposal and provisions in the Recreation Management Plan substantially accommodate Pathfinders' recommendations.

We do not recommend including a measure to require DWR to build an Oroville Rim trail because steep slopes are common along the 167 miles of the Lake Oroville shoreline and this condition would probably limit the ability to create a trail or, at a minimum, require substantial site modification to avoid soil erosion. In addition the existing trail use at the project is characterized as low to moderate. Based on difficult site conditions and because the existing and proposed project trails appear to meet current and projected demand, we do not recommend including this measure in the project license.

The Lake Oroville warmwater fishery is currently a self-sustained fishery and the black bass fishery is excellent, both in terms of angler effort and economic effect on the area. Since the bass population is self-sustaining, stocking, as Pathfinders recommends, would be unnecessary. We also find that DWR's proposed warmwater fishery improvement program (Proposed Article A110) would sufficiently improve habitat and catch rates for warmwater fish.

Anglers Committee et al. recommend that DWR construct additional public boat launching facilities in the Feather River downstream of the fish barrier dam and downstream of the Thermalito afterbay outlet and fund trash removal at all public facilities in the OWA.

The Recreation Management Plan includes additional boat launch development at the OWA and appendix B of the Settlement Agreement includes a measure to provide funding to manage the OWA. We therefore conclude that the Anglers Committee et al.'s recommendation is already adequately addressed by DWR's Proposal.

Trails and Trail Management—Individuals, agencies, and organizations filed a multitude of letters both in support of and in opposition to the trail designations in the Recreation Management Plan.¹¹⁶ Most of the opposing commentors are equestrian users and most of the supportive commentors are bicyclists.

In terms of the number of users, DWR's use studies showed that there was low to moderate use on trails throughout much of the year with hikers constituting most (65 to 82 percent) of the existing trail users, with the exception of the Thermalito diversion pool where most users were equestrians followed by bicyclists. At Lake Oroville, equestrians were the second largest user group representing 15 percent of the existing trail use closely followed by bicyclists (11 percent). These data indicate that the existing use of most of the project trails is primarily pedestrian with the remainder of the use attributed to almost equal percentages of equestrian and bicycle use.

Based on DWR's study results, we determined there may be slightly greater existing demand for more bicycle trails than equestrian trails in the project area. Looking into the future, demand for all types of trail use will increase over the term of the license. DWR's studies indicate that hiking will have high demand and both bicycle and equestrian use will have moderate demand.

Currently, there are 2.6 miles of trails available only to hikers, 27.4 miles of trails available only to hikers and equestrians, and 51.4 miles of trails available only to hikers and bicyclists, with some segments of those trails also open to equestrians (see figure 19). About half of the bicycle trails near the Thermalito forebay and Thermalito afterbay are paved and the other half are graveled, whereas unpaved equestrian/hiking trails and bicycle/hiking trails can be found in the hills surrounding the Thermalito diversion pool and Lake Oroville. Under the Proposed Action there would be 2.6 miles of trails available

¹¹⁶ Commenting entities are identified in section 3.3.6.2, *Recreational Resources*.

only to hikers, about 6 miles of trails available to hikers and equestrians, and the remaining 81 miles of trails available to hikers, bicyclists, and equestrians. DWR would also develop approximately 0.5 mile of trail available only to hikers, approximately 5 miles of trail available to hikers and bicyclists, and approximately 5 miles of trails available to hikers, bicyclists, and equestrians. DWR would increase the total amount of trails accessible by all groups and create different route options through trail designation changes and the addition of connector segments. The most notable change would be opening more than 21 miles of trails to bicycle use where it historically has not been allowed. This change would give bicyclists access to more unpaved terrain in the hills, but would result in about a 78 percent reduction in the length of trails where equestrians could ride without expecting bicycle encounters.

Although the intent of DWR's proposed draft Comprehensive Non-Motorized Trails Program is to increase access for all user groups and retain portions for equestrian-only use, it does not allow for continuous access on the project trails for each group. For example, implementation of the program would convert most of the Dan Beebe trail to multiple use, except for the switchback portion in the middle of the trail. This would create a discontinuous route for bicyclists and equestrians who do not want to ride with bicyclists. In effect, equestrians would not have an 'equestrian-only' way to access to this portion of the trail. Creating a parallel trail to provide separate trails for each type of use would eliminate this circumstance. However, as proposed, the parallel trail would be built, if feasible, after the Dan Beebe trail would already have been changed to multiple use. While the Proposed Action would increase access to more miles of trail in absolute terms, increase access to different types of trails, and create more route options, there are several fundamental issues that must be resolved.

Considering our 2004 finding and our conclusion here that there is almost equivalent demand for equestrian and bicycle trails in the project area, we find it is premature to change any trail designations to multiple use as outlined in the draft Comprehensive Non-Motorized Trails Program. The fact that existing trails appeal to bicyclists is not necessarily sufficient rationale for reducing the existing opportunity for a unique recreational experience for equestrians. Because the data DWR collected relative to trail use has several shortcomings (as discussed in section 3.3.6.1 *Affected Environment, 2002–2003 Estimated Annual Use: Trail Use*) that bring into question the foundation of its proposal, we find there are insufficient recreational data on which to base any final decision to change trail designations to multiple use. We make this finding given the concerns of commentors, our 2004 finding that the current recreation plan provides for a unique equestrian experience, the absence of a trail condition inventory, and the apparent existence of trail maintenance problems. However, we recognize existing and projected levels of trail use generally supports increasing access to more trails and that the data provide enough information to form preliminary determinations and trail plans.

We recommend that DWR revise the Recreation Management Plan and the draft Comprehensive Non-Motorized Trails Program to allow for the definition of trail maintenance standards and data collection that reflects existing trail designations. We recommend these revisions include provisions that DWR complete the following assessments: (1) conduct a trail condition inventory relative to the trail maintenance standards within the first year of the license; (2) conduct visitor use surveys (on-site and mail-back, including methodology to focus on multiple use and user conflicts); (3) collect additional trail use data; (4) survey the users who are not using the trails to determine latent demand; (5) complete trail feasibility investigations (as proposed); and (6) use all of this information to make final recommendations regarding a need to change the trail designations within 3 years of license issuance. Survey and trail use data collection should occur within the first 2 years of license issuance and capture data during spring, summer, and fall seasons.

Our recommendations here are consistent with DWR's statement in the draft Comprehensive Non-Motorized Trails Program that "additional trail planning and design assessment is necessary to effectively balance public access and recreational needs or desires with management requirements to ensure appropriate levels of resource protection and public safety." Finally, we recommend that the final Non-Motorized Trails Program outline a more specific, phased implementation schedule. The current

draft Non-Motorized Trails Program includes a draft schedule that states which trail changes will occur in the first 10 years after license issuance and which changes will occur in the second 10 years. Instead, the schedule for trail program implementation should include specific timelines for the assessments listed above, the development of final recommendations, and prioritized trail modification or construction. This schedule should be developed with public input representing the various user groups.

We recognize that this recommendation could eliminate existing access to some equestrian and hiker-only trails and this could decrease opportunities for equestrians who do not want to ride with bicyclists. However, this program can strike a balance between retaining some single use trails and expanding public access to the project for all users. In addition, our recommended modifications would address the safety concerns and future needs for trails at the project that were raised by entities who filed comments in opposition to the proposed trail designations. We consider both DWR's proposal and our staff modification relating to trails and trails management would have approximately equal costs.

5.1.2.6 Land Use and Aesthetics

Screening of Material Storage Area (Proposed Article A132)

DWR proposes to plant appropriate vegetation¹¹⁷ to screen the material storage area below Oroville dam from the public view. We estimate the total annualized cost of this measure is \$89,500. We consider this would be a reasonable cost to reduce the visual effects of the project equipment and support facilities.

5.1.2.7 Cultural Resources

Historic Properties Management Plan (Proposed Article A128 and Forest Service 4(e) Condition No. 16)

DWR proposes to implement the Historic Properties Management Plan for the project.

Project effects on cultural resources include erosion from fluctuating water levels, and project recreational use. We agree that the project license should include this measure to require DWR to implement an HPMP to protect and manage these resources. However, we recommend some changes to the draft HPMP before it is approved by the Commission.

The draft HPMP states that resource evaluations of the 144 ethnographic and ethno-historic locations, a 10-percent sample of the historic-era archaeological sites, and a limited number of prehistoric archaeological sites subject to ongoing project effects are underway, but DWR does not provide a list of the resources to be evaluated nor a timetable for the completion of these evaluations. We also note that DWR proposes to complete formal resource evaluations of about 20 percent of the prehistoric sites located in the APE. We cannot determine if this proposal is adequate because the HPMP does not provide the rationale for not evaluating all of the sites. We recommend DWR provide its rationale for evaluating only 20 percent of the sites and whether this percentage includes the sites in the Lake Oroville fluctuation zone. DWR should also explain the disposition of the remaining 80 percent of the sites that they do not propose to evaluate.

We also recommend the HPMP provide for complete resource evaluations of all the sites within the fluctuation zone because of the potential harm that could occur from shoreline erosion and vandalism.

Finally, we recommend that the list of archaeological and historic resources appended to the draft HPMP include additional columns for: (1) indicating the site management recommendations and resource evaluation (National Register) status and (2) a timetable for the completing resource evaluations.

¹¹⁷ To the extent practical, native plants would be used.

This modification would enable the SHPO, the Commission, and the Forest Service and BLM, for sites on federally managed land, to better understand the resource evaluation program proposed in the HPMP in terms of the priority areas and resources for which evaluations are planned, as well as the reasonableness of the schedule for completion of the evaluations.

Improve and Redirect Recreation Usage to Specific Areas at Foreman Creek (Proposed Article A129)

DWR proposes to develop a plan to protect cultural resources at Foreman Creek while continuing to allow recreational use. The plan would outline measures to restrict usage and develop facility improvements in certain areas at Foreman Creek and justify how continued use could be sustained with specific consultees on the protection of cultural resources.

Foreman Creek has existing developed project recreation facilities. Based on both the archaeological and ethnographic survey results, Foreman Creek is also a locus of Maidu culture and is currently subject to vandalism, looting, and damage from public and recreational use, especially from OHV use. Once cultural materials are removed or damaged they cannot be replaced and the ability to learn from the artifactual context of a site is greatly diminished. Although we desire to maintain the existing developed recreational capacity at the project while planning for and installing improvements, we are uncertain that this would adequately protect or effectively reduce on-going damage to cultural sites of significance to the Maidu Tribe. We recommend closing the site until a detailed site plan for recreation development has been developed. We also recommend DWR develop the plan in consultation with affected Native American Tribes. Tribes would prefer to entirely close the site to public use because of their concern for on-going effects of recreational use on cultural resources. A temporary closure would reduce the ongoing effects of recreational use on cultural resources and provide sufficient time for DWR to prepare the plan to avoid or minimize the effects of continued recreational use. Avoidance is the preferred method to protect cultural resources and the draft HPMP filed by DWR provides for site avoidance and restrictions to public access to protect significant cultural resources. Therefore, we recommend that the plan should be developed within six-months of license issuance. It should demonstrate how cultural resources would be protected with restricted recreation at Foreman Creek, if the development of recreation facilities elsewhere in the vicinity of the site is warranted, or advocate discontinued recreational use at Foreman Creek. We anticipate this action would only cause a minor decrease in developed recreational capacity and a minimal amount of visitor displacement since there is relatively low visitor use at this small recreational site (only 4 percent of recreational use occurs at this location). These effects are minimal considering the importance of protecting irreplaceable cultural resources at Foreman Creek and the effects of existing recreational use on cultural resources in the area as identified in many filings by Native American Tribes.

We estimate the total annualized cost of implementing the HPMP, including the plan for the protection of cultural resources at Foreman Creek, would be \$1,783,900. We consider this to be a reasonable cost to protect historic properties and other culturally significant areas.

5.1.2.8 Socioeconomics

In considering the potential socioeconomic effects of DWR's continuing to operate the Oroville Facilities, we looked at the potential effects on Butte County, the neighboring cities (Oroville, Biggs, Gridley, Chico, and Paradise) and the region. Neither DWR's proposal nor the Staff Alternative includes specific socioeconomic measures. However, our analysis shows that various proposed and staff-recommended measures would affect socioeconomic resources. Operation of the Oroville Facilities as proposed would continue to attract tourist dollars from recreationists; would maintain or increase state agency expenditures from DWR, DFG and DPR; and would continue to support employment related to recreation and O&M activities. In addition, proposed facility modifications, including modifications to improve habitat for anadromous fish and improve recreation facilities, would provide a substantial

number of construction related jobs in addition to the more than 1,000 jobs currently supported. The increase in O&M expenditures would also create other employment opportunities. Recreational facility improvements would likely lead to increased visitation and associated spending, while measures designed to enhance both warm and coldwater fisheries could lead to increased catch rates and an improved recreation experience, which could also lead to increased visitation and spending.

Project socioeconomic effects would not be uniform across all jurisdictions. Because the city of Oroville has more lodging places, eating establishments, and shopping destinations than unincorporated Butte County, most of the sales tax revenue associated with project-related spending (both the spending of recreational visitors to the project and project-related O&M spending) accrues to the city. DWR's analysis, with which we concur, shows that the city of Oroville receives a net fiscal benefit from the project, with project-related tax revenue exceeding project-related expenditures. Similarly, the cities of Biggs, Gridley, Chico, and Paradise are projected to experience a net fiscal benefit. Our analysis shows that the opposite would be true for Butte County, where project operation would likely continue to have a direct negative net fiscal impact. The County's costs are predicted to exceed revenues associated with all three elements of project-related economic activity, including non-residents visiting the Oroville Facilities for recreation, O&M related to the project, and indirect growth attributable to the population supported by visitor spending and related economic activity.

In terms of regional effects, the project would continue to provide flood protection benefits and increased property values in some neighborhoods near Lake Oroville.

Recommendations of Others

Butte County recommends DWR relocate the Emergency Operations Center; provide low cost power to local residents; provide funding for law enforcement, fire and rescue services, health and human services, and road construction and maintenance; make payments in lieu of taxes; and prepare socioeconomic monitoring reports to describe the status and effectiveness of DWR's implementation of these measures.

Emergency Operations Center—We are not convinced that DWR's operation of the power canal or that DWR's operation of the Oroville Facilities during flood events has increased the flood risk for the Emergency Operations Center, which is not in either the 100-year or 500-year floodplain. Even during the 1997 flood, a low probability event, the Emergency Operations Center was not damaged. This low probability, in combination with the fact that the inlet to the Thermalito power canal can be regulated by three radial gates and the fact that the Emergency Operations Center is at a higher elevation than the power canal, suggests that operation of the project helps alleviate downstream flooding and does not increase the flood threat to the Emergency Operations Center.

Low Cost Power—The potential distribution of low cost power is an issue beyond the scope of this EIS.

Cost for County Services—DWR's study results and Butte County's socioeconomic studies presented divergent conclusions. We critiqued the methods used by both parties and did not entirely concur with some of the assumptions and analysis presented by either. Consequently, we used information in both DWR's and Butte County's reports and what we considered to be defensible assumptions to adjust the reports' findings (see section 3.3.10.2, *Environmental Effects, Net Fiscal Effects in Socioeconomics*). Our staff estimate of the net fiscal deficit, -\$573,800 represents about 0.2 percent of the County's total FY 2002-2003 budget, and about 2 percent of the General Fund budget, which covers safety and law enforcement costs.

As we note in the socioeconomic section, this estimate of net fiscal effects does not account for other tax revenue estimates that have been submitted in the record, including a possible net tax revenue increase of \$598,000 associated with the land and developments protected from flooding by the project

(CH2M HILL, 2006) and a positive but unquantified change in tax revenue associated with the increased value of property near Lake Oroville (Harza/EDAW Team and DWR, 2004). Nor does it account for possible indirect benefits related to DWR's planned Supplemental Benefits Fund.¹¹⁸ However, none of these revenue estimates consider County expenditures that could be associated with any of the revenues, and it is not clear that they would have a net positive fiscal effect if both revenues and expenditures were considered.

After considering the costs and benefits that have been quantified, we conclude that the project may impose a negative net fiscal impact on Butte County. This negative net fiscal impact is the result of the County's obligation to provide services to the project and project visitors, including law enforcement, fire and rescue, and road maintenance services, that are not compensated through property taxes, sales taxes, or other payments. Some of the economic benefits that the project provides, that were not quantified in our fiscal analysis, may lessen this negative impact.

Payments in Lieu of Taxes—As a state entity, DWR does not pay state, local, or federal taxes associated with the Oroville Facilities, which an investor-owned utility would be required to pay. Any tax or other payment would help to reimburse the County for the services it provides. However, state and local tax law does not fall under the Commission's jurisdiction, and including payments in lieu of taxes in any project license is an issue beyond the scope of this EIS.

Socioeconomic Monitoring Report—There is no clear indication of why the data or reports are needed. Because Butte County's recommended socioeconomic monitoring report does not identify a specific information need or indicate how such information would be used, we do not recommend including this measure in the project license.

5.1.2.9 Administrative

Ecological Committee (Proposed Article A100)

DWR proposes to establish and convene, within 3 months of license issuance, an Ecological Committee for the purpose of reviewing plans and reports and providing advice to DWR on implementing 13 proposed articles.

The project encompasses numerous types of natural, social, and cultural resources. Several programs are proposed to address the effects of the project on these interrelated resources and each program has monitoring, reporting and evaluation elements, some with adaptive management provisions. We recommend including this measure because an Ecological Committee would be an effective framework for DWR to engage interested parties in reviewing monitoring results and making recommendations related to implementation of certain license articles. This committee would provide a forum for interdisciplinary discussions and integrated approaches to making recommended changes related to adaptive resource management. The list of proposed Ecological Committee members¹¹⁹ includes appropriate key agencies at the federal, state, and local levels while protecting any agency's authority as it may relate to a specific license condition. Since the goal of the committee is to reach consensus on recommendations related to specific articles, there would likely be fewer divergent opinions on recommendations to the Commission. This would streamline Commission approval and avoid delays

¹¹⁸ See appendix B of the Settlement Agreement.

¹¹⁹ With the exception of the Water Board and Regional Board, members are required to be signatories to the Settlement Agreement. We note that not all of the entities listed in the proposed article, including Butte County, have signed the Settlement Agreement and therefore may not be eligible to be Ecological Committee members.

to implementing changes. Benefits would be realized sooner than if the Commission needed to evaluate competing recommendations. Therefore, we recommend the establishment of the Ecological Committee.

We recognize that some parties object to the Ecological Committee membership requirement of being a signatory to the Settlement Agreement. The details of participant involvement will be addressed in any license order for the project. We estimate that the annual cost to establish and implement the Ecological Committee would be \$57,000. This would be a reasonable cost to provide a forum for stakeholders to review and comment on DWR's monitoring efforts and adaptive management actions related to license implementation.

Flood Control (Proposed Article A130)

This proposed article restates DWR's responsibility to operate the project for flood control pursuant to section 204 of the Flood Control Act of 1958 and other applicable law.

We recommend including this proposed article to acknowledge the project will continue to be operated subject to Corps rules and regulations for flood control. We also recommend in any new license articles similar to articles 32 and 50 of the existing license, to require that DWR continue to collaborate with the Corps in implementing a program of operations for the Project in the interest of flood control.

Early Warning System (Proposed Article A131)

This measure requires DWR to develop an Early Warning Plan for Commission approval. We recommend including this measure as part of the project's existing Emergency Action Plan. The licensee should develop the early warning system in consultation with the specified agencies. Upon completion, the licensee should file the proposal with the Commission's Division of Dam Safety and Inspections San Francisco Regional Office, along with documentation of consulted agencies approvals. Upon review, San Francisco Regional Office would direct the licensee to modify the project's Emergency Action Plan to include the new measure, or take other actions as appropriate.

Project Boundary Modifications (Proposed Article A133)

Under this proposed article, DWR proposes to file revised exhibit G maps and a license amendment to show all project works. In accordance with section 4.41(h) of our regulations and/or specific articles in a license, the Commission requires that licensees file updated exhibit G drawings.

Expenditures (Proposed Article A134)

This measure acknowledges that the Commission reserves the right to require the licensee to undertake reasonable actions regardless of cost caps identified in the Settlement Agreement articles.

Procedural Requirements (Proposed Article A135)

Under this measure the Commission would not consider motions from Settlement Agreement signatories to reopen or amend the project license unless they have complied with procedural requirements of the Settlement Agreement.

This matter is not addressed in our recommendations; however, it will be addressed in the license order for the project.

Recommendations of Others

Multiple entities recommended eliminating the requirement to be a signatory to the Settlement Agreement in order to be a Recreation Advisory Committee member. Several other commentors had recommendations relating to public involvement, organizational structure of the Recreation Advisory

Committee and complaint processes. Our analysis focuses on the function of the proposed committees. Issues concerning membership or related organizational processes are not addressed in our recommendations, but will be addressed in the license order for the project.

5.1.3 Forest Service Terms and Conditions

The Forest Service filed 19 preliminary 4(e) conditions for the project. Two preliminary 4(e) conditions that are not standardized license conditions or included in the proposed articles of the Settlement Agreement are discussed below in sections, 5.1.4.2, *Protection of Forest Service Special Status Species*, and 5.1.4.3, *Fuels Management Plan*.

5.1.4 Additional Measures Recommended by Staff

We recommend including the following additional measures not contained in the Settlement Agreement in any license issued for the project.

5.1.4.1 Reseeding Oroville Dam

We recommend DWR develop a plan to continue reseeding the Oroville dam with wildflowers. DWR indicated that seeding the dam face with poppies has not been successful and is more costly than we originally estimated in the draft EIS. The plan should identify planting locations, characterize seasonal presence of the plants, and describe the estimated plant height. The plan should also state that DWR would remove the plants if the Division of Dam Safety Inspections determines this action would be necessary for the purposes of dam safety or inspections. We note that providing a floral cover would continue a practice that DWR initiated as an interim measure during its relicensing effort. We also recommend securing plan approval from the Division of Dam Safety and Inspections, San Francisco Regional Office to address any dam safety concerns before implementation. Although this measure would not provide screening for the dam, it would take advantage of its prominent feature on the landscape by introducing a dimension of interest and scenic beauty that would please those viewing the dam. We find that since the view cannot be screened, it should at least have a pleasing appearance. We recommend the use of self-sustaining plant species and to occasionally supplement bare areas on an as-needed basis to continue providing this benefit. We consider the cost for this measure to be minimal compared to continuing to provide the benefits of a pleasing and interesting view to visitors as well as the local residents.

We estimate the total annualized cost of this measure would be about \$900. We consider the improvements to aesthetic resources to be worth the cost.

5.1.4.2 Protection of Forest Service Special Status Species (Forest Service 4(e) Condition No. 17)

This preliminary 4(e) condition would require that DWR prepare a biological evaluation of the effects of any proposed project construction activities on Forest Service special status species or their habitat.

We recommend including this condition in the project license. Although the Proposed Action does not include construction on National Forest System lands, unforeseen events could occur that result in such a need. This condition provides a contingency that would afford proper protection for special status species if construction were necessary on National Forest System lands. We find it is appropriate to include this measure in the project license considering the agency's statutory authority to protect special status species and any such construction would be directly related to the project.

We do not estimate the total annualized cost of this measure but we find it would be minimal. There is no planned construction under the Proposed Action, and it is unlikely that any such construction would be needed.

5.1.4.3 Fuels Management Plan (Forest Service 4(e) Condition No. 19)

This preliminary 4(e) condition would require a fuel management plan for National Forest System lands within the project boundary.

Although there is minimal National Forest System land within the project boundary we note that its upslope location from the project places these lands at particular risk from fires that may be related to the project. We also note that DWR has agreed to prepare a broader fuels management plan for the project and DWR's actions under this condition would be a minor component of the larger plan. We recommend including this measure because it would reduce the risk associated with potential project-related fires and would require a marginal level of effort to develop this plan as part of the larger plan DWR proposes to develop under Measure B102, *Development of a Fuel Load Management Plan*, of the Settlement Agreement.

We estimate the total annualized cost of this measure would be about \$1,000.

5.2 CUMULATIVE EFFECTS

Geology and Soils

The interruption of natural geomorphic processes that has been occurring in the Feather River watershed beginning with timber harvesting and hydraulic mining activities in 1800s and followed by hydroelectric facility construction within the watershed since the early 1900s would continue under the No-action Alternative. The Oroville Facilities and other upstream hydroelectric dams would continue to cause a sediment deficit in the river. These facilities would also continue to reduce sediment transport, channel migration, and the recruitment of gravel and LWD on portions of the Feather River. The continued deprivation of sediment load in the Feather River from related actions would also result in a reduction in the formation of sediment benches and point bars, which in turn would affect the ability of the channel to capture and retain quantities of LWD. These geomorphic effects would result in incremental reductions to channel complexity downstream of the Oroville Facilities. The most significant reductions in downstream channel complexity (as related to reductions in salmonid holding, spawning, and rearing habitat) are the continued coarsening of the Feather River salmonid spawning beds, homogenization of the channel (decrease in pool depth, and reduction in channel migration and alteration of pool riffle sequences), and reduction of LWD loading. The Oroville Facilities would continue to attenuate peak flows, providing a level of flood protection benefits downstream.

Under the Proposed Action and Staff Alternative, the Gravel Supplementation and Improvement Program (Proposed Article A102), the Channel Improvement Program (Proposed Article A103), the Structural Habitat Supplementation and Improvement Program (Proposed Article A104), and the Riparian and Floodplain Improvement Program (Proposed Article A106) would provide some improvement in the level of channel complexity downstream of the fish barrier dam. Side-channel habitat improvements would provide about 2,500 feet of additional spawning and rearing habitat available to salmonids and some large wood and/or other habitat features (between 50 and 500 elements) would be placed in the river. DWR proposes to place 8,300 cubic yards of gravel in the river to improve spawning habitat and offset the sediment deficit. The increase in minimum flow in the low flow channel would not affect geology, soil, and geomorphologic resources because the increase is still far below the threshold required to cause any geomorphic change, as related to channel migration, scour and sorting of spawning gravels, or recruitment of LWD. There would continue to be an estimated 97 percent reduction in sediment supply from the watershed above Lake Oroville, and a reduction in channel migration, gravel, and LWD

recruitment. The Oroville Facilities would continue to attenuate peak flows, providing a level of flood protection benefits downstream.

Water Resources

Since construction of the Oroville Facilities, and other FERC-licensed projects upstream of the Oroville Facilities, their operations have affected water quantity throughout much of the Feather River Basin. Increasing flows in the low flow channel would slightly increase localized flows in that reach; however, such changes would not be expected to produce a major shift in flows downstream of the Oroville Facilities. Under all the alternatives, we would expect average annual Feather River service area deliveries under existing conditions and year 2020 conditions to remain 994,000 acre-feet, and average annual South Delta deliveries to increase from the existing 3,051,000 acre-feet to 3,247,000 acre-feet in year 2020. Although the annual flows in the Feather River downstream of Thermalito afterbay would remain similar over time, there is a seasonal change in flow distribution with higher flows from May through August and lower flows from September through April under year 2020 conditions relative to existing conditions.

Aquatic Resources

Past and present cumulative effects on aquatic resources in the Feather River Watershed result from hydropower development and operations; irrigation withdrawals; agricultural and urban development; extensive mining activities; recreational use and development; timber harvesting; road building and maintenance; sport and commercial fisheries; and hatchery management.

These actions have caused adverse water quality and aquatic habitat effects, such as increased erosion and sedimentation, chemical and bacterial contamination, decreased floodplain connectivity, decreased riparian zones and LWD recruitment potential, altered peakflows and baseflows, altered sediment transport, wetland and side-channel filling, riprapping to control channel migration, decreased aquatic habitat complexity, creation of migration barriers, changes in anadromous run timing and genetics, decreased MDN and productivity, and non-native fish and noxious/invasive weed introductions (see also Cumulative Effects in section 3.3.1, Soils, Geology, and Paleontological Resources).

The Settlement Agreement includes nine environmental measures to improve coldwater and warmwater fisheries habitats and increase the populations of ESA-listed Chinook salmon and steelhead within the project area. These measures include the formation of an Ecological Committee and development of: a Gravel Supplementation and Improvement Program; Channel Improvement Program; Structural Habitat Supplementation and Improvement Program; Fish Weir Program, Riparian and Floodplain Improvement Program; Feather River Fish Hatchery Improvement Program; Flow/Temperature to Support Anadromous Fish; and a Comprehensive Water Quality Monitoring Program that have been previously discussed. These fisheries conservation measures would reduce the cumulative effects associated with the operation of Oroville Facilities, and benefit all native, coldwater fishes (not just anadromous fishes) by improving the quality of coldwater and warmwater aquatic habitats in the Feather River.

Terrestrial Resources

Riparian communities in the Sacramento Valley have been adversely affected by the development of numerous hydroelectric and reservoir projects, mining, water diversions, channelization, and levee construction. Project facilities and operations contribute to the loss of riparian communities downstream of the project by reducing sediment discharge and floodflows.

Flow management and project maintenance, along with recreational use, land development, agriculture, and fire suppression contribute to the loss of upland plant communities and wetlands and the spread of invasive species. Loss of vegetation would occur, as a result of the proposed aquatic and

recreational measures, as well as non-project related land management, development, and agriculture. Water level fluctuations and project recreational use contribute to the loss of waterfowl and grebe nesting habitat; however, the proposed brood ponds and improved cover and forage habitat, in addition to existing activities by the DFG, would have a beneficial effect on Sacramento Valley waterfowl.

Existing and proposed activities, in addition to management and development of lands adjacent to the project boundary, would also increase the potential for invasive species proliferation. The proposed invasive species plan, however, would result in a cumulative beneficial effect on native plant communities and wildlife because it would manage for, control, and eradicate invasive species, particularly in areas with special-status species and commercially and recreationally important species.

Threatened and Endangered Aquatic Species

The cumulative effects on geomorphic, floodplain, riparian, and aquatic resources listed in sections 3.3.3 *Soils, Geology, and Paleontological Resources*, and 3.3.3, *Aquatic Resources*, have adversely affected and led to ESA-listing of Chinook salmon and steelhead in the Feather River. The Settlement Agreement includes nine environmental measures to improve coldwater fisheries habitat and increase the populations of ESA-listed Chinook salmon and steelhead within the project area. These measures include those identified above under Aquatic Resources.

DWR developed the coldwater fisheries environmental measures in the Proposed Action in cooperation with NMFS and other entities to reduce the cumulative effects associated with the Oroville Facilities and their operation and to improve the quality of coldwater habitat in the Feather River and operations of the Feather River Fish Hatchery. These measures are expected to increase the listed Central Valley Chinook salmon and steelhead populations in the Feather River, and conserve the spring-run of Chinook salmon. However, genetic introgression of hatchery and wild stocks and of spring-run and fall-run Chinook, potential disease transfer between hatchery and wild salmonids, redd superimposition, and pre-spawning mortality would still occur (albeit to a lesser degree than currently occur) due to the intense competition for limited spawning and rearing habitat, hatchery supplementation and other fisheries management practices (e.g., stocking fish from another basin) that are intended to compensate for the loss of high quality, anadromous habitat.

Cultural Resources

The Oroville Facilities is one component in the State Water Project and only one of several other hydroelectric projects in central California that affect prehistoric and historic archaeological resources located along the Feather River and its tributaries. These projects attract recreational use around the reservoirs. The increased recreational use resulting from the availability of large lakes has contributed to the inadvertent or intentional destruction of prehistoric and historic archaeological resources. While continued erosion and recreational use of the Feather River area would be expected to continue to affect prehistoric and historic archaeological resources, the measures included in HPMPs being developed or implemented at the Upper North Fork Feather River Project and the Poe Project, among others, taken in combination with the measures included in the HPMP for the Oroville Facilities would cumulatively reduce the rate of destruction of these cultural resources.

5.3 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

Under provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other

applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

In response to the Commission's Ready for Environmental Analysis notice dated September 12, 2005, Interior (on behalf of FWS) filed Section 10(j) recommendations and Section 18 reservation of authority to prescribe fishways for the project on March 31, 2006. NMFS filed Section 10(j) recommendations and Section 18 reservation of authority on March 29, 2006, and DFG filed Section 10(j) recommendations on March 29, 2006. These agencies are also parties to the Settlement Agreement and, and their recommendations are consistent with DWR's proposed articles.

In their letters, Interior, NMFS, and DFG recommend that the Commission approve the Settlement Agreement and all the provisions thereof. Commission staff is also recommending that most of the provisions of the Settlement Agreement, with minor modifications, be included as terms of any new license. Although we adopt Interior, NMFS, and DFG's recommendations under the Staff Alternative, we note minor modifications to some measures listed below in italics. Our rationale for these modifications is discussed above.

Supplement gravel in the Feather River to benefit spawning habitat for anadromous fish. Monitor at least 10 of the 15 riffles every 5 years *on a rotating basis or after a high flow event. Develop a common definition of median size ranges of gravels to benefit Chinook salmon and steelhead.* (Proposed Article A102)

Identify potential actions and implement a phased program to enhance riparian corridor and connect the Feather River to its floodplain, including how flood/pulse flows may contribute to floodplain values and benefit fish and wildlife species. *DWR's evaluation of potential actions should include the potential for flood/pulse flows to increase the risk of IHN transmission. Delineate specific on-the-ground actions, or provide a quantified benchmark by which success and compliance of the measures can be assessed.* (Proposed Article A106)

Maintain at least 700 cfs in the low flow channel except from September 1 to March 31 when the requirement is 800 cfs to provide suitable conditions for spawning anadromous fish. *Obtain Commission approval prior to implementing any modification to instream flows.* (Proposed Article A108)

Meet specified water temperature objectives in the low flow and high flow channels according to a two-phase approach. A set of water temperature objectives would be targets up until 10 years after license issuance or completion of facility modifications after which they would become license requirements. Alternative water temperature objectives at least as restrictive as DWR's Proposal could be developed as part of this program *and submitted to the Commission for approval.* (Proposed Article A108)

5.4 CONSISTENCY WITH COMPREHENSIVE AND OTHER RESOURCE PLANS

Section 10(a)(2)(A) of the FPA requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, or conserving waterways affected by the project. Under Section 10(a)(2), federal and state agencies filed plans that address various resources in California. Seventeen plans address resources relevant to the Oroville Facilities. We determined there are no conflicts with the proposed project.

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5.5 RELATIONSHIP OF LICENSE PROCESS TO LAWS AND POLICIES

5.5.1 Water Quality Certification

Section 401 of the Clean Water Act (33 U.S.C. §1341) requires that a license applicant obtain from the state a certification that project discharges will comply with applicable effluent limitations, or

waiver of certification. Without a 401 certificate, the project cannot be licensed. On October 26, 2005, DWR applied to Water Board for water quality certification for the Oroville Facilities as required by Section 401 of the Clean Water Act. On October 16, 2006, DWR withdrew and re-applied for Water Quality Certification. The Water Board is required to take action within 1 year of the application filing date, which would be October 16, 2007.

5.5.2 Endangered Species Act

Section 7 of the ESA requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or cause the destruction or adverse modification of the critical habitat of such species.

Protected salmonid ESUs that occur in the project area include the federally listed as threatened Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*), and the Central Valley steelhead (*Oncorhynchus mykiss*). A Distinct Population Segment for the North American green sturgeon (*Acipenser medirostris*) occurs in the project area. The Feather River downstream of the Oroville dam also has been designated as critical habitat for these species. Areas upstream of Oroville dam have not been designated as critical habitat for either species by NMFS.

Although no federally listed plant species have been found in the project boundary during relicensing surveys, potential habitat exists for the following seven species: the endangered Butte County meadowfoam (*Limnathes floccosa* ssp. *Californica*), hairy Orcutt grass (*Orcuttia pilos*), Hartweg's golden sunburst (*Pseudobahia bahiifolia*), and Greene's tuctoria (*Tuctoria greenei*), and the threatened Hoover's spurge (*Chamaesyce hooveri*), slender Orcutt grass (*Orcuttia tenuis*), and Layne's ragwort (*Senecio layneae*). No designated critical habitat for these species occurs in the project area.

FWS, in a letter dated January 28, 2004, identified the following federally listed wildlife species that potentially occur in the project vicinity: the endangered vernal pool tadpole shrimp (*Lepidurus packardii*) and conservancy fairy shrimp (*Branchinecta conservatio*), and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*), bald eagle (*Haliaeetus leucocephalus*), giant garter snake (*Thamnophis couchi gigas*), California red-legged frog (*Rana aurora draytonii*), and valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). No designated critical habitat for these species occurs in the project area.

Our analysis of project effects on these species are presented in section 3.3.5, *Threatened and Endangered Species*, and our final recommendations are presented in section 5.1, *Comprehensive Development and Recommended Alternative*.

Although the seven discussed listed plant species do not occur in the project boundary, because suitable habitat does exist, we conclude that relicensing the project would be not likely to adversely affect those species. Additionally, we conclude that relicensing the project would be not likely to adversely affect the conservancy fairy shrimp and the California red-legged frog. Suitable habitat for the conservancy fairy shrimp does not exist within the project boundary. Like the listed plant species, the California red-legged frog does not exist within the project boundary, however suitable habitat does occur.

We conclude that relicensing this project with the fish habitat protection and enhancement measures proposed in the Settlement Agreement and recommended under the Staff Alternative would likely have no effect on green sturgeon in the lower Feather River because this species has not been documented in the project area. If future monitoring indicates North American green sturgeon are present in the project area, or the lower Feather River population is being affected by Oroville Facilities and operations, adaptive management strategies would be implemented in consultation with NMFS and DFG, and ESA consultation may need to be reinitiated. We also conclude that relicensing the project would not

be likely to adversely affect delta smelt because it does not occur within the project area, and the project would not affect water quantity downstream.

We conclude that relicensing this project with the fish habitat protection and enhancement measures proposed in the Settlement Agreement and recommended under the Staff Alternative would likely have a beneficial effect on the Central Valley spring-run Chinook salmon and Central Valley steelhead relative to the current conditions. DWR developed the coldwater fisheries conservation measures in the Proposed Action in cooperation with NMFS and other entities to reduce the cumulative effects associated with the Oroville Facilities and its operation and to improve the quality of coldwater habitat in the Feather River and operations of the Feather River Fish Hatchery. These measures are expected to increase the listed Central Valley Chinook salmon and steelhead populations in the Feather River, conserve the spring-run Chinook salmon, and increase the amount of suitable habitat for these species. However, the Oroville Facilities and its operation would continue to decrease the amount of high quality habitat available to these species due to the fish passage barrier that prevents access to tributaries, flow alteration, loss of LWD and spawning gravel recruitment, and decreased floodplain connectivity. As such, we conclude that the project may be likely to adversely affect the Central Valley spring-run Chinook salmon, Central Valley steelhead, and their designated critical habitat below Lake Oroville despite the proposed improvements to baseline conditions.

We conclude that relicensing this project with the terrestrial habitat protection and enhancement measures proposed in the Settlement Agreement and recommended under the Staff Alternative would likely have a beneficial effect on the bald eagle, giant garter snake, California red legged frog, Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and valley elderberry longhorn beetle. No giant garter snakes were located within the project boundary, however, several aquatic and recreation protection and enhancement measures, such as the channel improvement program, gravel supplementation and improvement program, fish weir program, and development of recreation facilities have the potential to adversely affect giant garter snake habitat. Additionally, terrestrial and recreational resources enhancements, such as the proposed upland habitat enhancements and construction of recreational facilities, could adversely affect bald eagle, vernal pool invertebrate (vernal pool fairy shrimp and vernal pool tadpole shrimp), and valley elderberry longhorn beetle habitat. As such, we conclude that the project may be likely to adversely affect, the bald eagle, giant garter snake, vernal pool fairy shrimp, vernal pool tadpole shrimp, and valley elderberry longhorn beetle.

On October 24, 2006, we requested formal consultation with NMFS based on our findings of “likely to adversely affect” for the Central Valley Chinook spring-run salmon and Central Valley steelhead along with their designated critical habitat. NMFS has not as yet issued its biological opinion.

On October 24, 2006, we requested formal consultation with FWS based on our findings of “likely to adversely affect” for the endangered vernal pool tadpole shrimp and Conservancy shrimp, and the threatened bald eagle, giant garter snake, California red-legged frog, Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and valley elderberry longhorn beetle. We also requested concurrence with our finding of “no effect” on the endangered Butte County meadowfoam, hairy Orcutt grass, Hartweg’s golden sunburst, and Greene’s tuctoria, and the threatened Hoover’s surge, slender Orcutt grass, and Layne’s ragwort.

FWS issued its biological opinion on April 9, 2007, finding that the proposed project is not likely to jeopardize the continued existence of any of the federally listed species that could be found in the project area. The biological opinion included incidental take statements for the bald eagle, giant garter snake, vernal pool fairy shrimp, vernal pool tadpole shrimp, and valley elderberry longhorn beetle. The following reasonable and prudent measures to minimize the effect of incidental take are contained within the biological opinion: (1) take in the form of harm, harassment, and mortality of the valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, giant garter snake, and bald eagle during proposed project activities and activities associated with implementing the project shall be

minimized and (2) the effects to the valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, giant garter snake, and bald eagle resulting from habitat modification and temporary and permanent losses and degradation of habitat shall be minimized.

The biological opinion also included the following terms and conditions that would implement the previously described reasonable and prudent measures: (1) DWR should implement the conservation measures described in the draft biological assessment contained in Appendix E of the PDEA; (2) DWR should adhere to the conservation measures described in the biological opinion; (3) DWR should provide proof of purchase to the FWS if habitat compensation credits are purchased; (4) DWR should provide FWS with a habitat management plan for compensation areas if DWR conducts habitat compensation within the project boundary; (5) DWR should include within the habitat management plan measures to be implemented over the term of license period and a list of prohibited activities within the compensation preserve areas; (6) adherence with FWS's statement pursuant to reinitiation of formal consultation; and (7) adherence with the reporting requirements contained in the biological opinion.

Our recommended measures included as part of the staff alternative are consistent with these terms and conditions. We recommend development of a threatened and endangered species implementation plan that would describe how DWR would comply with its proposed conservation measures to protect threatened and endangered species and the terms and conditions contained within FWS's April 9, 2007, biological opinion. The implementation plan would require, in the event of unanticipated adverse effects on the giant garter snake, valley elderberry longhorn beetle, and vernal pool invertebrates, compensation plans to address adverse effects on these species, including a discussion of purchased compensation credits versus onsite habitat conservation, consistent with terms and conditions 3 through 5.

In addition to these terms and conditions, FWS also makes the following conservation recommendations: (1) the Commission should encourage DWR to work with Butte County, Butte County Association of Governments, FWS, city governments, and other stakeholders to implement a multi-species HCP in Butte County to further the conservation of special-status species; (2) the Commission should continue to encourage license applicants to implement resource actions that benefit federally listed species and their habitats to aid in the recovery of federally listed species; and (3) any transmission lines constructed as part of the Oroville Facilities should be constructed in a manner to prevent electrocution to raptor species and existing transmission lines should be modified in a manner to prevent electrocution of raptor species using methods recommended in the Avian Power Line Interaction Committee's Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (APLIC, 2006). Although we do not specifically include these recommendations in our staff alternative, our recommended measures and policies are consistent with these conservation recommendations. The Commission routinely encourages license applicants to implement measure to benefit federally listed species and their habitats. The parties mentioned in the first conservation recommendation have sufficient incentive to develop a multi-species HCP on their own without Commission intervention. It is up to the affected parties to determine if an HCP is in their best interests. As discussed in section 3.3.5.2, *Environmental Effects on Bald Eagles*, the existing project transmission lines do not pose an electrocution hazard to raptors and no new transmission lines are proposed as part of this relicensing. If unforeseen electrocutions occur or new transmission line construction is proposed in the future, the standard consultation reopener could be invoked at that time to enforce additional measures.

5.5.3 Essential Fish Habitat

Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with the Secretary of Commerce on all actions or proposed actions that are authorized, funded, or undertaken by the agency and that may adversely affect essential fish habitat (EFH). The Pacific Fisheries Management Council has designated EFH for the following federally managed Pacific salmon: Chinook, coho, and Puget Sound pink salmon. Freshwater EFH for these

Pacific salmon includes all streams, lakes, ponds, wetlands, and other waterbodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable artificial (man-made) barriers, and long-standing, naturally impassable barriers. The Feather River downstream of Lake Oroville is EFH for Central Valley spring-run Chinook salmon (PFMC, 1999).

The Proposed Action would result in improved conditions in the Chinook salmon riverine habitat downstream of Lake Oroville over existing conditions due to the LWD and spawning gravel supplementation programs, increased flows, and floodplain improvements. At the same time, the continued regulation of flows, decreased LWD and gravel recruitment, and loss of floodplain connectivity would continue to have adverse effects on Chinook habitat, despite the proposed supplementation and improvements.

Therefore, we conclude that relicensing the project as proposed by the applicants would continue to have an adverse effect on Chinook salmon EFH, but that elements of the Proposed Action would reduce these effects over the existing conditions.

5.5.4 National Historic Preservation Act

Relicensing is considered an undertaking within Section 106 of the National Historic Preservation Act of 1966, as amended (P.L.89-665; 16 U.S.C.470). Section 106 requires that every federal agency “take into account” how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register. As the lead federal agency for issuing a license, the Commission is responsible for ensuring that the licensee will take all necessary steps to “evaluate alternatives or modifications” that “would avoid, minimize, or mitigate any adverse effects on historic properties” for the term of the new license involving the project. The lead agency must also consult with the SHPO(s), as well as with other land management agencies where the undertaking may have an effect, and with Indian tribes who may have cultural affiliations with affected properties involving the undertaking. The overall review process involving Section 106 is administered by the Advisory Council on Historic Preservation, an independent federal agency.

To meet the requirements of Section 106, the Commission will execute a programmatic agreement for the protection of historic properties from the effects of the continued operation of the Oroville Facilities. The terms of the programmatic agreement would ensure that DWR would address and treat all historic properties identified within the project area through an HPMP. The HPMP entails ongoing consultation involving historic properties for the license term.

5.5.5 California Environmental Quality Act

CEQA is the California counterpart to NEPA. CEQA went into effect in 1970 for the purpose of monitoring land development in California through a permitting process. This statute, enacted to protect the health of the environment from current and future development, requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA applies to all discretionary activities proposed to be undertaken or approved by California state and local government agencies, including DWR and the Water Board. Because the Water Board must act on DWR’s request for a water quality certificate for the Oroville Facilities relicensing (see section 5.5.1, *Section 401 of the Clean Water Act—Water Quality Certification*), the Water Board has responsibilities as the lead agency under CEQA.

Under CEQA, an environmental impact report is prepared when the public agency finds substantial evidence that the project may have a significant effect on the environment. An environmental impact report is the public document used to analyze the significant environmental effects of a proposed project, to identify alternatives, and to disclose possible ways to reduce or avoid the possible

environmental damage. CEQA guidelines state that when federal review of a project is also required, state agencies are encouraged to integrate the two processes to the fullest extent possible, which may include a joint environmental impact report/EIS. While this document is not a joint environmental impact report/EIS, the Water Board has the opportunity to use this document, as appropriate, to satisfy its responsibilities under CEQA. As such, we invite the Water Board's comments on this EIS as they may pertain to the agency's use of the final EIS for CEQA purposes.

The content requirements for an environmental impact report under CEQA are similar to the requirements for an EIS, although an environmental impact report must contain two elements not required by NEPA. The first element needed in an environmental impact report not required by NEPA is a discussion of how the proposed project, if implemented, could induce growth. A project can be considered to have a growth-inducing effect if it directly or indirectly fosters economic or population growth or removes obstacles to population growth, strains existing community service facilities to the extent that the construction of new facilities would be needed, or encourages or facilitates other activities that cause significant environmental impacts. We discuss growth-inducing impacts of the Oroville Facilities these effects in section 3.3.10, *Socioeconomic Resources*.

The second element needed in an environmental impact report, but not required by NEPA, is a discussion of a program for monitoring or reporting on mitigation measures that were adopted or made conditions of project approval. The monitoring or reporting program must ensure compliance with mitigation measures during project implementation. The program may also provide information on the effectiveness of mitigation measures. Although discussion of the mitigation reporting or monitoring program can be deferred until the final environmental impact report or, in some cases, after project approval, it is often included in the draft environmental impact report to obtain public review and comment.

In section 5.1, *Comprehensive Development and Recommended Alternative*, we list the mitigation measures and monitoring and reporting requirements we recommend for inclusion in any license issued for the Oroville Facilities. See chapter 3, *Environmental Analysis*, for a review of the analysis of each affected environmental resource and the rationale for each recommended measure. Many of the measures are consistent with the comprehensive Settlement Agreement for the Oroville Facilities that was filed with the Commission by DWR on March 24, 2006 (see section 1.4, *Settlement Agreement*, for more discussion).

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COVER SHEET

**FEDERAL ENERGY REGULATORY COMMISSION
FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE OROVILLE FACILITIES PROJECT
Docket No. P-2100-052**

**Section 6
Literature Cited
Pages 399 to 414
FEIS**

6.0 LITERATURE CITED

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COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION
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Section 7
List of Preparers
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7.0 LIST OF PREPARERS

Federal Energy Regulatory Commission

James Fargo—Project Coordinator/Engineering, Economics, and Socioeconomics (Civil Engineer; M.S., Civil Engineering)

Emily Carter—Land Use and Aesthetics (Environmental Biologist; B.A. Environmental Studies)

John Mudre—Geology and Soils, Aquatic Resources, Threatened and Endangered Species (Ecologist; Ph.D. Fisheries Science)

Shana Murray—Recreational Resources (Outdoor Recreation Planner; M.S. Recreation, Park and Tourism Management)

Ann-Ariel Vecchio—Terrestrial Resources and Threatened and Endangered Species (Environmental Biologist; B.A. Environmental Studies and International Relations; M.P.A. Environmental Science and Policy)

Frank Winchell—Cultural Resources (Archeologist; B.A., M.A., Ph.D., Anthropology)

Louis Berger Group

Sue Davis—Terrestrial Resources and Threatened and Endangered Species (Terrestrial Biologist; B.S., Wildlife Management)

Carol Efirid—Task Manager (Recreation Specialist; B.S., Forestry)

Eric Ginney—Geology and Soils (Senior Geomorphologist; M.S., Environmental Geomorphology; B.S., Geosciences [Hydrology and Environmental Science]; B.A., Geography and Planning)

Frankie Green—Recreational Resources and Aesthetics (Senior Environmental Scientist; B.S., Wildlife Biology)

Ellen Hall—Socioeconomics (Senior Project Manager; Ph.D., Resource Economics; M.Ag., Agricultural Economics; B.A., History/Economics)

Coreen Johnson—Editorial Review (Technical Editor; B.A., English Education)

Mark Killgore—Engineering, Economics, and Water Quantity (Water Resources Engineer; M.S.C.E., Water Resources Engineering; B.C.E., Civil Engineering; B.A., Liberal Arts)

Lucy Littlejohn—Aquatic Resources and Threatened and Endangered Species (Fisheries Biologist; M.S., Marine Science; B.S., Natural Science)

Marcelle Lynde—Aquatic Resources and Threatened and Endangered Species (Fisheries Biologist; M.M.A, Marine Resource Management; B.S., Fisheries)

Jot Splenda—Water Quality (M.E.S.M., Water Resources; B.S., Ecology and Evolution)

Pat Weslowski—Cultural Resources (Preservation Planner; Master of Public Administration)

This page intentionally left blank.

COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION
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Section 8
List of Recipients
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FEIS

8.0 LIST OF RECIPIENTS

William O. Davis
Law Offices of William O. Davis
P.O. Box 64
12205 Big Springs Blvd
Old Station, CA 96071

Robert D Alvarez
11280 Yankee Hill Rd
Yankee Hill, CA 95965-8038

Dave Steindorf
California Stewardship Director
American Whitewater Affiliation, Inc.
1325 Deodara Way
Paradise, CA 95969

Steve Rothert
Associate Director Dams Program
American Rivers Inc
409 Spring St
Nevada City, CA 95959

Robert Baiocchi
Anglers Committee
P.O. Box 1790
Graeagle, CA 96103

Wallace Spinarski
Manager
Antelope Valley-East Kern Water Agency
6500 W Avenue N
Palmdale, CA 93551-2855

Wade B. Hough
Commodore
Butte Sailing Club
P.O. Box 787
Palermo, CA 95968-0787

Wayne M. Whitlock
Pillsbury Winthrop Shaw Pittman LLP
Berry Creek Rancheria of Maidu Indians
2475 Hanover Street
Palo Alto, CA 94304-1114

Tom Arend
16847 Dorvel Ln
Anderson, CA 96007-9552

Michael J. Kelley
Butte County Citizens for Fair Gvt
5055 Miners Ranch Rd
Oroville, CA 95966-9318

Carol A. Smoots
Perkins Coie LLP
Butte County, California
607 Fourteenth Street, N. W.
Suite 800
Washington, DC 20005-2011

Bruce Alpert
Butte County, California
25 County Center Dr
Oroville, CA 95965-3316

Susan Minasian
Butte, County Of
Board Of Supervisors
25 County Center Dr
Oroville, CA 95965-3316

CA Sportfishing Protection Alliance
Director
P.O. Box 1790
Graeagle, CA 96103-1790

Jim Crenshaw
CA Sportfishing Protection Alliance
Suite D
1248 E Oak Ave
Woodland, CA 95776-4104

Barbara Leidigh
Staff Counsel IV
California State Wtr Res Control Board
P.O. Box 100
Sacramento, CA 95812

Sharon Stohrer
Environmental Scientist
California State Wtr Res Control Board
1001 I Street, 14th Floor
Sacramento, CA 95814

James Canaday
Senior Environmental Scientist
CA State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000

Kathy Mrowka
CA State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000

California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812-2815

Water Rights & FERC
Coordinator
California Department of Fish and Game
P.O. Box 944209
Sacramento, CA 94244-2090

Ann S. Malcolm
Acting General Counsel
California Department of Fish and Game
Office of the General Counsel
1416 Ninth St., 12th Floor
Sacramento, CA 95814

Nancee M. Murphy
California Department of Fish and Game
1416 9th St Fl 12
Sacramento, CA 95814-5510

Mike Meinz
FERC Relicensing Coordinator
California Department of Fish and Game
Suite A
1701 Nimbus Rd
Rancho Cordova, CA 95670-4503

Larry Eng
California Department of Fish and Game
Suite A
1701 Nimbus Rd
Rancho Cordova, CA 95670-4503

Chief Oroville Field District
California Department of Water Resources
P.O. Box 1191
Oroville, CA 95965-1191

William Cochran
Licensing Coordination Unit
California Department of Water Resources
P.O. Box 1191
Oroville, CA 95965-1191

Deputy Director State Water Project
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Henry M. Ramirez
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Chief Division of Engineering
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Ward Tabor
Office of Chief Council
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Chief
Division of Operations and Mgmt
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Richard Sanchez
Assistant to Division Chief
Division of Operations and Mgmt
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

James Gleim
License and Regulatory Compliance Division
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Director
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Dan Peterson
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Office of Chief Counsel
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Environmental Analyst
California Dept of Conservation
MS 24-01
801 K St
Sacramento, CA 95814-3500

Resource Mgmt. Division
Chief
California Dept. of Parks and Recreation
P.O. Box 942896
Sacramento, CA 94296-0001

State of California
Atty.General
California Office of Attorney General
300 S Spring St Fl 2
Los Angeles, CA 90013-1230

Matthew R. Campbell
California Office of Attorney General
1300 I St # 125
Sacramento, CA 95814-2919

Cherilyn E. Widell
Director
California Office of Historic Preserv
P.O. Box 942896
Sacramento, CA 94296-0001

California Office of the Governor
State Capitol Building
Sacramento, CA 95814

California Public Utilities Commission
Secretary
505 Van Ness Ave
San Francisco, CA 94102-3214

Director
California State Lands Commission
Suite 100-South
100 Howe Ave
Sacramento, CA 95825-8202

Lee Carrico
719 Haselbush Ln
Biggs, CA 95917-9742

Donn Furman
Ex. Director
Committee To Save The Kings River
P.O. Box 4221
Fresno, CA 93744-4221

Stuart Somach
County of Sutter
813 Sixth Street
3rd Floor
Sacramento, CA 95814

Christian Charles Scheuring
County of Sutter
813 Sixth Street
3rd Floor
Sacramento, CA 95814

Secretary
El Dorado County Taxpayers For Quality
P.O. Box 94
Greenwood, CA 95635-0094

Paul Hardy
Feather River Land Trust, Inc.
P.O. Box 4276
Quincy, CA 95971-4276

Jeannie G Gillen
CSHA
State Trails Chair
Commerce Bancshares, Inc.
13133 Franceschi Rd
Twin Oaks Caliente, CA 93518

Liz Murphy
CSHA Reg. 2 Trails Committee
Trails Committee Chair
200 Gold Country Ln
Oroville, CA 95965

Dan Israel
Enterprise Rancheria (CA)
3455 Table Mesa Dr.
Boulder, CO 80305

Jessica F. Miller
Feather River Recreation & Park District
686 Rio Lindo Avenue
Chico, CA 95926

Edward J. Perez
Federal Energy Regulatory Commission
101 SW Main St Ste 905
Portland, OR 97204-3217

Regional Engineer
Portland Regional Office
101 SW Main St Ste 905
Portland, OR 97204-3217

Mark Forwalter
6 Shannon Ct
Chico, CA 95928-4149

Ronald Martin Stork
Friends of the River
915 20th Street
Sacramento, CA 95814

B. Doreen Gordon
2026 6th St
Oroville, CA 95965-3251

Jim Haagen-Smit
Northern CA. Rep.
IMBA
7589 Ridge Rd.
Newcastle, CA 95658

Cathy Haagen-Smit
IMBA
7589 Ridge Rd.
Newcastle, CA 95658

Mark P. Harris
2027 Valencia Way
Sparks, NV 89434-8623

Cathy H. Hodges
P.O. Box 1126
Oroville, CA 95965

General Manager
Imperial Irrigation District
P.O. Box 937
Imperial, CA 92251-0937

Michael Joseph Vandeman
2600 Camino Ramon # 2E950I
San Ramon, CA 94583-5000

Stan Malinky
JBS Energy Inc
BES Hydro, Inc.
311 D St Ste A
West Sacramento, CA 95605-2814

Vicki Ann Weir
1220 Long Bar Rd
Oroville, CA 95966

Anna West
Kearns & West
475 Sansome St Ste 570
San Francisco, CA 94111-3136

Michael J. Kelley
Chairman
Individual
5055 Miners Ranch Rd
Oroville, CA 95966-9318

Edward J. Tiedemann
Kern County Water Agency
Kronick, Moskovitz, Tiedemann & Girard
400 Capitol Mall
27th Floor
Sacramento, CA 95814

Lyle C. Wright
President/Trail Advocate
Lake Oroville Bicyclist Organization
P.O. Box 619
9 Faye Mar Dr.
Oroville, CA 95965

Robert Baiocchi
Lake Oroville Fish Enhancement Committee
P.O. Box 1790
Graeagle, CA 96103

Donald J. Blake Jr.
Lake Oroville Recreation Authority Inc
1875 Wyandotte Ave # B
Oroville, CA 95966-5920

Pat Corgan
P.O. Box 60940
Sacramento, CA 95860-0940

Darcie Houck
Mechoopda Indian Tribe
Monteau & Peebles, LLP
1001 Second Street
Sacramento, CA 95814

Daniel M. Adamson
Metropolitan Water Dist. of Southern CA
Davis Wright Tremaine LLP
1500 K Street, NW
Suite 450
Washington, DC 20005

John Schlotterbeck
Metropolitan Water Dist. of Southern CA
P.O. Box 54153
Los Angeles, CA 90054-0153

Ann M. Milligan
Attorney at Law
P.O. Box 991822
Redding, CA 96099-1822

Steven K. Beckett
Mojave Water Agency
Brunick, Alvarez & Battersby
1839 Commercenter West
San Bernardino, CA 92412

Judith K Albietz
Mooretown Rancheria of Maidu Indians
809 Coombs Street
Napa, CA 94559

James Laster
793 Haselbush Ln
Biggs, CA 95917-9742

Jim Marazzo
299 Plumas Dr
Oroville, CA 95966-9241

Doug McWilliams
8340 Wittedden Lakes Drive
Granite Bay, Ca 95747

Michael L. Morgan
115 Acacia Ave
Oroville, CA 95966-3658

Tom Munson
13482 Sinclair Circle
Magalia, Ca 95954

Marta Nammack
National Marine Fisheries Service
904 S Morris St
Oxford, MD 21654-1323

Dan Hytrek
National Marine Fisheries Service
NOAA, General Counsel Southwest
501 W. Ocean Blvd.
Long Beach, CA 90802

Regional Director
National Marine Fisheries Service
501 W Ocean Blvd Ste 4200
Long Beach, CA 90802-4221

Eric Theiss
Hydro Coordinator
NOAA
650 Capitol Mall Suite 8-300
Sacramento, CA 95814

David A. Neilsen
4828 Fortna Rd
Yuba City, CA 95993-8526

Director
Northwest Power Planning Council
Suite 1100
851 SW 6th Ave
Portland, OR 97204-1337

Kevin Zeitler
ORAC Chair
P.O. Box 528
Oroville, CA 95965-0528

Karolyn Fairbanks
Oroville Chamber of Commerce
1789 Montgomery St
Oroville, CA 95965-4820

Legal Department
Oroville Pageant Riders
Attorney at Law
P.O. Box 991822
Redding, CA 96099-1822

Cassie Aw-Yang
City of Oroville
Associate Attorney
813 6th Street, 3rd Floor
Sacramento, CA 95814

Sharon Atteberry
City Administrator
City of Oroville
1735 Montgomery St
Oroville, CA 95965-4820

Mayor Gordon Andoe
City of Oroville
1735 Montgomery St
Oroville, CA 95965-4820

Town Supervisor
City of Oroville
1735 Montgomery St
Oroville, CA 95965-4820

Kay Fenrich
Oroville Chamber Of Commerce
1789 Montgomery St
Oroville, CA 95965-4820

Elizabeth J. Diamond
Legal Secretary
Pacific Gas and Electric Company
77 Beale Street, B30A
San Francisco, CA 94105

Eric Palo
1628 Almendia Dr
Chico, CA 95926-7756

Janet Peterson
Legal Department
Attorney at Law
P.O. Box 991822
Redding, CA 96099-1822

Action Coalition for Equestrians
P.O. Box 1320
Meadow Vista, CA 95722

Kathleen A. Smith
Clerk of the Board
Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604-6570

Brian Morris
Plumas Co Flood Control & Water
Deputy County Counsel
County of Plumas
520 Main Street, Room 302
Quincy, CA 95971

Steven Proe
P.O. Box #94
2905 Slinger Mine Rd.
Greenwood, CA 95635

Judy W. Rhoades
400 Craig Access Rd
Oroville, CA 95966-8736

A. M. Rodeghiero
38 Cynthia Dr
Colusa, CA 95932-3210

Roy Rogers
Legal Department
Attorney at Law
P.O. Box 991822
Redding, CA 96099-1822

Tony Rushing
116 Westelle Dr
Oroville, CA 95966-6831

Stephanie Sager
Legal Department
Attorney at Law
P.O. Box 991822
Redding, CA 96099-1822

Ben Sevdy
9460 Freeland Dr
Chico, CA 95928-8915

Robert Sperry
21 Cedar Tree Ln
Oroville, CA 95966-8744

Tom Berliner
State Water Contractors
Duane Morris LLP
One Market Plaza, Spear Tower, Suite 2000
San Francisco, CA 94105

Craig T. Jones
Project Energy-Resource Mngr
State Water Contractors
1121 L Street
Suite 1050
Sacramento, CA 95814-3944

Taxpayers for Responsible Planning
P.O. Box 1126
Oroville, CA 95965

Legal Department
Attorney at Law
P.O. Box 991822
Redding, CA 96099-1822

Operations Manager
US Department of Interior
DOI/Bureau of Reclamation
3310 El Camino Ave Ste 300
Sacramento, CA 95821-6377

Regional Director
US Department of Interior
DOI/Bureau of Indian Affairs
2800 Cottage Way Ste W2820
Sacramento, CA 95825-1886

Regional Env Officer
US Department of Interior
DOI/Office of Env Policy & Compliance
1111 Jackson St Ofc 520
Oakland, CA 94607-4807

Harry Williamson
US Department of Interior
National Park Service
1111 Jackson St., Suite 700
Oakland, CA 94607

Stephen M. Bowes
US Department of Interior
National Park Service
1111 Jackson Street
Oakland, CA 94607

Kevin Tanaka
Attorney
U.S. Department of the Interior
Department of the Interior - Solicitor's Office
1849 C Street NW, MS 6210
Washington, DC 20240

Chris Watson
Attorney-Advisor
US Department of the Interior
1849 C St, NW - MS 6513
Washington, DC 20240

Howard Matzat
US Department of Interior
DOI/Bureau of Land Management
355 Hemsted Dr
Redding, CA 96002-0910

FERC Coordinator
US Department of Interior
DOI/Bureau of Land Management
2800 Cottage Way Ste W1834
Sacramento, CA 95825-1886

Kaylee A. Allen
Regional Solicitor
US Department of Interior
Pacific Southwest Region
2800 Cottage Way Ste E1712
Sacramento, CA 95825-1863

Kerry O'Hara
US Department of Interior
Office of the Regional Solicitor
2800 Cottage Way Ste E1712
Sacramento, CA 95825-1863

Nancy Zahedi
US Department of Interior
DOI/Office of the Regional Solicitor
2800 Cottage Way Ste E1712
Sacramento, CA 95825-1863

Field Supervisor
US Department of Interior
DOI/Sacramento Fish & Wildlife Office
2800 Cottage Way Ste W2605
Sacramento, CA 95825-1888

Supervisor
DOI/U.S. Fish and Wildlife Service
ARCATA FWO
1655 Heindon Rd
Arcata, CA 95521-4573

Supervisor
DOI/U.S. Fish and Wildlife Service
2493 Portola Rd Ste B
Ventura, CA 93003-7726

Regional Director
Attn: FERC Coordinator
DOI/U.S. Fish and Wildlife Service
911 NE 11th Ave
Portland, OR 97232-4169

Oper Office Manager
US Department of Interior
DOI/Fish & Wildlife Service
2800 Cottage Way Rm W-2606
Sacramento, CA 95825-1846

Regional Director
U.S. Department of Interior
DOI/Bureau of Indian Affairs
2800 Cottage Way Ste W2820
Sacramento, CA 95825-1846

Chief
U.S. Army Corps Of Engineers
San Francisco District Office
333 Market St Fl 8
San Francisco, CA 94105-2102

Regional Director
Attn: LC 705
U.S. Bureau of Reclamation
P.O. Box 61470
Boulder City, NV 89006-1470

David P. Schmidt
CMD-2
U.S. Environmental Protection Agency
Region 9 - Federal Activities Office
75 Hawthorne St
San Francisco, CA 94105-3920

District Chief
U.S. Geological Survey
Placer Hall - 6000 J Street, Ste 2012
Sacramento, CA 95819-6129

Jack Gipsman
Attorney
USDA-Forest Region 5
United States Department of Agriculture
33 New Montgomery, 17th Flr
San Francisco, CA 94105

Joshua S. Rider
USDA-Forest Region 5
United States Department of Agriculture
33 New Montgomery, 17th Flr
San Francisco, CA 94105

Bob Hawkins
Hydropower Coordinator
USDA Forest Service
650 Capitol Mall Rm 8200
Sacramento, CA 95814-4700

James M. Pena
Forest Supervisor
USDA Forest Service
P.O. Box 11500
Quincy, CA 95971-6025

Edward C. Cole
Forest Supervisor
USDA Forest Service
2550 Riverside Dr.
Susanville, CA 96130

Director
U.S. Department of Energy
P.O. Box 10940
Pittsburgh, PA 15236-0940

Michael A. Swiger
Member
Van Ness Feldman, P.C.
1050 Thomas Jefferson St., NW
7th Floor
Washington, DC 20007

State Of California
Washington Office of the Governor
305 Hall Of The States
444 N Capitol St NW
Washington, DC 20001-1512

Lucian Vandegrift
Attorney at Law
P.O. Box 991822
Redding, CA 96099-1822

Wanda Chilton
Attorney at Law
P.O. Box 991822
Redding, CA 96099-1822

Michelle C. Waterbury
Attorney at Law
P.O. Box 991822
Redding, CA 96099-1822

Nancy and Bob Weinzinger
Attorney at Law
P.O. Box 991822
Redding, CA 96099-1822

Leta E. Weiss
46 Greenbrier Dr
Oroville, CA 95966-3900

Jeffrey Albert Meith
Western Canal Water District
Minasian, Spruance, Baber, Meith, Soares
1681 Bird Street
Oroville, CA 95965

Kristina Nygaard
Western Canal Water District
Troutman Sanders LLP
401 9th Street, NW
Suite 1000
Washington, DC 20004-2134

Bernoy Bradford
Western Canal Water District
Biggs-West Gridley Water District (CA)
1713 W Biggs Gridley Rd
Gridley, CA 95948-9400

Ted Trimble
Western Canal Water District
P.O. Box 190
Richvale, CA 95974-0190

Honorable Wally Herger
US House Of Representatives
Washington, DC 20515

Honorable Barbara Boxer
US Senate
Washington, DC 20510

Honorable Dianne Feinstein
US Senate
Washington, DC 20510

John Nerud
Cascade County Planning Board
415 3rd St NW
Great Falls, MT 59404

Natural Heritage Institute
100 Pine Street, Suite 1550
San Francisco, CA 94111

County of Butte
c/o Pete Soderberg
The Dangermond Group
2400 "O" Street
Sacramento, CA 95816

Western Canal Water District
c/o Michael Sexton
Minasian Spruance Baber Meith Soares & Sexton
PO Box 1679
Oroville, CA 95965

County of Butte
c/o Pete Dangermond
The Dangermond Group
2400 "O" Street
Sacramento, CA 95816

City of Oroville
c/o Kristen Castanos
Somach Simmons & Dunn
813 Sixth Street Third Floor
Sacramento, CA 95814

Chief Environmental Compliance & Evaluation
Branch
California Department of Water Resources
1725 23rd Street Room 220
Sacramento, CA 95816

Robert C Adams
State President
California State Horsemen's Association
PO Box 1040
Forestville, CA 95436

John Allen
Feather River Low Flow Alliance
5781 Vista Del Cerro
Oroville, CA 95966

Art Angle
Enterprise Rancheria
1940 Feather River Boulevard Room B
Oroville, CA 95965

Donald Anthrop
California Waterfowl Association
46 Senior Avenue
Berkeley, CA 94708

Kristine Armstrong
President
Oroville Downtown Business Association
PO Box 2458
Oroville, CA 95965

Art Baggett
Chair
State Water Resources Control Board
PO Box 100
Sacramento, CA 95812

Chuck Bartok
Region II President
California State Horsemen's Association -
Region II
3992 Highway 99 West
Orland, CA 95963

RJ Beeler
1230 High Street
Oroville, CA 95965

Lisa Boothe
Secretary
Cherokee Tribe
PO Box 37
Palermo, CA 95968

Clarence G Brandt
Feather River Recreation & Park District /
Joint Powers Authority
3 Glen Circle Drive
Oroville, CA 95966

Kirby Brill
General Manager
Mojave Water Agency
22450 Headquarters Drive
Apple Valley, CA 92307

Paul Buttner
California Rice Commission
701 University Avenue Room 205
Sacramento, CA 95825

Celeste Cantu
Executive Director
State Water Resources Control Board
PO Box 100
Sacramento, CA 95812

Dennis Carty
PO Box 5404
Berkeley, CO 94705

Wanda Chilton
Pacific Cherokee Tribal Council
175 Lakeland Boulevard
Oroville, CA 95966

Rodney Clements
Mechoopda Indian Tribe of the Chico Rancheria
125 Mission Ranch Boulevard
Chico, CA 95826

William Cochran
California Department of Water Resources
460 Glen Drive
Oroville, CA 95966

William Connelly
Low Flow Collaborative Alliance
5490 Debbie Avenue
Oroville, CA 95966

Brad Corkin
Oroville Water Ski Club
PO Box 286
Oroville, CA 95966

Doak Cotter
Joint Water District Board
735 Virginia Street
Gridley, CA 95948

Banky Curtis
Regional Manager
California Department of Fish & Game
1701 Nimbus Road Room A
Rancho Cordova, CA 95670

Jeff Davis
General Manager
San Geronio Pass Water Agency
12210 Beaumont Avenue
Beaumont, CA 92223

James DiGiorgio
Associate Civil Engineer
California Department of Boating & Waterways
2000 Evergreen Street Room 100
Sacramento, CA 95815

Brandy Doering
Konkow Valley Band of Maidu
2309 Wyandotte Avenue
Oroville, CA 95966

Jon Ebeling PhD
County of Butte
1786 Estates Way
Chico, CA 95928

Steve Edmondson
NOAA - National Marine Fisheries Service
777 Sonoma Avenue Room 325
Santa Rosa, CA 95404

Robert Edwards
Chairman
Indians of Enterprise No. 1
5835 Golden Oaks Road
Paradise, CA 95969

Debbie Edwards
Mooretown Rancheria
#1 Alverda Drive
Oroville, CA 95966

Terry Erlewine
State Water Contractors
1121 L Street Room 1050
Sacramento, CA 95814

Steve Feazel
Sector Supervisor
California Department of Parks & Recreation
400 Glen Drive
Oroville, CA 95966

Carter Fickes
Black Bass Action Committee
PO Box 67420
Scotts Valley, CA 95067

Steve Ford
California Department of Water Resources
3251 S Street
Sacramento, CA 95816

Robert Foster
Superintendent
California Department of Parks & Recreation
400 Glen Drive
Oroville, CA 95966

Russell Fuller
General Manager
Antelope Valley-East Kern Water Agency
6500 West Avenue N
Palmdale, CA 93551

G Loren Gill
President
Berry Creek Citizens Committee
1673 Bald Rock Road
Berry Creek, CA 95916

Michael Glaze
General Manager
South Feather Water & Power
PO Box 581
Oroville, CA 95965

Brent L Graham
General Manager
Tulare Lake Basin Water Storage District
1001 Chase Avenue
Corcoran, CA 93212

Chuck Hanson
Hanson Environmental
132 Cottage Lane
Walnut Creek, CA 94595

William D Harrison
Secretary-Manager
Oak Flat Water District
PO Box 1596
Patterson, CA 95363

David Hawks
California Department of Forestry & Fire
Protection
176 Nelson Avenue
Oroville, CA 95965

Alex Henes
3763 Osceola Street
Denver, CO 80212

Floyd P Higgens
Oroville Model Airplane Club
5128 VE Avenue
Oroville, CA 95966

Rex S Hime
President and Chief Executive Officer
California Business Properties Association
1121 L Street Room 809
Sacramento, CA 95814

Michael Hoover
Chief Division of Habitat Conservation
U.S. Department of the Interior
Fish & Wildlife Service
2800 Cottage Way Room W-2605
Sacramento, CA 95825

Robert Hughes
Associate Hydraulic Engineer
California Department of Fish & Game
1701 Nimbus Road Room A
Rancho Cordova, CA 95670

Mike Hurst
Lake Oroville Bicyclist Organization
15 Oakcrest Drive
Oroville, CA 95966

Michael B Jackson
Attorney at Law
County of Plumas
PO Box 207
Quincy, CA 95971

Jon Jarvis
Regional Director
U.S. Department of the Interior
National Park Service
1111 Jackson Street Room 700
Oakland, CA 94607

DC Jones
833 Mt Ida Road
Oroville, CA 95966

Darin Kasamoto
General Manager
San Gabriel Valley Municipal Water District
PO Box 1299
Azusa, CA 91702

Mary Keller
County of Sutter
1160 Civic Center Boulevard Room D
Yuba City, CA 95993

Frances Kelley
Butte County Citizens for Fair Government
5055 Miners Ranch Road
Oroville, CA 95966

Laurence Kerckhoff
California Department of Water Resources
1416 Ninth Street Room 1118-18
Sacramento, CA 95814

Jason Kindopp
California Department of Water Resources
460 Glen Drive
Oroville, CA 95966

Nick Kontos
California Department of Water Resources
1416 Ninth Street Room 1601-1
Sacramento, CA 95814

Kenneth Kules
Senior Engineer
Metropolitan Water District of Southern
California
PO Box 54153
Los Angeles, CA 90054

Dave Lane
California Department of Water Resources
1416 Ninth Street Room 1620
Sacramento, CA 95814

John Leahigh
California Department of Water Resources
3310 El Camino Avenue
Sacramento, CA 95821

Carrol Leong
California Department of Water Resources
1416 Ninth Street Room 425
Sacramento, CA 95814

William P Lewis
Utilities Director
City of Yuba City
302 Burns Drive
Yuba City, CA 95991

David Luker
General Manager
Desert Water Agency
PO Box 1710
Palm Springs, CA 92263

MaryLisa Lynch
FERC Coordinator
California Department of Fish & Game
1701 Nimbus Road Room A
Rancho Cordova, CA 95670

Robert MacKenzie
Chief Deputy County Counsel
County of Butte - County Counsel
25 County Center Drive
Oroville, CA 95965

Donald Marquez
Senior Engineer
Kern County Water Agency
PO Box 58
Bakersfield, CA 93302

James Martin
California Department of Water Resources
1725 23rd Street Room 220
Sacramento, CA 95816

Roger Masuda
County of Butte
c/o Roger Masuda
Griffith & Masuda
517 East Olive Street
Turlock, CA 95380

Kevin McCormick
Forest Archaeologist
U.S. Forest Service - Plumas National Forest
875 Mitchell Avenue
Oroville, CA 95965

Rodney McInnis
Acting Regional Director
NOAA - National Marine Fisheries Service
650 Capitol Mall Room 8-300
Sacramento, CA 95814

Michael Meinz
California Department of Fish & Game
3356 Hacienda Road
Shingle Springs, CA 95682

Knox Mellon
California Department of Parks & Recreation
Office of Historic Preservation
1416 Ninth Street Room 1442-7
Sacramento, CA 95814

Dale Morris
Chief of Natural Resources
U.S. Department of the Interior
Bureau of Indian Affairs
2800 Cottage Way Room W-2550
Sacramento, CA 95825

Steve Nachtman
Montgomery Watson Harza/EDAW Team
150 Chestnut Street
San Francisco, CA 94111

Carolyn Norton
Chairperson
City of Oroville - Parks Commission
1735 Montgomery Street
Oroville, CA 95965

David B Okita
General Manager
Solano County Water Agency
PO Box 349
Elmira, CA 95625

Kathy Petersen
South Feather Water & Power
PO Box 581
Oroville, CA 95965

F.D. Pursell PE
F.D. Pursell Civil Engineering Services
220 Hillcrest Avenue
Oroville, CA 95966

Irenia Quitiquit
Tribal Coordinator
California - Bay Delta Authority
650 Capitol Mall 5th Floor
Sacramento, CA 95814

Patty Reece-Allen
Berry Creek Rancheria
5 Tyme Way
Oroville, CA 95966

Robert Reiter
General Manager
San Bernardino Valley Municipal Water District
PO Box 5906
San Bernardino, CA 92412

Donald Ridenhour
Napa County Flood Control & Water
Conservation District
1195 Third Street Room 201
Napa, CA 94559

Eric Ritter
District Archaeologist
U.S. Department of the Interior
Bureau of Land Management
355 Hemsted Drive
Redding, CA 96002

Ronald Rogers
6827 Creekside Street
Redding, CA 96001

Richard Roos-Collins
Natural Heritage Institute
100 Pine Street Room 1550
San Francisco, CA 94111

Rich Sanchez
California Department of Water Resources
1416 Ninth Street Room 406
Sacramento, CA 95814

Eric See
California Department of Water Resources
460 Glen Drive
Oroville, CA 95966

Bob Sharkey
Chairperson
City of Oroville - Redevelopment Agency
1735 Montgomery Street
Oroville, CA 95965

Daniel Shillito
Regional Solicitor
U.S. Department of the Interior
Office of the Solicitor - Pacific Southwest
Region
2800 Cottage Way Room E1712
Sacramento, CA 95825

Rob Shulman
Plumas County Counsel
520 Main Street Room 302
Quincy, CA 95971

Dan Smith
Director of Regulatory Affairs
Association of California Water Agencies
910 K Street Room 100
Sacramento, CA 95814

Adrian Smith
Kuksu Society
PO Box 5623
Oroville, CA 95965

Tao Stadler
Publications Editor
Oroville Area Chamber of Commerce
1789 Montgomery Street
Oroville, CA 95965

Dave Starks
California Department of Water Resources
460 Glen Drive
Oroville, CA 95966

Dave Steindorf
Regional Coordinator
American Whitewater Affiliation
179 Valley Ridge Drive
Paradise, CA 95969

Karl B Stinson
Operations Manager
Alameda County Water District
PO Box 5110
Fremont, CA 94537

Mike Taylor
U.S. Forest Service - Plumas National Forest
875 Mitchell Avenue
Oroville, CA 95965

Richard Thompson
Tribal Member
Greenville Rancheria of Maidu Indians
410 Main Street
Greenville, CA 95947

Vene Thompson
Member Board of Directors
Feather River Recreation & Park District
PO Box 348
Oroville, CA 95965

Ralph Torres
Deputy Director
California Department of Water Resources
1416 Ninth Street Room 1115-9
Sacramento, CA 95814

Raynor T Tsuneyoshi
Director
California Department of Boating & Waterways
2000 Evergreen Street Room 100
Sacramento, CA 95815

Thomas Van Gelder
Lake Oroville Fish Enhancement Committee
5360 Treasure Hill Drive
Oroville, CA 95965

Stan Wangberg
Western Canal Water District
PO Box 190
Richvale, CA 95974

Timothy Welch
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Stanley M Williams
General Manager
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Frank Winchell
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Takeshi Yamashita
Regional Director
Federal Energy Regulatory Commission
901 Market Street Room 350
San Francisco, CA 94103

Jeff Zelsdorf
Feather River Low Flow Environmental
Alliance
565 Rustic Lane
Paradise, CA 95969

State of California Electricity Oversight Board
770 L Street Room 1250
Sacramento, CA 95814

Yuba-Feather Workgroup
455 Capitol Mall Room 305
Sacramento, CA 95814

California Chamber of Commerce
PO Box 1736
Sacramento, CA 95812

Northern District Chief
California Department of Water Resources
2440 Main Street
Red Bluff, CA 96080

Michael Aceituno
NOAA - National Marine Fisheries Service
650 Capitol Mall Room 6-070
Sacramento, CA 95814

Curt Aikens
General Manager
Yuba County Water Agency
1402 D Street
Marysville, CA 95901

Mark Andersen
California Department of Water Resources
1416 Ninth Street Room 1620
Sacramento, CA 95814

Juanita Anglin
Pacific Cherokee Tribal Council
1780 Pine Street
Oroville, CA 95965

Gary Archuleta
Chair
Mooretown Rancheria
#1 Alverda Drive
Oroville, CA 95966

Andrew Atkinson
California Department of Fish & Game
945 Oroville Dam Boulevard West
Oroville, CA 95965

Gordon Banks
3432 Cripple Creek Sq.
Boulder, CO 80303

James Beck
General Manager
Kern County Water Agency
PO Box 58
Bakersfield, CA 93302

Brad Bones
General Manager
Littlerock Creek Irrigation District
35141 North 87th Street East
Littlerock, CA 93543

Ernest Bouskos
JEM Farms
5555 North West Avenue Room 150
Fresno, CA 93711

Bill Brennan
Executive Director
Central Coast Water Authority
255 Industrial Way
Buellton, CA 93427

L Ryan Broddrick
Director
California Department of Fish & Game
1416 Ninth Street Room 1207
Sacramento, CA 95814

Roger Calloway
California Department of Parks & Recreation
400 Glen Drive
Oroville, CA 95966

Nik Carlson
City of Oroville
Environmental Science Associates
225 Bush Street Room 1700
San Francisco, CA 94104

Jen Carville
Policy Advocate
Friends of the River
915 20th Street
Sacramento, CA 95814

Ellen Clark
California Department of Parks & Recreation
400 Glen Drive
Oroville, CA 95966

John Coburn
State Water Contractors
1121 L Street Room 1050
Sacramento, CA 95814

Ruth Coleman
Director
California Department of Parks & Recreation
1416 Ninth Street
Sacramento, CA 95814

Bill Connelly
County of Butte,
Board of Supervisors District 1
5280 Lower Wyandote Road
Oroville, CA 95966

Susan Corkin
City of Oroville
3390 Glen Avenue
Oroville, CA 95966

Mary Lou Cotton
Castaic Lake Water Agency
27234 Bouquet Canyon Road
Santa Clarita, CA 91350

Tom Dang
General Engineer for Natural Resources
U.S. Department of the Interior
Bureau of Indian Affairs
2800 Cottage Way Room W-2619
Sacramento, CA 95825

Ronald Eugene Davis
PO Box 122
Oroville, CA 95965

C. Dee Dillon
State Water Contractors
1121 L Street Room 1050
Sacramento, CA 95814

Sam Dresser
Town of Paradise / Lake Oroville Joint Powers
Authority
2221 De Mille Road
Paradise, CA 95969

Stuart Edell
County of Butte - Public Works
7 County Center Drive
Oroville, CA 95965

Jim Edwards
Tribal Chair
Berry Creek Rancheria
5 Tyme Way
Oroville, CA 95966

Kandy Edwards
Tribal Administrator
Indians of Enterprise No. 1
5835 Golden Oaks Road
Paradise, CA 95969

H Woody Elliott PhD
Resource Ecologist
California Department of Parks & Recreation
400 Glen Drive
Oroville, CA 95966

James Fargo
Federal Energy Regulatory Commission
888 First Street NE Room 61-03
Washington, DC 20426

Dick Ferreira
Kern County Water Agency
6285 Wilhoff Lane
Granite Bay, CA 95746

Lanny H Fisk PhD
F & F GeoResource Associates Inc
5325 Elkhorn Boulevard Room 294
Sacramento, CA 95842

William E Foster
Sr Fish & Wildlife Biologist
U.S. Department of the Interior
Fish & Wildlife Service
2800 Cottage Way Room W-2605
Sacramento, CA 95825

Lorraine Frazier
Mooretown Rancheria
PO Box 2379
Oroville, CA 95965

Douglas Garcia
U.S. Department of the Interior
Bureau of Indian Affairs
650 Capitol Mall Room 8-500
Sacramento, CA 95814

Scott Gillingwater
Area Commander
California Highway Patrol - Oroville
PO Box 1471
Oroville, CA 95965

Carol Gleichman
Advisory Council on Historic Preservation
12136 West Bayaud Avenue Room 330
Lakewood, CO 80226

Larry Grundmann
Citizens for Fair and Equitable
Recreation Use of Lake Oroville
6375 Woodman Drive
Oroville, CA 95966

William Harper
Lime Saddle Marina
3428 Pentz Road
Paradise, CA 95969

John Hattesen
Manager
Empire West Side Irrigation District
PO Box 66
Stratford, CA 93266

Wilson Head
California Independent System Operator
151 Blue Ravine Road
Folsom, CA 95630

Mark Hennelly
California Waterfowl Association
4630 Northgate Boulevard Room 150
Sacramento, CA 95834

Derek Hilts
U.S. Department of the Interior
Fish & Wildlife Service
2800 Cottage Way Room W-2605
Sacramento, CA 95825

Roxanne M Holmes
General Manager
Crestline-Lake Arrowhead Water Agency
PO Box 3880
Crestline, CA 92325

Thomas Hunter
Director of Public Works
County of Plumas
1834 East Main Street
Quincy, CA 95971

Michael Hutton
President
Oroville Rotary Club
363 Kelly Ridge Road
Oroville, CA 95966

Lori Jaimez
Chair
Greenville Rancheria of Maidu Indians
PO Box 279
Greenville, CA 95947

Thomas Jereb
Project Manager
Pacific Gas and Electric Company
Mail Code N11D PO Box 770000
San Francisco, CA 94177

Curt Josiassen
County of Butte - Board of Supervisors District
4
PO Box 385
Richvale, CA 95974

Anna Kastner
California Department of Fish & Game
5 Table Mountain Boulevard
Oroville, CA 95965

Randy Kennedy
5797 West 71st Avenue
Arvada, CO 80003

Jeffrey Kightlinger
General Manager
Metropolitan Water District of Southern
California
PO Box 54153 Terminal Annex
Los Angeles, CA 90054

Annette Kolkey
Equestrian Trail Riders/Hikers
888 Manzanita Court Room A
Chico, CA 95926

Hans J Kreutzberg PhD
Chief Project Review
California Department of Parks & Recreation
Office of Historic Preservation
1416 Ninth Street Room 1442-7
Sacramento, CA 95814

Dennis D LaMoreaux
General Manager
Palmdale Water District
2029 East Avenue Q
Palmdale, CA 93550

Sue Larsen
California Department of Water Resources
1416 Ninth Street Room 1620
Sacramento, CA 95814

Howard Lee
Montgomery Watson Harza/EDAW Team
3321 Power Inn Road Room 300
Sacramento, CA 95826

Kevin Lewis
Shasta Paddlers/AWA
6069 Hornbeck Lane
Anderson, CA 96007

Chris Logan
Descendant of Strawberry Valley Rancheria
2560 Yard Street
Oroville, CA 95966

Charles Lynch
National Oceanic & Atmospheric Administration
1 Blackburn Drive
Glouster, MA 01930

Kathleen Lyons
Equestrian Trail Riders/Hikers
331 Fig Street
Oroville, CA 95966

Todd Manley
Director Government Relations
Northern California Water Association
455 Capitol Mall Room 335
Sacramento, CA 95814

Duane Marti
U.S. Department of the Interior
Bureau of Land Management
2800 Cottage Way Room W-1834
Sacramento, CA 95825

Dan Masnada
General Manager
Castaic Lake Water Agency
27234 Bouquet Canyon Road
Santa Clarita, CA 91350

Stacy Matthews
Central Valley Regional Water Quality Control
Board
415 Knollcrest Drive Room 100
Redding, CA 96002

Dave McClain
County of Butte - County Counsel
25 County Center Drive
Oroville, CA 95965

Barbara McDonnell
California Department of Water Resources
3251 S Street
Sacramento, CA 95816

Paul McIntosh
Chief Administrative Officer
County of Butte
25 County Center Drive
Oroville, CA 95965

Michael A Melanson
Consultant
Metropolitan Water District of Southern
California
1121 L Street Room 900
Sacramento, CA 95814

William Mendenhall
California Department of Water Resources
2440 Main Street
Red Bluff, CA 96080

Dwight Moore
City of Oroville
5555 Skyway
Paradise, CA 95969

Randall "Cass" Mutters PhD
University of California Cooperative Extension
2279 Del Oro Avenue
Oroville, CA 95965

Glenda Nelson
Tribal Chair
Enterprise Rancheria
1940 Feather River Boulevard Room B
Oroville, CA 95965

Janis Offermann
California Department of Water Resources
1725 23rd Street Room 220
Sacramento, CA 95816

Steve Onken
Yuba County Water Agency
PO Box 176
Dobbins, CA 95935

Patricia Port
Environmental Review Officer
U.S. Department of the Interior
Office of the Solicitor
1111 Jackson Street Room 520
Oakland, CA 94607

Tim H Quinn, Vice President
Metropolitan Water District of Southern
California
1121 L Street Room 900
Sacramento, CA 95814

Henry "Rick" Ramirez
Program Manager
California Department of Water Resources
1416 Ninth Street Room 1601-2
Sacramento, CA 95814

Donald Reighly
Oroville Area Chamber of Commerce
396 Stone Ridge Parkway
Oroville, CA 95966

Stephen Reynolds
Senior Engineering Geologist
California Department of Conservation
801 K Street
Sacramento, CA 95814

Douglas Rischbieter
California Department of Water Resources
1725 23rd Street Room 220
Sacramento, CA 95816

Steve Robbins
General Manager
Coachella Valley Water District
PO Box 1058
Coachella, CA 92236

Heidi Rooks
California Department of Water Resources
3251 S Street
Sacramento, CA 95816

Magalie R Salas
Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Steve C Santos
Tribal Chair
Mechoopda Indian Tribe of the Chico Rancheria
125 Mission Ranch Boulevard
Chico, CA 95926

Eric Schroth
County of Butte - Public Works
7 County Center Drive
Oroville, CA 95965

Patsy Seek
Tribal Chair
Konkow Valley Band of Maidu
1706 Sweem Street
Oroville, CA 95965

Robert Sharkey
General Manager
Feather River Recreation & Park District
1200 Myers Street
Oroville, CA 95965

Merton D Short
Experimental Aircraft Association
PO Box 180
Durham, CA 95938

Ellen Simon
Cherokee Preservation Society
PO Box 1641
Oroville, CA 95965

JD Smith
Berry Creek Rancheria
PO Box 342
Oroville, CA 95965

Larry Spikes
Administrative Officer
County of Kings - Government Center
1400 West Lacey Boulevard
Hanford, CA 93230

Mark Stahl
Commodore
Butte Sailing Club
2603 Lakewest Drive
Chico, CA 95928

Russell Stein
California Department of Water Resources
1725 23rd Street Room 220
Sacramento, CA 95816

Dave Steindorf
Conservation Chair
Chico Paddleheads
1325 Deodora Way
Paradise, CA 95969

Ward Tabor
California Department of Water Resources
1416 Ninth Street Room 1118-23
Sacramento, CA 95814

Jennifer Thomas
U.S. Department of the Interior
Bureau of Indian Affairs
2800 Cottage Way Room W-2550
Sacramento, CA 95825

Steve Thompson
Regional Director
U.S. Department of the Interior
Fish & Wildlife Service
2800 Cottage Way Room W-2605
Sacramento, CA 95825

L Vene Thompson Jr, Director
Lake Oroville Recreation Authority
PO Box 348
Oroville, CA 95965

Bud Tracy, President
Oroville Economic Development Corporation
2227 Myers Street
Oroville, CA 95965

Ron Turner
Oroville Foundation of Flight
1050 Plumas Avenue
Oroville, CA 95965

Geoffrey Vanden Heuvel
Southern California Water Committee
10184 Sixth Street Room C
Rancho Cucamonga, CA 91730

Arlene Ward
Mechoopda Indian Tribe of the Chico Rancheria
125 Mission Ranch Boulevard
Chico, CA 95926

Laurine White
U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814

Leah Wills
PO Box 44
Taylorsville, CA 95983

Vince Wong
Assistant General Manager
Alameda County Flood Control and Water
Conservation District Zone 7
5997 Parkside Drive
Pleasanton, CA 94588

Eric Zigas
City of Oroville
c/o Eric Zigas
Environmental Science Associates
225 Bush Street Room 1700
San Francisco, CA 94104

Resources Agency of California
Room 1311
1416 9th St
Sacramento, CA 95814-5511

California Fish & Game Commission
Attn: Environmental Services Division
1416 9th St
Sacramento, CA 95814-5511

Field Supervisor
U.S. Fish and Wildlife Service
2800 Cottage Way W2605
Sacramento, CA 95825-1846

Arnold W. Johnson
California Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236

Frank Lawrence
Holland & Knight LLP
21st Floor
633 W 5th St
Los Angeles, CA 90071-2005

Nicholas Jacobs
Somach, Simmons, & Dunn
813 6th St
Third Floor
Sacramento, CA 95814

Vicki Hittson-Weir
P.O. Box 954
Palermo, CA 95968

Christopher Shutes
FERC Projects Director
1608 Francisco St.
Berkeley, CA 94703

COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION
FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE OROVILLE FACILITIES PROJECT
Docket No. P-2100-052

Appendices
FEIS

APPENDIX A
REVIEW OF SOCIOECONOMIC MODEL AND RELATED DOCUMENTS

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REVIEW OF SOCIOECONOMIC MODEL AND RELATED DOCUMENTS

This appendix presents a review of several documents submitted by Butte County (or County) and the California Department of Water Resources (DWR) regarding the Oroville Facilities relicensing process. The focus is on the model and assumptions used by DWR to estimate costs incurred by Butte County to provide project-related services, as well as project-related revenues accruing to the County. This independent review was undertaken to address questions raised by Butte County about the appropriateness of both the model itself and the inputs and assumptions used by DWR in running the model. In our analysis, we used a copy of the model provided by DWR. We did not, however, have access to the original data set used by DWR as input to the model. While we found areas in which the model or assumptions could be improved upon, we found nothing to suggest that the model or assumptions would produce biased results, and therefore conclude that the material submitted by DWR is adequate for the staff's use in preparing the draft environmental impact statement.

DWR's MODEL AND ASSUMPTIONS

As part of the relicensing process, DWR submitted several reports to the Federal Energy Regulatory Commission (FERC, or Commission) detailing the economic impact of the project on Butte County. The reports address fiscal and socio-economic effects that the Commission will consider in its evaluation of the application for license. Of the reports submitted by DWR, our focus is on reports R18, *Recreation Activity, Spending and Associated Economic Impacts* (DWR, 2004a), and R-19, *Fiscal Impacts, Final Report* (DWR, 2004b). R-19 summarizes the fiscal impacts of the project on Butte County. Each report appears to be thorough and comprehensive in its content, using up-to-date methods of analysis, including the IMPLAN model and econometric techniques.

The IMPLAN Model

DWR used the IMPLAN (Impact Analysis for Planning) model to derive its fiscal impact results. The IMPLAN model is an input-output model developed in 1979 by the Forest Service and is one of the most widely used input-output models used to evaluate changes in policy and to produce socioeconomic forecasts. Its primary attribute is that it captures multiplier effects as changes in policy create ripples throughout the economy. The effects can be classified as direct, referring to changes in production associated with a change in demand; indirect, referring to a secondary impact caused by the changing input requirements of producers; and induced, referring to changes in household spending due to additional employment generated by the direct and indirect effects. Its assumptions restrict production functions to be homogenous across all firms within an industry, and linear, with constant returns to scale. Output is also assumed to be homogenous or undifferentiated by quality, branding, etc. The IMPLAN model places no constraints on supply, and it assumes that in- and out-migration maintain the region in question at full employment at all times.

IMPLAN Model Inputs

Inputs used to estimate the fiscal impact of the project's recreation visitors, the primary focus of our review, are the annual number of visitors to the project and their daily expenditures in the County. DWR estimated visitation via traffic counting, supplemented with other data, and estimated expenditures from survey data. Other model inputs, not related to visitor spending, include DWR's estimated annual spending in the County for salaries, goods, and services needed to operate and maintain the project.

IMPLAN Model Output

The direct cost impact of the project on Butte County derives from the County's providing public services (primarily fire and rescue services and law enforcement and criminal justice services) to the project and the project's recreational visitors, as well as to maintaining access roads to sites within the project. The indirect cost impact stems from providing services to the growth-related population associated with project and visitor spending. Direct revenues to the County come from collecting tax revenue associated with project and visitor expenditures in the unincorporated portion of the County; indirect revenues come from taxes paid by the growth-related population. In its application to Butte County, the model predicts that direct costs to the County exceed direct revenue and that indirect costs exceed indirect revenue, such that there is a deficit associated with both recreational visitors and the growth-related population

Model Estimation of Indirect Impacts

Indirect effects flow from changes in input requirements of producers directly affected by economic changes. For example, an increased number of visitors to the project may raise demand for local restaurants. This is the direct effect. But the restaurants will then purchase more food from local suppliers. This is the indirect effect. Both the restaurant and its suppliers are then likely to raise their demand for inputs and labor. As stated above, the IMPLAN model instantaneously "clears" the labor market by assuming that in- and out-migration occur immediately. Thus, in the IMPLAN model, if the demand for labor rises, then it will be met by in-migration. This would result in an increase in the County's population and a subsequent increase in the cost of providing services, but would also raise its revenue through the additional taxes paid by newcomers. Similarly, if the demand for labor falls, workers are assumed to out-migrate such that the economy remains at full employment. This would have the effect of reducing the fiscal burden on the County and also reducing the tax revenue associated with the out-migrants. As noted above, the model predicts that indirect growth adds more to Butte County's cost of providing services than it adds to revenue, such that there is a deficit associated with each additional person.

Structural Parameters

The structural parameters of the IMPLAN model are in widespread use and are considered sound. There is little benefit to reviewing them further, except to say that over time, the parameters of the model are subject to change. The degree of change derives primarily from changes in technology that increase the efficiency of production. For example, as manufacturing establishments are modernized, it takes fewer employees to produce the same amount of output. While it is possible to estimate the process of technological change by a time series analysis of the IMPLAN parameters, it is also reasonable to state that growth in productivity is a slow process. With respect to providing government services, such as police and fire protection, or recreational services, such as food service and hotels, productivity would not likely be appreciably different in the future than it is today. Thus, we find the structural parameters of the model to be entirely suitable to this application.

Sensitivity Analysis

The model reacts to changes in inputs, including the number of visitors and their spending habits during their visit. In this section, we describe the sensitivity of the model to recreational visitation and spending.

Recreation Days/Visits

DWR provided estimates of annual visits to the project area by recreational site. The number of visits to the project was estimated using traffic count data supplemented by periodic visual inspections of passengers in each vehicle, California Department of Parks and Recreation (DPR) campground information, observational data, other DPR data, and trail counters.¹ Table A-1 shows the total fiscal impact (direct plus indirect effects) of visitors to the project on Butte County, as estimated by DWR's IMPLAN model. In this case, a 5.0 percent change in visitors (holding visitor spending constant) in either direction results in a 5.0 percent change in Butte County's fiscal deficit. This indicates a precise 1:1 relationship between the percent change in visitors and percent change in costs to the County and percent change in County tax revenues.

Table A-1. Fiscal impact on Butte County of recreational visitors to the Oroville Facilities. (Source: DWR IMPLAN model and Staff)

Costs	Baseline	+ 5% Visitor Days	-5% Visitor Days
Fire protection	\$283,584	\$297,764	\$269,405
Law enforcement	\$481,497	\$505,572	\$457,423
Road maintenance	\$129,061	\$135,514	\$122,608
Other Services & Costs	\$131,724	\$138,310	\$125,138
Total Costs	\$1,025,867	\$1,077,160	\$974,573
Percent Change		+5.0%	-5.0%
Revenues			
Sales Tax	\$217,074	\$227,927	\$206,220
Property Tax	\$97,356	\$102,224	\$92,488
Lodging Tax	\$3,348	\$3,516	\$3,181
Other Revenue	\$318,440	\$334,362	\$302,518
Total Revenues	\$636,218	\$668,029	\$604,407
Percent Change		+5.0%	-5.0%
Net Fiscal Effect	-\$389,649	-\$409,132	-\$370,167
Percent Change		+5.0%	-5.0%

Table A-2 provides a range of values for employment and earnings around the baseline visits, as estimated by the model. Again, the relationship is strictly 1:1.

This exercise sheds light on how the model estimates the change in the fiscal burden imposed by the project on Butte County in response to variations in the model inputs. The sensitivity analysis shows that the model used by DWR is strictly linear, which is what one expects of the IMPLAN model, and demonstrates that the model produces the expected results.

¹ Trail counters are infrared sensors placed strategically along side hiking trails. The sensors are placed high enough to avoid counting animals but low enough to count people.

Table A-2. Employment and earnings impact on Butte County of recreational visitors to Oroville Facilities. (Source: DWR IMPLAN model and Staff)

	Baseline Visits	+5% Visits	-5% Visits
Jobs	664	698	631
Percent Change		+5.0%	-5.0%
Earnings	\$12,833,000	\$13,475,000	\$12,191,000
Percent Change		+5.0%	-5.0%

There is a large difference in the visitation numbers used by DWR to run the model and those used by Butte County in its estimates of project-related costs. First, instead of using the year-round average daily visits, the County used average daily visits during the peak season as inputs to its calculations. The County’s estimate of the nonresident visitor population (5,270) is 176 percent higher than the 1,910 figure used in DWR’s license application studies. Holding average spending constant, the use of average peak visits as opposed to year-round averages would naturally raise the estimated fiscal burden placed on the County. Thus, following the logic shown in tables A-1 and A-2, increasing the number of non-resident visitors by 176 percent would also increase project-related costs (\$2,830,534), revenues (\$1,755,429), the net fiscal deficit (\$1,075,105), and the number of jobs (1,832) by the same percentage.

The County states that its rationale for using peak numbers is that the County’s supply of its services is fixed in the short-run, not unlike the supply of electric power or other highly capital intensive enterprises. And like the suppliers of electric power, the use of peak numbers suggests that the County needs to keep spare government services capacity available in order to adequately cover peak periods. The implication of this argument is that the County cannot fluidly procure labor service for fire, police, and so on to cover peak visitation periods and then dismiss these resources during the off-peak periods. In other words, the County must retain the necessary infrastructure to cover peak periods even if it becomes spare capacity during the off-peak period. The larger the difference between peak and off-peak numbers, the starker will be the difference in costs. This inability to hire and fire resources at will would end up raising the fixed costs to the County and hence its fiscal burden. Resources would include at least fire and police equipment and the necessary infrastructure to store and maintain it, additional trained staff, and a communications network.

However, the information on the record also shows that other agencies that provide law enforcement, fire, rescue, and other services in the project area, such as California Department of Parks and Recreation, increase their staff during the peak recreation season and decrease their staff during the off-season. This increase in the availability of other service providers during the peak season argues against the need for Butte County to staff up during the peak season or provide infrastructure designed to meet peak season needs. Additionally, DWR’s proposed funding of DFG under Measure B111 would likely lead to a reduction in the demand for Butte County law enforcement services at the OWA.

On page 32 of its detailed comments on the draft EIS, Butte County provides emergency call statistics that demonstrate at least a 2:1 ratio of peak emergency response calls to off-peak calls to Lake Oroville from 2004 to October of 2006. The data indicate that calls per month during the peak period (May 15 to September 15 each year) equaled 8.8 to 13.5 calls per month, compared to 0.6 to 2.0 calls per month in the off-peak period. This supports the County’s position that peak visitation periods at the project generate a higher number of emergency calls

than off-peak visitation periods. Yet it is still not clear that the additional labor resources required for peak-season visitation could not be augmented on a seasonal basis to handle the number of calls in question.

Visitor Spending

Visitor spending affects Butte County’s fiscal condition indirectly through its effects on earnings, employment, and population. DWR’s visitor spending estimates were based on data taken from surveys conducted throughout one year. The surveys are subject to error and, as we discuss in more detail below, are considered deeply flawed by Butte County’s consultant, Dr. Jon S. Ebeling. Nevertheless, they provide the only available information on visitor spending in the area. DWR presents spending data with accompanying measures of spread around the mean, by which some assumptions about the distribution can be made. Table A-3 provides a summary of DWR’s visitor spending estimates.

Table A-3. Visitor spending by site at Oroville Facilities. (Source: DWR, 2004a)

Site	Residents of Butte County				Non Residents of Butte County				Number of Residents/Non-Residents Surveyed
	Mean	Std Dev	Min	Max	Mean	Std Dev	Min	Max	
Oroville	\$39.3	\$46.6	\$0.0	\$283.0	\$20.2	\$31.3	\$0.0	\$268.2	268/312
Feather River	\$23.8	\$38.2	\$0.0	\$200.8	\$22.8	\$32.0	\$0.0	\$139.2	49/27
Forebay	\$32.3	\$49.8	\$0.0	\$335.0	\$14.8	\$22.9	\$0.0	\$100.5	71/19
Afterbay	\$35.6	\$35.0	\$0.0	\$206.5	\$11.9	\$21.7	\$0.0	\$82.7	61/43
OWA	\$40.8	\$51.0	\$0.0	\$174.5	\$42.1	\$59.8	\$0.0	\$340.0	31/83

The statistics indicate a wide dispersion of spending among visitors in both the resident and non-resident populations. For each site, the coefficient of variation (standard deviation/mean) is close to one or significantly above one for both residents and non-residents, indicating a high degree of variance in the data set.² We have made assumptions about the shape of the distribution in order to apply a Monte Carlo simulation³. First, the fields are each truncated at \$0.0 since it is not possible to observe negative spending. Second, at each recreation site, the data in table A-3 indicate that the maximum spending is high relative to the mean. Without the advantage of visual inspection of the distribution, it is reasonable to assume that these statistics

² Standard deviation is the most common measure of statistical dispersion, measuring how spread out the values in a data set are. If the data points are all close to the mean, then the standard deviation is close to zero. If many data points are far from the mean, then the standard deviation is far from zero. If all the data values are equal, then the standard deviation is zero. The coefficient of variation is a dimensionless statistic that is useful for comparing the degree of variation from one data series to another, even if the means are drastically different from each other. A coefficient of variation greater than one indicates a high degree of variance in the data points.

³ In Monte Carlo simulation values for uncertain variables are randomly generated over and over to simulate a model.

indicate a log-normal distribution. Figure A-1 gives a graphical example, showing the theoretical distribution for the log-normal distribution for Butte County resident spending at Lake Oroville.

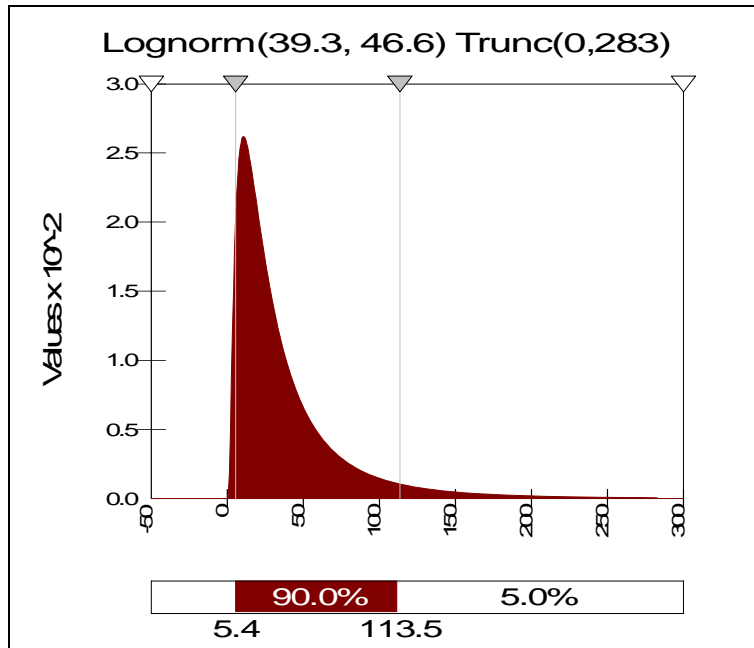


Figure A-1. Log-normal distribution of Butte County resident spending at Lake Oroville. (Source: Staff)

Monte Carlo simulations of the above distributions generate the mean values given in table A-4. In each case the simulated values are lower than the survey sample values.

Table A-4. Survey-based and simulated average spending by site for resident and non-resident visitors at the Oroville Facilities. (Source: DWR, 2004 and Staff)

Site	Residents	Non-Residents
	Survey/Simulated	Survey/Simulated
Oroville	\$39.30 / \$37.50	\$20.20 / \$19.49
Feather River	\$23.80 / \$21.75	\$22.80 / \$20.44
Thermalito Forebay	\$32.30 / \$30.53	\$14.80 / \$13.19
Thermalito afterbay	\$35.60 / \$34.29	\$11.90 / \$10.17
OWA	\$40.80 / \$35.31	\$42.10 / \$39.30

In relative terms, the differences between the simulated and survey values range between 3.5 percent and 14.5 percent. If one holds visitor days constant, this means that the model input used by DWR (the mean of the surveyed spending values) would project a greater effect on employment, population, County expenses, and tax revenue than the simulated values would. Visitor spending falls into the indirect fiscal impact category, estimated via the IMPLAN model, where indirect effects are assumed to be a function of visitor spending across a range of industrial categories. In table A-4, visitor spending averages estimated from survey data and then simulated based on a theoretical log-normal distribution are given. To test the sensitivity of indirect effects on Butte County operations to visitor spending by site, the simulated values are applied under the

assumption that the difference between survey and simulated values is even across all spending items. In addition, the survey averages are subjected to changes of +/-5.0 percent. In each case, visitor days are held constant. Table A-5 contains the results of this exercise.

Table A-5. Fiscal impact on Butte County of recreational visitors to Oroville Facilities, based on surveyed and simulated average visitor spending. (Source: DWR, 2005 and Staff)

Costs	Baseline (from survey)	Simulated Average Visitor Spending	-5% Survey Expenditure	+ 5% Survey Expenditure
Fire protection	\$73,873	\$69,678	\$70,179	\$77,566
Law enforcement	\$304,806	\$287,499	\$289,565	\$320,046
Road maintenance	\$98,399	\$92,812	\$93,479	\$103,319
Other Services & Costs	\$119,892	\$113,085	\$113,897	\$125,887
Total Costs	\$596,969	\$563,074	\$567,121	\$626,818
Percent Change		-5.7%	-5.0%	+5.0%
Revenues				
Sales Tax	\$193,551	\$182,706	\$183,874	\$203,229
Property Tax	\$88,141	\$83,197	\$83,734	\$92,549
Lodging Tax	\$3,298	\$3,084	\$3,133	\$3,463
Other Revenue	\$288,957	\$272,585	\$274,509	\$303,404
Total Revenues	\$573,948	\$541,572	\$545,250	\$602,645
Percent Change		-5.6%	-5.0 %	+5.0%
Net Fiscal Effect	-\$23,021	-\$21,502	-\$21,871	-\$24,173
Percent Change		-6.6%	-5.0%	+5.0%

The results in table A-5 indicate a precise 1:1 proportionality of visitor spending to revenues and costs, such that if inputs are changed by X percent across all sites and visitor categories (resident and non-resident), all outputs change by the same proportion. Application of the simulated mean expenditure is by site and by residency. In this case, because not all inputs are changed by the same proportion, the model results show that aggregate Butte County service costs would decline by slightly more than revenues and the result is a deficit that would be 6.6 percent lower than the baseline estimate.

In table A-6, we again raise and reduce visitor spending across all sites and visitor types evenly by 5.0 percent and then by the simulated percent differentials by individual site and visitor type to estimate the impact on employment and earnings. The results for the 5.0 percent deviations are identical to the impact of visitor days, such that jobs and earnings both rise and decline in proportion. The simulated differentials result in an average (unweighted) decrease in spending per visit of 7.2 percent for residents and 9.2 percent for non-residents, for a total unweighted average of 8.2 percent. The application of these simulated percentage changes to the model reduces both jobs and earnings by a weighted average 5.6 percent from the baseline estimate.

A more thorough accounting of the possible range of County costs, revenue, employment, and earnings would require simulation over the appropriate distribution of visitor days and visitor spending by site, by type of visitor, and expenditure type simultaneously.

Table A-6. Impact on Butte County employment and earnings of recreational visitors to Oroville Facilities, based on surveyed and simulated average visitor spending. (Source: DWR, 2005 and staff)

	Baseline Average Expenditure	Simulated Average Expenditures	(-5% Survey) Expenditure	(+5% Survey) Expenditure
Jobs	664	627	631	698
Percent Change		-5.6%	-5.0%	+5.0%
Earnings	\$12,833,000	\$12,113,000	\$12,191,000	\$13,475,000
Percent Change		-5.6%	-5.0%	+5.0%

Visitor Projections

Visitor projections are important in determining the economic impact of the project because a new license could be granted for a period of 30 to 50 years. DWR projects recreational visits to the project on a weighted per capita basis by recreational site (Lake Oroville and Thermalito forebay) using an econometric model that incorporates the joint influences of water levels, population trends, and gasoline prices after 1979.⁴ DWR reports the following results:

- Water levels are positively associated with visits to Lake Oroville but negatively associated with attendance at Thermalito forebay, which DWR surmises to be an indication that Thermalito forebay is a substitute recreational good for Lake Oroville. That is, at lower water levels some people who prefer to recreate at Lake Oroville will move instead to Thermalito forebay, but when water levels are higher, they move back to the lake.
- Population growth was considered as a potential factor in explaining demand for recreation at the project, but an analysis of population growth and demand for project recreational facilities over a 30-year period failed to reveal a relationship.⁵
- Because higher gas prices raise the cost of a visit, gas prices have a negative impact on visits to both sites, as expected. With respect to gasoline prices, these are volatile. In addition to economic conditions of supply and demand, they are subject to uncertain geopolitical influences. Hence gasoline prices are notoriously difficult to forecast beyond the short-term and are often forecasted as returning to some long-run trend rate of growth.
- DWR subsequently used the models to project attendance levels annually through 2050.

DWR submitted two annual models and one monthly model to account for seasonal differences in attendance. The models appear to be robust and the coefficients retain the expected

⁴ See Projected Recreation Use Final R-12.

⁵ See Projected Recreation Use Final R-12, page 5-8.

signs. The models detected that, holding all other variables in the model constant, the trend in visitation between the fiscal years 1980-81 and 2000-01 is negative at both Lake Oroville and at the forebay. We have not examined the statistical properties of the models other than the standard measures of fit, the statistical significance of the estimated coefficients, and assurance that the models have been corrected for autocorrelation.⁶ Nor are we in possession of the raw data used to generate the results. However, DWR's results appear to show that their models adequately represent visitation at project facilities.

Butte County does not appear to object to the models' specification but is concerned that DWR does not sufficiently address future variation in the independent variables and does not account for population growth. It is not clear from DWR what their assumptions about gasoline prices and water levels are. With respect to gasoline prices, these are volatile. In addition to economic conditions of supply and demand, they are subject to uncertain geopolitical influences. Hence gasoline prices are notoriously difficult to forecast beyond the short-term and are often forecasted as returning to some long-run trend rate of growth. Recent experience has shown that even a large increase in gas prices does not necessarily result in a reduction in driving. Thus, it would be impossible to predict not only gas prices but the effect of gas prices on recreational use of the Oroville Facilities' recreational amenities.

With respect to water levels, they are a function of weather and various operational requirements of the project. The econometric method employed by DWR should be able to produce models that generate visits for a "worst case", a "base case" and a "best case" scenario. In practice, variations around the baseline forecast are usually generated with 5.0 percent differentials of the independent variables in either direction. DWR provides various scenarios on page 4-9 of R-12, *Projected Recreation Use (Final)*. Using recreation days as units, DWR's base case projections call for a compounded annual average increase in demand at the project of 1.5 percent from 2002 to 2050.

MODEL CRITIQUE BY DR. JON EBELING

In its Answer to DWR's rejection of a motion for relief from alleged negative fiscal impacts imposed by the Project, Butte County submitted a critique of the DWR results by Dr. Jon S. Ebeling of Regional and Economic Sciences. Dr. Ebeling reviewed all submissions by DWR but the bulk of his work was in reviewing R-18, *Recreation Activity, Spending and Associated Economic Impacts*, which is a study of fiscal impacts using IMPLAN (DWR, 2004a). Dr. Ebeling raises seven issues that in his view are critical flaws of the study. We address each of those issues as follows:

1. Input data are point estimates rather than a range of values around a distribution. This point is addressed in the sensitivity analysis above by assuming a range of input values of +/- 5 percent around the mean. Given sufficient information, this point can be corrected using Monte Carlo simulations of the data. In the simulations, the distribution of the survey data is inspected and a particular distributional assumption is chosen based on how closely the theoretical shape matched the actual survey data. In most cases, distributions will appear normal or log-normal. The appropriate statistics are entered to simulate values as if they were

⁶ Autocorrelation occurs when the estimated errors of past realizations of the dependent variable are correlated with the current errors. It indicates that the model is partially driven by past "shocks," the effect of which die out only slowly through time. The effect is to render the estimated coefficients inefficient and inferences drawn from them will be prone to error.

picked out of the chosen distribution. The simulations are done typically up to 500 times or more. The simulations will result in a new mean based on the theoretical distribution, as well as extreme values. Each of these outputs can subsequently replace the survey data in the fiscal impacts model. Our application of this method to survey expenditure data (see table A-6) found that under an assumed log-normal distribution, mean spending by Butte County resident and non-resident visitors to project recreational facilities is lower by 8.2 percent on an unweighted average basis, and that the resulting impact would be reduce the County's net fiscal deficit by 6.6 percent and to reduce the indirect employment and earnings estimate by 5.6 percent.

2. The model is static and does not account for the dynamics of visitation owing to exogenous factors such as varying lake water levels, gasoline prices, population, and population demographics. We agree with Dr. Ebeling that it is not clear from DWR documents what their assumptions about water levels and gasoline prices are. As we note above in our discussion of Visitor Projections, DWR did not find a correlation between population and visits at the project. Given that water levels depend both on the weather and operational considerations, such as the trade-off between the demand for power and society preferences for recreational facilities, fish flows, etc., and that gasoline prices and consumer responses to those prices are similarly difficult to predict, assumptions based on the long-term average growth rate of each would be reasonable.

3. The process of “cleaning” the survey data is not properly explained and thus not justifiable. As was stated in the draft EIS, cleaning the data is not an unusual process. Good practice requires the data analyst to conduct an exploratory analysis of the dataset to eliminate nonsensical responses. Staff finds that the explanation of the data cleaning methods on pages B-2 and page B-3 of the R-18 report (DWR, 2004a) is consistent with good practice.

4. Indirect effects of the project are not explained. Above under *the heading Model Estimation of Indirect Impacts*, we describe how indirect effects flow from changes in input requirements of producers directly affected by economic changes. This is a standard feature of IMPLAN and other input-output models. First, the model considers the level of visitor spending and uses input/output coefficients to translate this into earnings and employment by industry generated by the additional demand. The level of new employment must be supplied by either the local labor market or from in-migrants. The model uses a constant ratio of population to employment to generate the new level of population. The new (indirect) population places demands on County services and pays taxes to the County in the same proportion as current residents.

5. The survey data collection was inadequate and the response rate of 37.3 percent is poor. In our experience, a response rate of 37.5 percent to a mail survey is not abnormally low. In any case, the response rate of a survey is not the only means by which to judge the adequacy of the sample. If the response rate was even lower but the number of responses was 1) sufficient to satisfy some standard measure of statistical confidence, and 2) is composed of a sample that is demographically representative of the population, then one can conclude that the survey results are valid. In the case of the expenditure data, 484 non-residents and 480 residents responded, which produces a margin of error of +/-4.5 percent at the 95 percent level of confidence.

Regarding the data cleaning methodology, as stated in the DEIS, “cleaning” the data is not an unusual process. Good practice requires the data analyst to conduct an exploratory analysis of the dataset to eliminate nonsensical responses. Staff finds that the explanation of the

data cleaning exercise on pages B-2 and page B-3 of R-18 (DWR, 2004a) is consistent with good practice.

6. Results could be biased because persons who did respond to the survey may retain unobservable characteristics (and therefore impossible to adjust for) that make them different from those who did not respond. This is a reasonable point, in that neither Dr. Ebeling nor we can assess the possibility of bias in a study without examining the distribution of data collected. For example, if all respondents belong to just one income, race, or other demographic and the universe is known to contain two or more classes, then the data could be biased. We have no evidence that this is the case.

7. Forecasts of fiscal impacts were generated using only one year of actual budget data. DWR used Butte County's FY2001-2002 and FY 2002-2003 budgets to derive its cost and revenue translators for the IMPLAN model. DWR reviewed budget data over time but found inconsistencies that precluded the development of a representative time series. DWR explains its rationale on page 4-4 of study report R-19 (DWR, 2004b). Further, beginning on pages 4 and 5 of R-19, DWR explains its assumptions for forecasted visitor fiscal impacts on the County in the year 2020. Staff finds these assumptions reasonable. Our conclusion is that changing the data collection methods or analytical techniques recommended by Dr. Ebeling would likely improve the robustness of DWR's results, but would not be likely to have a significant effect on the results themselves.

QUESTIONS POSED BY BUTTE COUNTY

In its November 15, 2005 filing with the Commission, Butte County requested that the Commission require DWR to provide responses to the following nine questions posed by Butte County. The Commission declined to make that requirement at that time. In the course of our independent review of DWR's model and analytical approaches, we have reached the following conclusions regarding Butte County's questions.

1. (a) *Please provide the standard deviations that were used after calculating the daily average in table 5.1-1 at page 5-2 of the R-9 Report.*
- (b) *Please provide the formulae used to calculate the daily averages presented in the columns and in the totals in table 5.1-1 at page 5-2 of the R-9 Report.*

The formula used to calculate the daily average is total use for the period/days in the period. The average daily value presented in the table is a typical measure presented by license applicants for this type of study, and we find it adequate for our use. We do not see any evidence that the standard deviations, if calculated by DWR, were used.

2. (a) *Did DWR calculate the daily average visitor figure in parentheses at the bottom of the Season Total column in table 5.1-1 at page 5-2 of the R-9 Report by calculating a weighted average of the Weekday Total and the Weekend Total?*
- (b) *If the answer to question 2(a) above is "yes," please provide an explanation concerning the weights used to calculate the daily average totals for both the column on Recreation Season and the column on Off-Season in table 5.1-1 at page 5-2 of the R-9 Report.*
- (c) *If the answer to question 2(a) above is "no," please state the methodology used and explain the rationale for the use of the methodology. Please provide the formulae that illustrate the calculations for totals for study areas on weekdays,*

weekends, and seasonal totals for recreation, and the same formulas for weekdays, weekends, and seasonal totals for off-season totals.

(d) Please provide the formulae used to calculate the combined season total.

From our review, it appears clear that the daily averages are a simple calculation based on the following: (1) 124 days in the 4-month season, (2) 241 days in the 8-month off season, (3) 84 weekdays and 40 weekend days during the 4-month season,⁷ and (4) 173 weekdays and 68 weekend days during the 8-month off season.

Season total average = visitation for season/days in the season

Combined season total = recreation season total + off-season total

3. The following statement appears on Page 5-1 of the R-9 report:

It is important to note that visitation at several Lake Oroville sites was probably affected by low water conditions on the reservoir during much of the 2002 recreation season. Compared to pool levels during the previous 12 years (1990 to 2001), the reservoir elevation was approximately 20 to 50 feet below average through most of that summer. By mid-summer, use of several boating and swimming facilities was impaired and some facilities were unusable. The pool level returned to full-pool by May, 2003 as the data collection period for this study ended.

(a) Were the data for “recreational days” in table 5.1-1 at page 5-2 of the R-9 Report adjusted to compensate for the low water levels at the lake during the one-year study period between May 15, 2002 and May 14, 2003?

(b) If the answer to 3(a) above is “yes”, please provide the compensation formula.

(c) If the answer to question 3(a) above is “no”, why not?

It appears to us from our review of the R-9 report and data that DWR did not adjust the figures in table 5.1-1 to compensate for low water levels. DWR presented the actual data counts. We note that there is no requirement in the R-9 study plan for DWR to adjust the data counts to reflect average conditions.

4. How was the number of people per vehicle cited at Page 4-12 of the R-9 Report calculated?

We find that DWR adequately explains in section 4.2.1.2 of report R-9 how the people-per-vehicle estimates were made

⁷ In 2002, there were actually 88 weekdays and 36 weekend days in the 4-month recreation season (May 15–September 15) defined by DWR. Although not explicitly stated by DWR, it appears that they followed the common practice of counting Memorial Day, July 4, and Labor Day as weekend days rather than weekdays. Because the Fourth of July holiday was on a Thursday in 2002 when the survey was made, DWR appears to have also counted July 5 as a weekend day.

5. *The R-9 Report contains frequent references to “professional judgments”. Regarding estimates of the number of persons visiting the project area, please answer the following:*

(a) Are the individuals who made the professional judgments employees of a State agency? If so, please name each State agency.

(b) How was it determined that the individuals who made the professional judgments are professional? Are these individuals members of a professional organization or organizations? If so, what are the name(s) of said organizations?

DWR uses the term “professional judgment” in the same way that other applicants use the term: to indicate that those collecting and presenting the recreational use data had to use some judgment in putting together and presenting the raw data acquired in the field. The authors of the R-9 report are noted on the title page of the report. Given that the report was prepared by environmental planners with EDAW, Inc., a firm selected based on criteria spelled out in the study plan and well known for preparing similar studies, and working under the direction of a DWR staff environmental scientist, we see no reason to doubt their judgment, and see no evidence of poorly applied judgment in the report.

6. *There are comments on page 4-17 of the R-9 Report indicates that, although data were collected at several different periods during the day, only peak time data was used to calculate both “people at one time” and the “vehicles at one time”.*

(a) What are the estimates for non-peak times at these locations?

(b) Please provide the data for both “people at one time” and the “vehicles at one time” for all non-peak times.

(c) Was the “people at one time” data for non-peak times included in the totals of table 5.1-1 at Page 5-2 of the R-9 Report?

(d) Was the “vehicles at one time” data for non-peak times included in the totals of table 5.1-1 at Page 5-2 of the R-9 Report?

We do not see a need for information about people-at-one-time or vehicles-at-one-time at non-peak periods. These data are generally used to determine the adequacy of facility capacity, such as whether there are enough parking spaces to accommodate the peak number of vehicles at a site. In this context, the peak number of people or vehicles during non-peak times is not relevant.

7. *Page 4-1 of the R-9 Report contains references to several different sources of data, including campground occupancy data, vehicle traffic counter data and observational data.*

(a) How were all of these sources of data merged and integrated to create table 5.1-1 at Page 5-2 of the R-9 Report? Please provide the formulae used to integrate the data from the various sources to create table 5.1-1 at Page 5-2 of the R-9 Report.

(b) Were adjustments made to account for the failure of some of the data collection instruments?

(c) If so, please explain how these adjustments were made.

This section of the report notes that some problems occurred during data collection, such as counters being stolen, batteries being taken, ant infestations, etc. DWR indicates that professional judgments were made to fill in the missing gaps. The data collection problems encountered by DWR are typical of this type of study and the use of professional judgment to fill data gaps is also common. The level of detail provided by DWR is adequate for our analysis.

- 8. *Page 4-12 of the R-9 Report states that there were adjustments made to traffic counted, in order to account for the percentage of non-recreational traffic counted. Please provide each adjustment made, in terms of how many vehicles were counted at each station, percentage of adjustment which was made, and each revised total after each adjustment.***

The non-recreational vehicles that DWR refers to here include DWR's or California Department of Parks and Recreation's vehicles, other state vehicles, and delivery or work vehicles. The report states that the counts were reduced by 1 percent, 5 percent, or 10 percent based on a combination of past DWR estimates, observation data, and professional judgment. Given the small amount of this traffic and the relative ease of estimating it, we do not see the need to know where each and every adjustment was made to account for it.

- 9. *As to the R-18 and the R-19 Report, what is the annual total indirect population figure?***

The model simulates population changes under the assumption that the total population/employment ratio remains constant. This implies an economy at full employment equilibrium. Equilibrium population/employment ratios are derived from census population estimates. In the model, the balance of labor supply and labor demand is disturbed when there is a change in total visits to the project, spending per visitor, or both. Excess labor demand created by increased visits or spending is satisfied by in-migration from outside Butte County. A commuter matrix of weights derived from census "*Journey to Work*" data forms the basis by which population is assigned across the towns and unincorporated areas. The population/employment ratio given in the model is 2.18. At spending levels consistent with those recorded in the survey data, and holding the number of visitor days constant, the model estimates 654 project-generated jobs for the County. At a ratio of 2.18 persons for every job, the project would generate 1,423 additional residents in Butte County.

In the model, population impacts are directly proportional to visitor spending, which probably overstates the impact of visitor spending on Butte County population. In reality, some of the increased jobs generated by the project would be filled by Butte County residents and not exclusively by in-migrants. The precise relationship between local labor supply and jobs generated by the project depends on traditional factors of labor economics, including skills, demographics and especially wages. Because the model predicts that Butte County's costs of serving the additional population would be greater than the revenue associated with those people, any overestimate of population impacts would also overstate the County's project-related fiscal deficit.

LITERATURE CITED

DWR (California Department of Water Resources). 2005. Responses to Deficiencies, Clarifications, Additional Information Requests, and Revisions to January 2005 License Application, Binder #1 Public Information: California Department of Water Resources, Sacramento, CA. August 2005.

- DWR. 2004a. SP-R18. Recreation activity, spending, and associated economic impacts. Oroville Facilities Relicensing FERC Project No. 2100. California Department of Water Resources, Sacramento, CA. May 2004.
- DWR. 2004b. SP-R19: Fiscal impacts. Oroville Facilities Relicensing FERC Project No. 2100. California Department of Water Resources, Sacramento, CA. May 2004.

APPENDIX B
CAPITAL COST AND ANNUALIZED COSTS FOR MEASURES FOR THE
OROVILLE FACILITIES PROJECT

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Appendix B. Summary of initial and subsequent capital cost and annualized costs for measures included in the Settlement Agreement and staff modifications to the Proposed Alternative for Oroville Facilities. (Source: Staff)

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
Geologic Resources									
A100	1. Establish and convene ecological committee within 3 months.	DWR	\$0	\$700	\$700	1	1	Yes	
A100	2. Purpose of Ecological Committee is to provide consultation, review of plans, and advise DWR regarding specific license articles (see note #4).	DWR	\$0	\$50,000	\$50,000	1	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A101	1. Develop and file Lower Feather River Habitat Improvement Plan with FERC for information within 3 years that includes the plans from Proposed Articles A102 through A104, A106, A108, A112, and A115.	DWR	\$0	\$600	\$600	1	3	Yes	We assume that proposed gravel augmentation is 55% of the proposed "Natural Salmonid Spawning and Rearing Habitat" costs, listed in table D.4.7-3 of the revised exhibit D. We assume that the O&M costs for developing the individual plans/monitoring reports for the individual programs are captured within each of those measures; the O&M costs in this measure relate only to adaptive management review and creation of the summary.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A101	2. Develop comprehensive monitoring and adaptive management summary report (including results, proposed changes, and updates to individual plans) 6th year after license issuance and every 5th year thereafter for term of license.	DWR	\$0	\$2,300	\$2,300			Yes	We assume that the O&M costs for developing the individual plans/monitoring reports for the individual programs are captured within each of those measures; the O&M costs in this measure relate only to adaptive management review and creation of the summary.
A106	Develop and file plan for FERC approval within 6 months for the Riparian and Floodplain Improvement Program.	DWR	\$15,000	\$0	\$1,100	1	1	Yes	
A106	Phase 1 within 1 year—Analysis of proposed RFIP with a recommended alternative.	DWR	\$0	\$13,700	\$13,700	1	1	Yes	Cost would be \$200,000 over the years shown.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A106	Phase 2 of Riparian and Floodplain Improvement Program within 4 years—Feasibility evaluation and implementation schedule of Phase 1 alternative (to be designed and commence construction within 8 years).	DWR	\$0	\$182,500	\$182,500	1	4	Yes	Cost would be \$725,000 over the years shown.
A106	Phase 3 of Riparian and Floodplain Improvement Program within 15 years—Analysis of other potentially feasible riparian/floodplain improvement projects with a recommended alternative.	DWR	\$0	\$10,600	\$10,600	1	15	No	Cost would be \$15,000 over the years shown.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A106	Complete construction of Phase 3 Riparian and Floodplain Improvement Program preferred alternative within 25 years.	DWR	\$0	\$59,400	\$59,400	1	25	No	Cost would be \$64,000 over the years shown.
A106	Monitor effectiveness of floodplain work and submit report to the Commission every 5 years.	DWR	\$0	\$900	\$900	1	30	Yes	\$5,000 in years 5, 10, 15, 20, 25, and 30.
A106	Re-evaluate every 5 years in consultation with Ecological Committee and agencies and submit recommended changes to the Commission for approval.	DWR	\$0	\$900	\$900	1	30	Yes	\$5,000 in years 5, 10, 15, 20, 25, and 30.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A106	Cost cap to DWR of \$5 million excluding profits from gravel sales.	DWR	\$0	\$0	\$0			No	The Commission does not recognize cost caps; however, we have adopted the \$5,000,000 total cost as a best estimate. We characterize these costs as O&M costs rather than capital costs.
Water Quality Resources									
A112	Water Quality Monitoring Program.	DWR	\$18,800	\$114,300	\$115,700	1	30	Yes	
A113	Recreation site bacteria monitoring.	DWR	\$7,200	\$129,600	\$130,100	1	30	Yes	
A114	Public education regarding fish consumption risk (Phase 1).	DWR		\$1,900	\$1,900	1	5	Yes	
A114	Public education regarding fish consumption risk (Phase 2).	DWR		\$1,900	\$1,900	6	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
Aquatic Resources									
A102	1. Develop and file plan for Gravel Supplementation and Improvement Program for the Commission's approval within 2 years.	DWR	\$200,000	\$0	\$14,100	1	2	Yes	We assume that proposed gravel augmentation is 55% of the proposed "Natural Salmonid Spawning and Rearing Habitat" costs, listed in table D.4.7-3 of the revised exhibit D. We assume that the O&M costs for developing the individual plans/monitoring reports for the individual programs are captured within each of those measures; the O&M costs in this measure relate only to adaptive management review and creation of the summary.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A102	2. Supplementation of at least 8,300 cubic yards of spawning gravels distributed over up to 15 locations in the low flow channel or high flow channel.	DWR	\$11,439,500	\$0	\$742,200	1	5	Yes	We assume an even cash flow over years shown.
A102	3. Monitor and replenish/rehabilitate gravel to maintain a minimum of 10 riffle complexes at criteria levels.	DWR		\$17,500	\$17,500	6	30	No	O&M cost is \$112,490 in year 6, 11, 16, 21, and 26.
A102	4. Determine need to augment gravel in high flow reach, including gravel budget.	DWR	\$175,000	\$0	\$7,300	10	30	No	
A102	5. Stage spawning gravel stockpile (up to 2,000 cubic yards) in the immediate vicinity of pool below the afterbay outlet.	DWR	\$500,000	\$0	\$19,100	12	12	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A102	6. Monitor, evaluate, and report once every 5 years and coordinate activities with other resource improvement activities.	DWR		\$600	\$600	6	30	Yes	O&M cost is \$4,000 in years 6, 11, 16, 21, and 26.
A103	1. Develop and file a Channel Improvement Plan for improving Moe's and Hatchery ditches to support spawning and rearing. File plan for the Commission's approval within 1 year.	DWR	\$200,000	\$0	\$14,500	1	1	Yes	We assume that proposed channel improvements are 23% of the proposed "Natural Salmonid Spawning and Rearing Habitat" costs, listed in table D.4.7-3 of the revised exhibit D.
A103	2. Modifications to Moe's and Hatchery ditches to be completed within 3 years for salmonid spawning and rearing habitat improvement.	DWR	\$1,750,000	\$0	\$116,500	2	3	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A103	3. Develop and file a Channel Construction Plan in order to identify and construct five additional side channel improvements. File plan for the Commission' approval within 4 years.	DWR	\$300,000	\$0	\$19,400	2	4	Yes	
A103	4. Modifications to five other side channels (2,460 feet) within 10 years to improve salmonid spawning and rearing habitat.	DWR	\$2,899,700	\$0	\$145,000	5	10	Yes	
A103	5. Maintain channel improvements.	DWR	\$0	\$2,400	\$2,400	8	30	Yes	O&M cost is \$11,696 in years 8, 13, 15, 18, 20, 23, 25, and 28.
A103	6. Monitor, evaluate, and report every year.	DWR	\$0	\$5,000	\$5,000	1	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A104	1. Develop and file Structural Habitat Supplementation and Improvement Program plan for the Commission's approval within 2 years; implement plan within 2 years of approval.	DWR	\$250,000	\$0	\$17,600	1	2	Yes	We assume that proposed structural habitat improvements are 22% of the proposed "Natural Salmonid Spawning and Rearing Habitat" costs, listed in table D.4.7-3.
A104	2. Map existing LWD, riparian habitat and sources of riparian and LWD recruitment.	DWR	\$100,000	\$0	\$7,100	1	2	Yes	
A104	3. Place 2 structures per riffle between RM 54.2 and 67.2 for salmonid habitat.	DWR	\$4,575,800	\$0	\$287,500	3	4	Yes	
A104	4. Assess safety to provide for public safety.	DWR		\$0	\$0			Yes	
A104	5. Monitor after high flow events or at least once every 5 years for effectiveness. Definition of high flow events TBD in plan.	DWR		\$700	\$700			Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A104	6. Structure replacement interval TBD in plan but is at least once every 5 years.	DWR		\$4,100	\$4,100			Yes	O&M cost is \$31,596 in years 9, 14, 19, 24, and 29.
A104	7. Report once per year and compile every 5 years a report to the Commission.	DWR		\$700	\$700			Yes	O&M cost is \$5,000 in years 9, 14, 19, 24, and 29.
A104	8. Re-evaluate once every 5 years in consultation with Ecological Committee and agencies and submit recommended changes to the Commission for approval.	DWR		\$700	\$700			Yes	O&M cost is \$5,000 in years 9, 14, 19, 24, and 29.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A105	Develop plan and install fish monitoring weir (Phase I) to determine timing and abundance of spring-run Chinook within 3 years of license issuance.	DWR	\$1,230,000	\$14,300	\$93,800	3	8	Yes	We assumed 30% of the cost for Proposed Article A105 is attributable to the monitoring weir.
A105	Within 8 years of license issuance develop a Phase 2 plan to schedule, install, and operate a segregation fish weir upstream of Thermalito afterbay within 12 years to separate spring- and fall-run Chinook. Evaluate need for egg taking station.	DWR	\$2,870,000	\$44,800	\$154,600	12	30	Yes	We assumed 70% of the cost for Proposed Article A105 is attributable to the segregation weir.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A107	Feather River fish hatchery improvements— Water disinfection system.	DWR	\$2,450,000	\$561,800	\$739,800	1	30	Yes	We assume capital cost as 35% of the \$7 million (beyond no action) shown in DWR's June 28, 2006, updated costs for the Feather River fish hatchery. We assumed that 35% of the \$1,605,000 O&M cost would apply to this measure.
A107	Feasibility studies for Feather River fish hatchery improvements, including management plan implementation and facilities assessment.	DWR	\$4,550,000	\$262,600	\$566,100	1	4	Yes	We assume capital cost as 65% of the \$7 million (beyond no action) shown in DWR's June 28, 2006, updated costs for the Feather River fish hatchery. We assume an even cash flow in years 1 through 4. We assumed that 65% of the \$1,605,000 O&M cost would apply to this measure.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A108	Implement one or more facility modifications or other actions that the temperature feasibility study suggests are most effective in terms of temperature control and cost.	DWR	\$52,870,000	\$86,000	\$2,427,700	10	30	Yes	We assume capital cost of \$52.87 million (beyond no action) shown in DWR's June 28, 2006, updated costs for temperature criteria/targets and an even cash flow of capital costs over 2 years ending in year 10.
A110	Plan and implement projects to benefit warmwater fisheries spawning and rearing habitat in 7-year cycles. Provide \$40,000 per year for 15 habitat units at \$2,000 each and O&M (\$10,000).	DWR		\$0	\$0	1	30	Yes	Part of No-action Alternative; no additional cost.
A111	Stock 170,000 yearling salmon or equivalents per year (+10%) not to exceed \$75,000 annually; \$68,000 for stocking, and \$7,000 for monitoring.	DWR		\$0	\$0	1	30	Yes	Part of No-action Alternative; no additional cost.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
Terrestrial Resources									
A115	Prescribe management direction for terrestrial, aquatic, and recreational resources through the OWA Management Plan.	DWR	\$432,000	\$692,000	\$723,400	1	30	Yes	Based on Settlement Agreement Explanatory Statement for Proposed Article A115.
A117 – A121	Develop and implement a threatened and endangered species implementation plan.	Interior, Staff	\$0	\$0	\$0			Yes	The cost to prepare this plan is divided equally among A117 through A121.
A117	Protect vernal pools.	DWR	\$5,000	\$17,100	\$17,500	1	30	Yes	The capital cost includes 20 percent of the cost to develop a threatened and endangered species implementation plan for the FWS conservation measures in the biological opinion issued by FWS on April 9, 2007.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A118	Minimize disturbance to nesting bald eagles.	DWR	\$5,000	\$17,100	\$17,500	1	30	Yes	The capital cost includes 20 percent of the cost to develop a threatened and endangered species implementation plan for the FWS conservation measures in the biological opinion issued by FWS on April 9, 2007.
A119	Protect the giant garter snake.	DWR	\$5,000	\$24,300	\$24,700	1	30	Yes	The capital cost includes 20 percent of the cost to develop a threatened and endangered species implementation plan for the FWS conservation measures in the biological opinion issued by FWS on April 9, 2007.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A120	Protect the valley elderberry longhorn beetle.	DWR	\$5,000	\$24,300	\$24,700	1	30	Yes	The capital cost includes 20 percent of the cost to develop a threatened and endangered species implementation plan for the FWS conservation measures in the biological opinion issued by FWS on April 9, 2007.
A121	Protect the red-legged frog.	DWR	\$5,000	\$24,300	\$24,700	1	30	Yes	The capital cost includes 20 percent of the cost to develop a threatened and endangered species implementation plan for the FWS conservation measures in the biological opinion issued by FWS on April 9, 2007.
A122	Construct and recharge brood ponds.	DWR	\$920,000	\$7,500	\$74,300	2	30	Yes	
A123	Provide upland food for nesting waterfowl.	DWR	\$0	\$30,700	\$30,700	1	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A124	Provide nest cover for upland waterfowl.	DWR	\$0	\$51,200	\$51,200	1	30	Yes	
A125	Install wildlife nesting boxes.	DWR	\$5,000	\$6,400	\$6,800	2	30	Yes	
A126	Invasive plant management.	DWR	\$450,000	\$89,300	\$122,000	5	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
Recreation Resources									
A127	Upon license issuance, implement the Settlement Agreement Recreation Management Plan for the project, including the following elements: a recreation facility development program, a recreation O&M program, a recreation monitoring program, a resource integration and coordination program, a Recreation Management Plan review and revision program, and an interpretation and education program.	DWR, Interior, DFG, Boating Groups		\$139,000	\$139,000	1	30	Yes	
	Prepare a plan addressing accessibility pursuant to the ADA for all public facilities at the Oroville Facilities.	Anglers Committee et al.	\$30,000	\$0	\$2,200	1	1	No	Staff estimate.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
	Develop a plan for conducting recreational use surveys in consultation with the Recreation Advisory Committee and conduct comprehensive recreational use surveys every 5 years beginning October 1, 2007.	Butte County	\$50,000	\$74,800	\$77,700	5	30	No	Staff estimate costs would be incurred every 5 years, not annually.
	In consultation with the Recreation Advisory Committee, update the Recreation Management Plan every 5 years.	Butte County	\$0	\$27,900	\$27,900	2	30	No	Costs would be incurred every 5 years beginning in 2008, not annually.
	Develop a plan to provide sandy beaches at the Oroville Facilities campgrounds located adjacent to a reservoir.	Anglers Committee et al.	\$20,000	\$0	\$1,500	1	1	No	Staff estimate.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 10 years of license issuance, install a sign, barrier, and/or gate at the terminus of the Nelson Bar boat launch.	DWR, Interior, DFG, Boating Groups	\$50,000	\$25,300	\$27,500	10	30	Yes	
A127	Within 10 years of license issuance, provide a variety of enhancements and improvements at the Lime Saddle complex (campgrounds, day-use area, boat launch, marina).	DWR, Interior, DFG, Boating Groups	\$2,250,000	\$63,200	\$160,000	10	30	Yes	
A127	Provide annual O&M at the Vinton Gulch boat launch.	DWR, Interior, DFG, Boating Groups	\$0	\$10,000	\$10,000	1	30	Yes	
A127	Within 10 years of license issuance, install a vault restroom at Dark Canyon boat launch and directional signs along the roads providing access.	DWR, Interior, DFG, Boating Groups	\$33,000	\$5,100	\$6,500	10	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127– A129	Within 10 years of license issuance, install an ADA-accessible vault restroom, 5 to 10 picnic tables with shade ramadas, and interpretive signs at the Foreman Creek boat launch.	DWR, Interior, DFG, Boating Groups	\$2,863,000	\$40,500	\$163,600	10	30	Yes	Contingent on resolving cultural resource issues to the Commission's satisfaction.
	Close the Foreman Creek boat launch and boat-in campground to recreational and other public use.	Berry Creek Rancheria and Mooretown Rancheria	\$30,000	\$5,000	\$7,200	1	30	No	Staff estimate.
	Provide new marina facilities and a boat ramp at Potter's Ravine by 2010.	Pathfinder Quarter Horses et al., George Weir, Vicki Hittson-Weir	\$1,000,000	\$43,300	\$108,000	3	30	No	Staff estimate.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 10 years of license issuance, provide 10 picnic tables with pole stoves/grills and a gravel parking area to accommodate 10 cars with trailers at the Enterprise boat launch; coordinate with the California Department of Boating and Waterways to extend the existing boat ramp to provide a low water access.	DWR, Interior, DFG, Boating Groups	\$3,500,000	\$37,900	\$188,400	10	30	Yes	
A127	Within 10 years of license issuance, install a sign, barrier, and/or gate at the terminus of the Stringtown boat ramp and provide directional signs along the roadside to the site.	DWR, Interior, DFG, Boating Groups	\$34,000	\$5,100	\$6,600	10	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Provide annual O&M at the 7 campgrounds along Lake Oroville with boat-in access.	DWR, Interior DFG, Boating Groups	\$0	\$40,000	\$40,000	1	30	Yes	
A127	Within 10 years of license issuance, provide a trash receptacle and trash pickup service at the Lake Oroville scenic overlook and make minor grading improvements (filling larger holes) at the head of the old construction road.	DWR, Interior, DFG, Boating Groups	\$69,000	\$12,600	\$15,600	10	30	Yes	
A127	Within 10 years of license issuance, install 10 picnic tables, a stock watering trough, and a sink at Saddle Dam Trailhead and provide 1 or 2 additional access trails from the trailhead/parking area to the Lake Oroville shoreline.	DWR, Interior, DFG, Boating Groups	\$145,000	\$12,600	\$18,800	10	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
	By 2009, improve the Saddle Dam Trailhead by providing lighting at the parking area, 2 vault restrooms with hand washing sinks, 10 concrete picnic tables, shade trees, piped potable water, 2 water tanks for horses with outlet valves, and tie rails between the picnic tables and at the restrooms.	Pathfinder Quarter Horses et al., George Weir, Vicki Hittson-Weir	\$500,000	\$37,300	\$71,600	2	30	No	Staff estimate.
A127	Within 10 years of license issuance, provide a variety of enhancements and improvements at the Loafer Creek Complex (campgrounds, day-use area, boat launch).	DWR, Interior, DFG, Boating Groups	\$5,410,000	\$202,300	\$434,900	10	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
	By 2009, build a new equestrian group campground at Loafer Creek with central water availability, 2 restrooms, washing facilities with showers, and parking for 15 vehicles with horse trailers and 15 self-contained RV horse trailers.	Pathfinder Quarter Horses et al., George Weir, Vicki Hittson-Weir	\$500,000	\$37,300	\$71,600	2	30	No	Staff estimate.
A127	Within 10 years of license issuance, provide a variety of enhancements and improvements at the Bidwell Canyon Complex (campground, day-use area, boat launch, and marina).	DWR, Interior, DFG, Boating Groups	\$9,268,000	\$113,800	\$512,300	10	30	Yes	
A127	Within 10 years of license issuance, provide an I&E program and enhance the existing facilities at the Lake Oroville Visitors Center.	DWR, Interior, DFG, Boating Groups	\$200,000	\$43,000	\$51,600	10	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 10 years of license issuance, determine the optimum boarding dock system configuration at the Spillway day-use area boat launch and install additional dock(s), if feasible.	DWR, Interior, DFG, Boating Groups	\$1,486,000	\$50,600	\$114,500	10	30	Yes	
A127	Within 10 years of license issuance, provide 100 parking spaces, 4 to 5 picnic tables with shade ramadas, and ADA-accessible interpretive panels, modify existing parking spaces and restroom to make ADA accessible, and improve the surface of the walkway at the Oroville dam overlook day-use area.	DWR, Interior, DFG, Boating Groups	\$200,000	\$0	\$8,600	10	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
	Construct an enclosed multiple-use events center on Lake Oroville State Recreation Area land with grandstands, concessions, support offices, facilities, and parking to be used for events, such as sporting events, concerts, conventions, livestock expositions, and fair expositions by 2013.	Pathfinder Quarter Horses et al., George Weir, Vicki Hittson-Weir	\$500,000	\$15,000	\$43,800	5	30	No	Staff estimate.
A127	Within 10 years of license issuance, install three new floating campsites on Lake Oroville.	DWR, Interior, DFG, Boating Groups	\$375,000	\$24,300	\$40,400	10	30	Yes	
A127	Continue to provide O&M for the seven floating restrooms on Lake Oroville.	DWR, Interior, DFG, Boating Groups	\$0	\$55,000	\$55,000	1	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 10 years of license issuance, modify or construct seven trails in the Lake Oroville area.	DWR, Interior, DFG, Boating Groups	\$269,000	\$25,300	\$36,900	10	30	Yes	
	Maintain current trail uses.	Anglers Committee et al., Pathfinder Quarter Horses et al., George Weir, Vicki Hittson-Weir	\$0	\$0	\$0	1	30	No	Continuation of existing measure without modifying trail use.
	By 2012, coordinate with DPR, Corps, Forest Service, and volunteers to build the Lake Oroville Rim Trail primarily for equestrians and hikers, and for sections meeting safety guidelines, for shared-use with mountain bikers.	Pathfinder Quarter Horses et al., George Weir, Vicki Hittson-Weir	\$100,000	\$15,000	\$20,800	5	30	No	Staff estimate.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
	By 2011, cooperate with DPR and the Plumas National Forest to extend the equestrian and hiking trail from the Dan Beebe Trail to Feather Falls Village and Trail and then to the Pacific Crest Trail, according to the California Riding and Hiking Trail Laws.	Pathfinder Quarter Horses et al., George Weir, Vicki Hittson-Weir	\$50,000	\$16,100	\$19,100	4	30	No	Staff estimate.
	Annually, provide \$10,000 for stocking bass in Lake Oroville and making a donation to the local bass tournament.	Pathfinder Quarter Horses et al., George Weir, Vicki Hittson-Weir	\$0	\$10,000	\$10,000	1	30	No	Included in recommendation.
A127	Within 11–30 years, provide improvements (campsites, swimming areas, and parking) at Lake Oroville.	DWR, Interior, DFG, Boating Groups	\$20,000,000	\$0	\$642,700	11	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Refurbish and/or replace all recreation facilities at Lake Oroville once during the license term.	DWR, Interior, DFG, Boating Groups	\$19,600,000	\$0	\$444,000	1	30	Yes	
A127	Within 10 years of license issuance, install 10 concrete picnic tables (each with a pole stove/grill), enhance the existing gravel boat launch, and possibly construct an ADA-accessible fishing platform or pier at the diversion pool day-use area.	DWR, Interior, DFG, Boating Groups	\$215,000	\$12,600	\$21,800	10	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 10 years of license issuance, construct access road to railroad bridge crossing at the Thermalito diversion pool, construct a new day-use area including a car-top boat launch, graveled parking area, vault restroom, picnic tables, pole grills, and foot trail access to the shoreline, install fencing to separate facilities from the railroad tracks, and install non-potable water trough near the Lakeland Boulevard Trailhead access.	DWR, Interior, DFG, Boating Groups	\$1,914,000	\$73,400	\$155,700	10	30	Yes	
A127	Within 10 years, enhance a car-top boat launch site at or near the Feather River fish hatchery and include in the I&E program.	DWR, Interior, DFG, Boating Groups	\$45,000	\$13,700	\$15,600	10	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 10 years of license issuance, modify or construct four trails along the Thermalito diversion pool.	DWR, Interior, DFG, Boating Groups	\$316,000	\$25,300	\$38,900	10	30	Yes	
A127	Refurbish and/or replace all recreation facilities at the Thermalito diversion pool once during the license term.	DWR, Interior, DFG, Boating Groups	\$900,000	\$0	\$65,400	1	30	Yes	
A127	Within 10 years of license issuance, provide a fish cleaning station, if it can be connected to the existing sewage system, conduct a feasibility study to evaluate warmer water swimming options, and monitor and maintain water quality in the swimming cove at the North Thermalito forebay day use area.	DWR, Interior, DFG, Boating Groups	\$470,000	\$32,600	\$52,800	10	30	Yes	Water quality monitoring cost not included in this amount.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 10 years of license issuance, enhance the South Thermalito forebay day-use area by providing a sandy swimming beach with safety buoys, picnic tables, pole stoves, shade ramadas, landscaping, and an ADA-accessible fishing pier.	DWR, Interior, DFG, Boating Groups	\$200,000	\$12,300	\$20,900	10	30	Yes	Water quality monitoring cost not included in this amount.
A127	Within 10 years of license issuance, modify or construct trails along the Thermalito forebay.	DWR, Interior, DFG, Boating Groups	\$225,000	\$12,600	\$22,300	10	30	Yes	
A127	Replace and/or refurbish all recreation facilities at the Thermalito forebay once during the license term.	DWR, Interior, DFG, Boating Groups	\$1,900,000	\$0	\$138,000	1	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 10 years of license issuance, provide directional signs along the roadside to the Wilbur Road boat launch.	DWR, Interior, DFG, Boating Groups	\$3,000	\$0	\$100	10	30	Yes	
A127	Provide model aircraft flying facility.	DWR, Interior, DFG, Boating Groups	\$0	\$0	\$0	1	30	Yes	
A127	Continue to provide O&M for the Monument Hill day-use area.	DWR, Interior, DFG, Boating Groups	\$0	\$0	\$0	1	30	Yes	The cost for monitoring water quality is not included in this amount.
A127	Within 10 years, provide a sandy swimming beach with safety buoys, picnic tables, pole stoves, and shade ramadas, and provide directional signs along the roadside to the Larkin Road boat launch.	DWR, Interior, DFG, Boating Groups	\$250,000	\$12,600	\$23,400	10	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 11 to 30 years, provide improvements (campsites, swimming areas, parking) at the Thermalito afterbay.	DWR, Interior, DFG, Boating Groups	\$1,000,000	\$0	\$40,600	11	30	Yes	
A127	Replace and/or refurbish all recreation facilities at the Thermalito afterbay once during the license term.	DWR, Interior, DFG, Boating Groups	\$900,000	\$0	\$65,400	1	30	Yes	
A127	Within 10 years, provide a variety of enhancements and improvements in the Thermalito afterbay outlet area (campground, day-use area, boat launch).	DWR, Interior, DFG, Boating Groups	\$2,450,000	\$139,100	\$244,500	10	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 10 years, provide 2 watchable wildlife sites in the OWA, designate two non-motorized boater launch sites/take-outs as access sites for the proposed River Trail, and maintain and enhance existing access to the OWA for traditional uses such as hunting and fishing.	DWR, Interior, DFG, Boating Groups	\$400,000	\$11,100	\$28,300	10	30	Yes	
A127	Replace and/or refurbish all recreation facilities at the OWA once during the license term.	DWR, Interior, DFG, Boating Groups	\$900,000	\$0	\$65,400	1	30	Yes	
	By 2009, complete the loop trails and trail water crossings as discussed during settlement negotiations.	Pathfinder Quarter Horses et al., George Weir, Vicki Hittson-Weir	\$50,000	\$9,300	\$12,700	2	30	No	Staff estimate.

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 6 months of license acceptance, establish a License Coordination Unit of appropriate DWR staff in Oroville to manage the terms and conditions of the new license.	DWR, Interior, DFG, Boating Groups	\$0	\$75,000	\$75,000	1	30	Yes	
A127	Within 6 months of license acceptance, create a Recreation Advisory Committee to advise DWR on implementation of the Settlement Agreement-Recreation Management Plan components, review recreational use data, and recommend modifications to the Recreation Management Plan.	DWR, Interior, DFG, Boating Groups	\$0	\$0	\$0	1	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
	Maintain Oroville Recreation Advisory Committee to receive community recommendations, oversee feasibility and environmental studies, and advise the Oroville Joint Powers Authority.	Pathfinder Quarter Horses et al., George Weir, Vicki Hittson-Weir	\$0	\$5,000	\$5,000	1	30	No	Staff estimate.
	Establish the Oroville Joint Powers Authority, whose members would include Butte County supervisors representing the cities of Oroville, Richvale, and Paradise, three Oroville City Council members, and the mayor of Paradise.	Pathfinder Quarter Horses et al., George Weir, Vicki Hittson-Weir	\$6,000	\$5,000	\$5,400	1	30	No	Staff estimate.
A127	Cooperate with local groups to plan annual Fourth of July fireworks presentation.	DWR, Interior, DFG, Boating Groups	\$0	\$210,000	\$210,000	1	30	No	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
A127	Within 1 year of license issuance, file a Recreation Implementation Plan with the Commission.	DWR, Interior, DFG, Boating Groups	\$50,000	\$0	\$3,600	1	30	Yes	
A116	Maintain and enhance existing access to the OWA for traditional uses such as hunting and fishing.	DWR, Interior, DFG, Boating Groups	0	\$0	\$0	1	30	No	
Land Use and Aesthetic Resources									
A132	Screening, fuels management, and miscellaneous land use and aesthetics measures.	DWR	\$750,000	\$35,000	\$89,500	1	30	Yes	
	Plan and implement reseedling on the downstream face of Oroville dam.	Staff	\$11,000	\$700	\$1,500	1	30	Yes	Staff assume that O&M cost would be \$4,000 every fifth year to maintain.
Cultural Resources									
A128	HPMP and temporary closure pending results of Plan for Protection of cultural resource values at Foreman Creek.	DWR	\$19,600,000	\$360,000	\$1,783,900	1	30	Yes	

Article No.	Environmental Measure	Entity	Capital Cost	Annualized O&M cost	Annualized Cost	Start Year	End Year	Included by Staff	Comment
Socio-economic Resources									
	Relocate Emergency Operations Center.	Staff, Butte County	\$2,500,000	\$0	\$181,600	1	30	No	
Total Applicant's Proposal			\$186,473,000	\$4,485,600	\$13,371,800				
Total Staff Included			\$186,339,000	\$4,193,800	\$13,075,700				

APPENDIX C
STAFF RESPONSES TO COMMENTS ON THE DRAFT EIS

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APPENDIX C

STAFF RESPONSES TO COMMENTS ON THE OROVILLE FACILITIES DRAFT EIS

The U.S. Environmental Protection Agency's (EPA) notice of availability of the draft environmental impact statement (EIS) was issued on September 29, 2006. Comments on the draft EIS were due on November 28, 2006. The following entities filed comments pertaining to the draft EIS.

Commenting Entity	Filing Date
Paul McIntosh, Chief Administrative Officer, Butte County	October 25 and 31, November 20 and 29, 2006
George Weir, Vicki Hittson-Weir, Pathfinder Quarter Horses	October 27 and December 19, 2006, and January 2 and February 23, 2007
Rick Keene, Assembly Member for the Third District	November 1, 2006
Kurt Flynn	November 2, 2006
James Brobeck	November 13, 2006
Joan C. Townsend	November 21, 2006
Mary Keiser	November 27, 2006
George and Marjorie West	November 27, 2006
Tony Rushing	November 27, 2006
Michael L. Ramsey, Butte County District Attorney (2 letters)	November 28, 2006
Janice Wilson, Committee for Access to Recreation for Lake Oroville	November 28, 2006 and December 21, 2006
Neil R. Meyer	November 28, 2006
Planning and Conservation League	November 29, 2006
Berry Creek Rancheria of Maidu Indians	November 29, 2006
State Water Contractors	November 29, 2006
Dr. Jon S. Ebeling and Dr. Frederica Shockley	November 29, 2006
Curt Josiassen, Chairman, Board of Supervisors, Butte County	November 29, 2006
Town of Paradise	November 29, 2006
James Tonick	November 29, 2006
Stacy Tonick	November 29, 2006
Gabriele Potter	December 8, 2006
Grace F. Napolitano, Member of Congress	December 8, 2006
Pamela Fuller	December 12, 2006
Butte County	December 18, 2006
Leslie Sabin	December 18, 2006
California Sportfishing Protection Alliance	December 19, 2006
State Water Resources Control Board	December 19, 2006
Friends of the River, Sierra Club, South Yuba River Citizens League	December 19, 2006
Robert Gage	December 19, 2006
Rebecca Gage	December 19, 2006
State Water Contractors, Inc. and the Metropolitan Water District of Southern California (SWC and Metropolitan)	December 19, 2006
California State Horsemen's Association, Region 2	December 19, 2006
Users of the Lake Oroville Trails	December 19, 2006

Commenting Entity	Filing Date
American Rivers	December 19, 2006
County of Sutter, City of Yuba City, and Levee District No. 1 of Sutter County (collectively Sutter County)	December 19, 2006
County of Plumas and the Plumas County Flood Control and Water Conservation District (collectively Plumas)	December 19, 2006
Gayle Leland	December 19, 2006
Western Canal Water District, Richvale Irrigation District, Butte Water District, Biggs-West Gridley Water District, and Sutter Extension Water District (The Districts)	December 19, 2006
California Equestrian Trails & Land Coalition	December 19, 2006
Butte County	December 19, 2006,
U.S Department of the Interior (Interior)	December 19, 2006
Berry Creek Rancheria, Mooretown Rancheria, and Enterprise Rancheria	December 19, 2006
William O. Davis for the Action Coalition for Equestrians, Equestrian Trail Riders, and Oroville Pageant Riders	December 19, 2006
Lake Oroville Bicyclist's Organization	December 19, 2006
United States Environmental Protection Agency, Region IX (EPA)	December 19, 2006
National Marine Fisheries Service (NMFS)	December 19, 2006
Enterprise Rancheria	December 20, 2006
Frank and Loraine Gomez	December 21, 2006
Hannah Tucker	December 21, 2006
Tammie Powell	December 21, 2006
Lavonne and Ernest Wilson	December 21, 2006
Individual	December 21, 2006
Perry L. Reniff, Sheriff Coroner, Butte County	December 21, 2006
Community Action Agency of Butte County, Inc.	December 21, 2006
Regina Reed	December 27, 2006
Denny Reed	December 27, 2006
Joel Brown	December 27, 2006
Barbara Mertens	March 1, 2007
Patty Walters	March 1, 2007
C. Caldwell	March 1, 2007
Gavin, Melissa, Kaci, and Carson Silberschlags	March 1, 2007
California State Horseman's Association	March 1, 2007
Leana Stoltenberg	March 1, 2007
Steven N. Brooks	March 1, 2007
Tammy Norton	March 1, 2007
Don Jones	March 1, 2007
Fay Verle	March 1, 2007
Ron Lindley	March 1, 2007
Dixie Klemp	March 1, 2007
Arin C. Murphy	March 1, 2007
Barbara Mertens	March 1, 2007
Patty Walters	March 1, 2007
C. Caldwell	March 1, 2007
Gavin, Melissa, Kaci, and Carson Silberschlags	March 1, 2007
California State Horseman's Association	March 1, 2007
Leana Stoltenberg	March 1, 2007

Commenting Entity	Filing Date
Steven N. Brooks	March 1, 2007
Tammy Norton	March 1, 2007
Don Jones	March 1, 2007
Fay Verle	March 1, 2007
Ron Lindley	March 1, 2007
Dixie Klemp	March 1, 2007
Arin C. Murphy	March 1, 2007
High Mountain Riders	March 2, 2007
Brian, Jennifer, Nick, and Jeremy Moreau	March 2, 2007
Adele J. Johnson	March 2, 2007
Liz Murphy	March 2, 2007
Gina Rouse	March 2, 2007
Flying D Kigers	March 2, 2007
James, Kathi, Isaac, and Erik Murphy	March 2, 2007
Deborah Shaner	March 2, 2007
Kayla Burton	March 5, 2007
Alan and Penny Davey	March 5, 2007
Nancy Wadsworth	March 5, 2007
Judy Scott	March 6, 2007
Joseph and Ann Basuino	March 6, 2007
Chuck and Shirley Bartok	March 6, 2007
Charles and Rose Waugh	March 6, 2007
Sandra Wineroth	March 6, 2007
Gene and Susan Williams	March 6, 2007
Bill and Jill Holmes	March 6, 2007
Dan and Shanean Tonick	March 6, 2007
Donald and Beth Murphy	March 6, 2007
Individual	March 13, 2007
Individual	March 13, 2007
Individual	March 13, 2007
Individual	March 13, 2007
Individual	March 13, 2007
David Tonick	March 13, 2007
Ben L. Wimple	March 13, 2007
J. Ronan	March 13, 2007
Mike and Sandy Hanbrough	March 14, 2007
Teresa Valle	March 14, 2007
Rita Cassiba	March 14, 2007
Stevie McAdam	March 14, 2007
Kennie Moore	March 14, 2007
California Equestrian Trails and Land Coalition	March 16, 2007
Jason Davis	March 20, 2007
Doug and Cheryl Smith	March 19, 2007
Susan Walker	March 19, 2007
Bill and Eve Fox	March 19, 2007
Al and Charlotte Johnson	March 19, 2007
Charlie and Margaret Ryan	March 20, 2007
Michael Walters, Harvey Walters, and John Mishella	March 20, 2007

Commenting Entity	Filing Date
Graham and Beverly Carter	March 22, 2007
Candi Fleming	March 22, 2007

In addition to the written comments, 57 people provided oral comments at the public meeting held on November 8, 2006, in Oroville, California. The written comments cover all of the issues raised during the oral testimony. Several entities filed comments in reply to comments made on the draft EIS, including the California Department of Water Resources (DWR) on December 19, 2006, the Pathfinder Quarter Horses on January 2, 2007, Butte County on January 10 and 18, 2007, and the State Water Contractors and Metropolitan Water District on February 2, 2007. DWR filed additional reply comments on February 8, 2007.

In this appendix, we summarize the comments received, provide responses to those comments, and indicate, where appropriate, how we modified the text of the final EIS. The comments are grouped by topic for convenience.

PROCEDURAL AND GENERAL

Comment 1: Butte County strongly objects to the wording in the summary that states “Overall, the measures proposed by DWR under the terms of the Settlement Agreement, along with additional staff-recommended and revised measures, would protect and enhance existing water use, water quality . . . land use, aesthetics, recreational and cultural resources.” Butte County comments that these measures fall far short of what is required to eliminate or mitigate the serious adverse project effects on Butte County and on the natural environment. Butte County claims that the draft EIS accepts all project benefits claimed by DWR, even though many are not supported by any documentation or evidence. In addition, Butte County states the draft creates “phantom” project benefits that are attributed to Butte County – including water supply, flood control, and job creation benefits. Butte County comments that, overall, the project imposes far more costs on county residents than benefits, and the project is a net financial loss for the local community.

Response: We continue to conclude that the measures proposed by DWR under the terms of the Settlement Agreement, along with our staff-recommended measures, would protect and enhance the many environmental resources in the project area. Butte County’s general comment does not lead us to conclude otherwise. We address specific comments about the costs and benefits of the relicensing the project on Butte County in this appendix under *Socioeconomics*.

Comment 2: EPA comments that the Commission’s eLibrary accession number attached to the Settlement Agreement as referenced in the draft EIS is incorrect.

Response: The Commission’s eLibrary accession number is correctly cited in footnote 7 in the draft EIS.

Comment 3: EPA comments that additional documents and studies found on the relicensing web page should be summarized and referenced in the final EIS, specifically, they recommend documents found in the Environmental Work Group Reports.

Response: The studies that EPA refers to were filed with the license application, reviewed by staff and used, as appropriate, as supporting documentation for the EIS, and are referenced in the literature cited section of the EIS. We are not sure what additional studies you believe need to be summarized and referenced in the final EIS that have not already been considered by staff.

Comment 4: DWR provided an appendix containing “Technical Comments and Clarifications” to the draft EIS. In addition, DWR comments that negotiations of the Habitat Expansion Agreement have been

completed since the draft EIS was issued and it will be signed and filed with the Commission once coordination between DWR and PG&E, the licensee of the three upstream projects, is completed. DWR suggests that consideration of this document should be included in the final EIS.

Response: We note that the strictly editorial comments raised in the “Technical Comments and Clarifications” document will be incorporated into the final EIS and not addressed in this document. Those comments requiring a more substantive discussion will be included in this Appendix, and changes, as appropriate, will be incorporated into the final EIS. We look forward to receiving the final Habitat Expansion Agreement. In the meantime, as noted in our responses to comments 85 and 93, we included more information about the Habitat Expansion Agreement in the final EIS.

PURPOSE OF ACTION AND NEED FOR POWER

Comment 5: DWR comments that footnote 8 incorrectly cites total federal, Bureau of Land Management (BLM), and Forest Service land acreages within the project. The correct acreages are 6,240, 4,620, and 1,620 acres, respectively.

Response: Thank you for clarifying the correct land acreages within the project boundary. We revised the EIS to reflect these corrections.

Comment 6: The Lake Oroville Bicyclist’s Organization comments that although trail designations remain a contentious issue at the project, the decision as to “proper mix” (section 1.1, *Purpose of Action*) must be made by local regulatory agencies such as the California Department of Parks and Recreation (DPR). DPR has both the required experience and written policies on which to base such a decision. Further, it comments that the Commission has no written “trail policy” that would guide staff in determining trail designations or permit staff to make the appropriate determination between “preserving the quality and safety of recreational experiences and providing abundant trail access for the public.” With regard to the statement “Specifically, changing trails designated as equestrian/hiker-only to multiple-use trails would diminish the opportunity for equestrians to ride on trails where they would not encounter bicycles (section 1.1, *Purpose of Action*), the Lake Oroville Bicyclist’s Organization comments that while the Commission requires recreation as a condition for licensing at the project, there are no requirements that it provide opportunities for equestrians to ride on trails where they would not encounter bicycles.

Response: We agree the Commission does not have a formal written trail policy and that there is no requirement that equestrian-only trails be provided. However, section 2.7 of Chapter 1 of Title 18 of the Code of Federal Regulations states that the Commission will evaluate the recreational resources of all projects under Federal license or applications and will seek, within its authority, the ultimate development of these resources, consistent with the needs of the area to the extent that such development is not inconsistent with the primary purpose of the project. We consider the needs of a variety of recreationists and base our recommendation on the applicable state and local comprehensive recreation plans.

Comment 7: Butte County comments that the summary and section 1.1, *Purpose of Action*, of the final EIS should note that while the project occupies a total of 5,900 acres of federal land, the entire project occupies 41,100 acres of land and is wholly located within the unincorporated areas of Butte County. Butte County comments that, in addition, the 35,200 acres of previously private land are not subject to local taxes because DWR is a tax exempt entity under California law.

Response: In section 1.1 of the EIS, we state that the project is located in Butte County and occupies 6,200 acres of federal land and a total of 41,540 acres of land. In section 3.3.10.2, *Environmental Effects, Payments in Lieu of Taxes*, we state that DWR is not required to pay local, state, or federal taxes.

AGENCY CONSULTATION AND PUBLIC INVOLVEMENT

Comment 8: In section 1.4.2, *Interventions and Comments*, the draft EIS lists the filing date of the U.S. Department of the Interior's intervention as April 4, 2006. Interior states that it filed its intervention on March 31, 2006, and that the final EIS should reflect this date.

Response: We modified the final EIS to show that Interior filed its intervention on March 31, 2006.

Comment 9: The text in section 1.4.3, *Settlement Agreement*, of the draft EIS, indicates that settlement discussions concluded in December 2005. SWC and Metropolitan comment that settlement negotiations continued through early March 2006, and concluded just prior to the March 21, 2006, signing ceremony.

Response: We revised the text in the final EIS to state that settlement negotiations continued into March 2006.

Comment 10: Butte County comments that section 1.4.3, *Settlement Agreement*, should specifically note that DWR negotiated the Settlement Agreement with interested parties of its own choosing and, chose to exclude Butte County. It comments that the listing of parties filing comments in opposition to the Settlement Agreement in section 1.4.3 is incomplete and that parties opposing the Settlement Agreement should specifically be listed.

Response: We summarize the comments made in opposition to the Settlement Agreement in sections 1.4.3.1 through 1.4.3.2 of the EIS.

Comment 11: With regard to the entities that filed comment letters in response to the Settlement Agreement filing in section 1.4.3, *Settlement Agreement*, the Lake Oroville Bicyclist's Organization comments that the draft EIS does not provide all relevant information by not disclosing the significant support for the agreement from equestrian commentators. The draft EIS also does not disclose comments supportive of the Settlement Agreement that addressed many of the comments made by those in opposition to the Settlement Agreement. The Lake Oroville Bicyclist's Organization notes that the draft EIS should differentiate between "equestrians" and "equestrians opposed to the Settlement Agreement" in both section 1.4.3 and 1.4.3.1. In addition, in section 1.4.3.1, *Comments by Equestrians in Opposition to the Settlement Agreement*, the Lake Oroville Bicyclist's Organization comments that the draft EIS should include specific information detailing the representation from each group at the focus groups. They note that Trails Focus Group attendance on November 9, 2004, was 18 percent cyclist and 39 percent equestrian.

Response: In section 1.4.3 we list those parties that signed the Settlement Agreement, including the California State Horsemen's Association, the Lake Oroville Bicyclist's Organization, the International Mountain Bicycling Association, and the Citizen's for Fair and Equitable Recreation. In sections 1.4.3.1 through 1.4.3.3 we discuss the opposing views filed in response to the Settlement Agreement. These views, as well as the views of those entities in support of the Settlement Agreement are discussed in the appropriate resource sections of the EIS.

PROPOSED ACTION AND ALTERNATIVES

Comment 12: Kurt Flynn asks that the Commission describe the authority that would allow DWR to continue to operate the facilities under existing conditions, if a license were denied and to indicate the time period that DWR would be allowed to operate under this authority. Mr. Flynn also asks the

Commission to clarify why the retirement alternatives discussed in section 2.4.3, *Retiring the Project*, were not used as the No-action Alternative for the proposed project.

Response: No-action in this proceeding would be continuation of the project under annual licenses until such time that the Commission makes a decision on whether to relicense the project. We use the No-action Alternative as our baseline because that is how the project currently operates and it allows us to compare the other action alternative. We do not use any of the retirement alternatives as a No-action Alternative because the retirement scenarios would either require the licensee to file an application for surrender of license in a separate proceeding or would require either the federal government or another entity to take over the project. All of these would be proposed actions and would not constitute no-action alternatives.

Comment 13: EPA comments that the final EIS should provide additional information on the No-action Alternative to describe the environmental impacts of continuing to operate the project under the terms and conditions of the current license. The final EIS should provide a concise summary of the environmental analysis performed for section 3 that allows for a clear comparison of the impacts of all alternatives, including the No-action Alternative. EPA suggests providing a table with (1) the impacts of the hydroelectric project operation on each resource; (2) the PM&E measures that are proposed under each alternative; and (3) the impacts of the project after implementing the PM&E measures under each alternative.

Response: The EIS provides a clear definition of the No-action Alternative and the existing environment (baseline) is discussed in detail in each resource section. Table 6 presents the measures included in the Proposed Action (Settlement Agreement) and section 2.3.5, *Staff Alternative*, provides the additional staff-recommended measures. These are presented again in section 5.1, *Comprehensive Development and Staff Alternative*.

Comment 14: The Water Board comments that the final EIS should compare the current flow regime with pre-dam hydrology in order to understand the impact of the alternatives on beneficial uses affected by geomorphic processes, water quality, and fisheries.

Response: We recognize the continuing effects of the project and used pre-dam information to the extent that it was available and relevant to our analysis. However, we note that our baseline is existing project conditions and we analyze the Proposed Action and action alternatives against this baseline.

Comment 15: Plumas comments that the draft EIS defines the No-action (baseline) and the Proposed Action too narrowly and therefore, the draft EIS is overly focused on the reliability of downstream water supply deliveries. In addition, Plumas comments that the No-action Alternative is presented in a way that the reader is unable to verify the claims that the proposed operations of the project will be largely similar to historic operations. It points out that the assertion by DWR that water supply, flood control operations, and environmental conditions above and below the project will not change is not a legally sufficient basis for concluding the project impacts will not change during the term of a new license.

Response: The No-action Alternative we define in the draft EIS is not based on DWR's claims, but rather on how the project currently operates under the requirements of the Commission's license articles and subject to the agreements and conditions that affect DWR's operation—such as the conditions of the NMFS 2002 biological opinion. Our conclusion that water supply and flood control operations will not change under the staff recommended alternative during the term of a new license is based on our analysis of the conditions we recommend be included in any new license. The various resource sections in the draft EIS discuss how the recommended measures would affect the environmental conditions.

Comment 16: Plumas comments that baseline data are presented in a manner that makes it difficult to distinguish between the influence of controllable and uncontrollable factors. Specifically, Plumas comments that water inflows (hydrology) and reservoir operations (water deliveries, minimum flow releases for downstream fish habitat, and controlled flood releases) all affect water levels in Lake Oroville. These key baseline factors should be displayed as separable project effects to assist the Commission in the formulation of real alternatives to the project.

Response: These issues are addressed in the EIS. We present information about water flows and reservoirs operations in section 3.3.2.2, *Water Resources* and analyze the effect of project operations on the quantities of water deliveries, the current and proposed minimum flow releases for fisheries, and recreational boating separately in the relevant sections of the draft EIS. We conclude that future project operations under the Settlement Agreement would not affect water deliveries or flood control management. The Settlement Agreement represents several years of negotiations with stakeholders to arrive at a preferred alternative that addresses key issues identified during the scoping process and for which 34 technical studies were conducted. We see no reason or need to develop additional alternatives, beyond staff's minor modifications to several proposed measures, at this point in the relicensing process.

Comment 17: DWR comments that section 2.1.1, *Existing Project Facilities*, fails to include a description for the hatchery water supply pipeline from the Thermalito diversion dam or flow diverted to the hatchery. In addition, in table 1, the draft EIS defines the high flow channel as Thermalito afterbay outlet to confluence with Honcut Creek. For the purposes of the Settlement Agreement articles, the high flow channel should be defined as the Feather River from the afterbay outlet, downstream to the project boundary.

Response: We reviewed Exhibit F and determined that a 30-inch water supply pipeline provides flow to the fish hatchery and added information to the text of section 3.2.2.1. Flow diverted to the fish hatchery was described in the draft EIS. We changed the description of the high flow channel in table 1 in the final EIS to state that it extends to the downstream limit of the project boundary.

Comment 18: In section 2.1.1, *Existing Project Facilities*, the draft EIS includes a list of numerous trailheads and trails not located in Thermalito Complex. SWC and Metropolitan comment that the column headings "Lake Oroville" and "Thermalito Complex" should be replaced with "Recreational Facilities Located within Oroville Facility Project Boundaries."

Response: We agree that the current headings of the list of recreational facilities presented in section 2.1.1, *Existing Project Facilities* are misleading. Therefore, we changed the headings in the list of recreational facilities to more accurately reflect the facilities listed.

Comment 19: EPA comments that the description of existing project facilities provided in section 2.1.1 is inadequate and not enough detail is provided for the reader to understand how the system works as a functioning unit.

Response: We describe project operations in section 2.1.3 and include a review of overall project operations, as well as operations of the individual components of Lake Oroville, the Thermalito forebay, diversion pool and power canal, and the Thermalito afterbay. However, we added additional detail on the pump-back operations in section 2.1.3.4 in the final EIS. In addition, Figure 3 provides a schematic diagram of how flows pass through the project, including the pumped storage facility.

Comment 20: DWR comments that in section 2.1.2, *Project Boundary*, the project boundary does not follow the Oroville Wildlife Area (OWA) boundary in this area.

Response: We agree that the project boundary is not coterminus with the OWA boundary and state in the draft EIS that the project boundary includes only 11,200 of the 12,000-acre OWA. Therefore, we revised the text in section 2.1.2 to clarify that the project boundary generally follows the OWA boundary south of Thermalito afterbay.

Comment 21: The Water Board comments that the description of the pump back operations described in section 2.1.3.4, *Thermalito Afterbay*, is incomplete. It suggests that a more thorough description of pump back operations, including the timing, flow, and duration should be included.

Response: We include a description of the pump-back operations in section 2.1.3.2 and section 2.1.3.4 and describe the pump-back capabilities in section 2.1.1 of the draft EIS. However, we include a more detailed description in the final EIS.

Comment 22: DWR comments that table 2 in section 2.1.3.5, *Minimum Instream Flow and Water Temperature*, should note that additional reductions in the minimum flows shown are possible per the 1983 Agreement (which carries over to the Settlement Agreement), under the following conditions: If the April 1 runoff forecast in a given water year indicates that, under normal operation of the project, Oroville reservoir will be drawn to elevation 733 feet (approximately 1,500,000 acre-feet), minimum flows in the high flow channel may be diminished on a monthly average basis, in the same proportion as the respective monthly deficiencies imposed upon deliveries for agricultural use from the project; however, in no case shall the minimum flow releases be reduced by more than 25 percent.

Response: We added the language from Proposed Article 108.21b of the Settlement Agreement to footnote a of table 2, as requested.

Comment 23: DWR comments that table 4 in section 2.1.3.5 represents a weekly time-step of the ramping criteria outlined in a now defunct agreement between DWR and DFG. The weekly time step was calculated for consistency with the modeling tools used in the relicensing process. The actual ramping criteria in the agreement are:

Feather River Low Flow Channel Releases (cfs)	Rate of Decrease (cfs)
Less than 2,500	200 per 24 hours
2,500 to 3,500	500 per 24 hours
3,500 to 6,500	1,000 per 24 hours
Greater than 6,500	2,000 per 24 hours

Response: We revised the ramping rates shown in table 4 accordingly. Presenting this information on a daily basis does not affect our analysis.

Comment 24: Friends of the River, Sierra Club, and the South Yuba River Citizens League comment that the draft EIS does not demonstrate continued adequacy of the proposed project facilities as stated in section 2.1.5, *Project Safety*. These groups comment that the draft EIS includes none of the project-safety facilities or operational changes they or Sutter County proposed be included or any description of special articles. The exclusion of flood management functions from the draft EIS suggests to these organizations that the goals of project safety have not been met. They also comment that it is possible that the Commission and DWR staff concluded that the operational or emergency use of the unarmored spillway will not result in any risk of failure of crest control at the dam; however, since this information is not available to the public because of security concerns, they are unable to form an independent opinion. They also point out that under the current Corps manual, the first 10 feet of the ungated spillway should be characterized as an auxiliary spillway.

Response: Ensuring the safety of Commission-licensed hydroelectric projects is an on-going process with evaluations by Commission-approved independent consultants for high hazard dams such as Oroville every 5 years. Work on dam safety issues is critical energy infrastructure information (CEII) that, as you point out, is not available to the public. A memorandum dated July 27, 2006, that summarizes our responses to several of the parties' concerns about the safety of the Oroville dam is available to the public via eLibrary under docket P-2100. This memorandum, from the Commission's Division of Dam Safety and Inspections, concludes that the spillway is properly characterized as an emergency spillway and is structurally adequate. Congress has given the responsibility for flood management at the Oroville dam to the Corps; however, we added information to section 3.3.2.3, *Water Resources, Cumulative Effects* in the final EIS about the Corps' on-going studies that pertain to flood management and the need for DWR to coordinate with the Corps.

Comment 25: Butte County and Perry Reniff, Sheriff Coroner for Butte County, request that the Commission review the Security Assessment at Oroville Dam currently being prepared by the Regional Terrorism Task Force and make all recommendations made by the task force a condition of relicensing.

Response: As with dam safety, security is an ongoing effort. Commission staff will consider the findings of the regional task force report and what actions should be required of DWR at the Oroville Facilities under Part 12 of the Commission's regulations when the findings are made available to us.

Comment 26: DWR comments that in section 2.2.2, *Proposed Project Operations*, the draft EIS combines the low and high flow channel temperature tables and erroneously states that DWR would operate to them and that they eventually will become requirements. DWR will operate to table 1 in the low flow channel, which eventually will become a requirement. DWR will not operate to table 2 in the high flow channel; rather this table will be evaluated and eventually modified.

Response: The information on temperature objectives for the low and high flow channels and the temperature values for the low and high flow channels presented in section 2.2.2 of the draft EIS are consistent with the Settlement Agreement. However, we separated the data into two tables as requested and revised the text in section 2.2.2 of the final EIS to clarify that DWR will operate to the temperature objectives in the low flow channel and that the temperature objectives for the high flow channel will be evaluated and eventually modified.

Comment 27: SWC and Metropolitan comment that the draft EIS should include a reference in section 2.2.2, *Fish hatchery—temperature*, to Conference Years and Uncontrollable Forces, as a year when the temperature requirement may not be met 100 percent of the time.

Response: We revised the note to the table in section 2.2.2 to state that the temperature objectives also would be subject to the conference year and uncontrollable forces provisions in Proposed Articles 108.6 and 108.7.

Comment 28: SWC and Metropolitan comment that table 6 in section 2.2.3, *Proposed Environmental Measures*, indicates that Proposed Article A104 will be implemented between the fish barrier dam and Honcut Creek, which is an additional 10 miles of the Feather River and is outside of the project boundary. They request that this be clarified in the final EIS.

Response: DWR also pointed out this discrepancy in the description of the high flow channel. We revised the text in both tables 1 and 6 under Proposed Article A104 to clarify that the measure would be implemented between the fish barrier dam and the downstream limit of the project boundary in the Feather River.

Comment 29: Interior comments that the summary of Settlement Agreement measures described in section 2.2.3, *Proposed Environmental Measures*, should reflect the actual language found in the Settlement Agreement. Specifically, Interior comments that the description of Proposed Article A109 should indicate that it, along with NMFS, reserve its authority to prescribe fish passage at the Oroville Facilities, as provided in the Habitat Expansion Agreement. Interior also notes that the summations of proposed articles A117 through A121 do not necessarily reflect all relevant terms from the proposed license articles.

Response: We revised the description of Proposed Article A109 in table 6 to state that both NMFS and Interior reserved their authority to prescribe fishways. We acknowledge in footnote 21 that the concise descriptions of the measures included in table 6 are not verbatim from the Settlement Agreement.

Comment 30: DWR comments that on October 16, 2006, DWR withdrew its original application for section 410 water quality certification and re-applied for 401 certification with the State Water Resources Control Board (Water Board).

Response: We updated section 2.3.1, *Water Quality Certification*, in the final EIS to state that DWR withdrew and re-applied for water quality certification on October 16, 2006.

Comment 31: EPA comments that the final EIS should describe the status of the Clean Water Act section 401 water quality certification that DWR requested from the Water Board. The final EIS should discuss the application in detail and address any water-quality issues identified by the Water Board, including the following: (1) all Clean Water Act section 303(d) impaired waters and efforts to develop TMDLs in the project area, including existing restoration and enhancement efforts, how the proposed project will coordinate with other protection efforts, and any mitigation measures that will be implemented to avoid further degradation of impaired waters; and (2) detected concentrations of metals in water samples in the Feather River watershed.

Response: The status of DWR's application for water quality certification is described in section 2.3.1 of the draft EIS. We discuss the concerns and issues raised by the Water Board in the relevant sections of the EIS. We find that, currently, there is one waterbody upstream of Oroville dam listed as impaired under section 303(d) of the Clean Water Act. The North Fork Feather River below Lake Almanor is listed for temperature and mercury. The Feather River downstream of Oroville dam to its confluence with the Sacramento River is listed on the 303(d) list of waters as impaired by sources of mercury, certain pesticides, and unknown toxicity. A TMDL has been established for the pesticide Diazinon for the Feather River below Oroville dam to the confluence with the Sacramento River. We clarified this information in section 3.3.2.1 of the final EIS.

The presence of mercury in the waters is a problem for almost all reservoirs and rivers of the western slope of the Sierras, as historical gold mining practices unearthed vast amounts of soil and in the process utilized mercury in the ore mining processes, that is now distributed in sediments throughout the foothills and is working its way down river and becoming trapped in reservoirs like Oroville. Generally, plans to protect human health from mercury focus on monitoring and education as there are no easy or cost effective solutions to reduce mercury loading. As for pesticides within the lower Feather River, the source of these is likely related to the agricultural sector of the county and application of pesticides would occur after water had passed through the Project and been delivered to senior water rights holders.

As for detected concentrations of metals in water samples in the Feather River watershed, DWR collected data on metals from 57 sampling sites above, within, and below the project boundary. Our review of the

sampling summary in the water quality report (DWR, 2004g) suggests that elevated metal concentrations exist in some of the samples and we added additional language to section 3.3.2.1.

Comment 32: EPA comments that the final EIS should include a full discussion and summary of all items in the Settlement Agreement filed on March 24, 2006, including those referenced in Appendix B (of the Settlement Agreement). EPA comments that the final EIS should also include a summary of the results of the Reconnaissance Study for potential facility modifications for fish habitat temperature needs that was supposed to be submitted by October 31, 2006.

Response: We reviewed Appendix B and addressed those issues that are project-related under *Cumulative Impacts* in the EIS. Some measures, however, agreed upon among the settling parties do not affect project operations and therefore are beyond the scope of our EIS, which is to evaluate the effect of proposed project-related operations on environmental resources. Most of these measures pertain to funding mechanisms, permit requirements, and future studies for the feasibility of additional enhancements. DWR filed the reconnaissance study for potential facility modifications for fish habitat temperature needs in January 2007, indicating that it is for information purposes only. Settlement Agreement Proposed Article A108 calls for a study of options for facility modification to improve temperature conditions for anadromous fish in the low and high flow channels. DWR anticipates that a license condition (A108) would require a detailed investigation of the range of alternatives presented in the reconnaissance study and selection of a preferred alternative within 3 years of license issuance that would support a Commission decision.

Comment 33: Plumas comments that the draft EIS does not disclose or analyze the differences between pre- and post-1995 project operations as a result of the Monterey Amendment to DWR's contracts with its water customers. They suggest that new license conditions or additional environmental measures are needed to prevent or mitigate impacts from continuing post-1995 operations over the term of the new license. The draft EIS blends pre- and post-1995 operations, obscuring the actual environmental effects of the project.

Response: We disagree that we need to analyze the pre- and post-1995 operations in the EIS, and find that it is reasonable to treat the operations over the past decade as the current baseline for purposes of our analysis of the effects of the proposed and action alternatives on environmental resources. DWR used a consistent set of input parameters in modeling the facilities operations, rather than strictly rely on historic data. Additionally the Monterey Agreement (an agreement reached in 1994 among DWR and several of the State Water Project contractors on a set of principles to settle long-term water allocation disputes and establish a new water management strategy for the State Water Project) relates primarily to the water supply function, rather than the hydroelectric operations. For that reason, DWR agreed to prepare an Environmental Impact Report for the Monterey Amendment to the State Water Project Contracts.

Comment 34: Plumas comments that the draft EIS should include analysis of an additional alternative for licensing the operations of the Oroville Facilities that reflects project operations and environmental measures accommodating operational variability resulting from climate change impacts. The Planning and Conservation League (Conservation League) comments that the draft EIS does not adequately analyze proposed hydropower operations, given the estimated results of global climate change. The Conservation League suggests that the final EIS specifically analyze the degree to which the project will maintain the current level of flood protection for communities downstream of the project and impact the availability of cold water for fisheries under climate change. The Conservation League and California Sportfishing Protection Alliance also comment that the draft EIS does not analyze how foreseeable operational changes, in quantity or timing, related to demands on the State Water Project for water delivery or climate change, can be expected to affect the viability of the cold water pool in Lake Oroville or proposed temperature control measures for the reaches of the Feather River downstream of Lake

Oroville. NMFS also comments that the EIS should provide an analysis of the effect of future climate changes over the term of any new licenses on water temperature controls and flows downstream of the Oroville Facilities.

Response: Future climate change impacts on water resources and water temperatures in Lake Oroville and the downstream reaches of the Feather River are unknown, although some models may attempt to predict change in certain river basins. The Commission’s standard reopener article would be included in any license as the vehicle for making changes to the license should unforeseen and unanticipated adverse environmental impacts occur in the future.

Comment 35: DWR comments that the first bullet of section 2.4.3 is worded incorrectly. DWR comments that it should be modified to read: “Energy currently generated by the project would be lost. The project is estimated to produce an annual average of 2.4 million MWh of electrical power, providing about one-third of the electricity needed each year to operate the pumps that move water through the State Water Project.”

Response: We edited the first bullet in section 2.4.3 to clarify that the project provides about one-third of the electricity needed each year to operate the pumps.

Comment 36: EPA comments that the draft EIS lists numerous environmental measures that have the potential to impact air quality from construction or prescribed burning; however, impacts to air quality are not discussed. EPA suggests that the final EIS include a discussion of existing air quality and conformity with State and Federal guidelines. It should also describe and estimate air emissions from potential activities associated with the project and propose mitigation measures to minimize emissions.

Response: Relicensing of the Oroville Facilities would not involve any major new construction that could potentially affect air quality; however, the project would continue to operate and displace the need for other power plants, primarily fossil-fueled facilities, thereby avoiding some power plant emissions and creating an environmental benefit. We summarize the effect of project-related thermal and other generation facilities and the net effect on carbon emission reduction in table 74 in section 4.5 of the final EIS.

Comment 37: EPA recommends that DWR adopt a formal adaptive management plan to ensure implementation of environmental measures and provide flexibility to meet changing research needs.

Response: Proposed Article A101 provides for a comprehensive monitoring and adaptive management plan designed to assess the overall effectiveness of each of the seven program components (Proposed Articles A101-A108) of the Lower Feather River Habitat Improvement Program, as well as the comprehensive water quality monitoring program (Proposed Article A115) and the Oroville Wildlife Area Management Plan (Proposed Article A112). Through adaptive management, environmental measures such as temperature objectives or the gravel needed for spawning over supplementation, should be adjusted based on direct field observations, however, rather than research.

GENERAL SETTING

Comment 38: DWR comments that in section 3.1, *General Setting*, the maximum pool elevation for Lake Oroville should be 899 feet msl; 900 feet is the absolute maximum, although water surface may actually be higher during a flood.

Response: On page A-5 of exhibit A in the final license application, DWR states in table A.2.1-1 that the normal maximum pool is 900 feet msl; we will continue to use this description.

Comment 39: Interior comments that the reference to U.S. Geological Survey datum in section 3.1, *General Setting* is incorrect. Interior suggests using National Geodetic Vertical Datum 1929 or North American Vertical Datum 1988.

Response: In exhibit F of the final license application, the applicant states that “Elevations shown refer to the U.S.C. and G.S. datum 1929 Adjustment,” which we understand is synonymous with National Geodetic Vertical Datum 1929. We clarified this with a footnote to our first use of feet msl. Please see the previous comment response for additional information about the datum.

CUMULATIVE EFFECTS

Comment 40: Paul McIntosh, Chief Administrative Officer for Butte County, comments that the draft EIS does not address cumulative impacts, past, present, and future of the Oroville Facilities on Butte County. He finds that the draft EIS fails to adequately identify the operational and socioeconomic impacts that the project has on the County and therefore that it greatly overstates the projects’ benefits to the County. He comments that while the draft EIS acknowledges Butte County’s concerns and spends 25 pages discussing the socioeconomic impacts of the project on the County, the Commission relies on inadequate and unsubstantiated reports submitted by DWR and the Metropolitan Water District of Southern California to discount these impacts.

Response: The draft EIS addresses the project-specific socioeconomic impacts of the project on the County in the socioeconomic resource section, acknowledging negative economic effects such as the loss of tax revenue associated with original project construction, as well as ongoing effects associated with County expenditures related to providing police, fire, and other services to the project and project users. We revised the text of final EIS section 3.3.10.3, *Cumulative Effects on Socioeconomics*, to address this point as well.

Comment 41: Butte County comments that the draft EIS should consider the cumulative impacts of continued flood control at the chain of dams and diversions above the project, especially in light of flood control issues.

Response: We summarized the effects of storage in projects upstream of Lake Oroville on the North Fork Feather River in Figure 7 (section 3.1, *General Setting*) of the draft EIS. We reviewed reports such as the *Integrated Regional Water Management Plan for the Upper Feather River Watershed* (IWRMP) and final environmental documents for both Rock Creek Cresta (FERC Project No. 1962) and Upper North Fork Feather River Project (FERC Project No. 2105) for information on dedicated flood control storage. We determined that no dedicated flood control existed in these locations. However, typically hydroelectric projects will refill during the spring runoff period and may provide incidental flood control. The IRWMP does include flood control as one of seven strategy elements. We added this discussion to section 3.3.2.3, *Cumulative Effects, Water Quality*.

Comment 42: The Conservation League comments that the final EIS should fully analyze the impact of this project in light of the cumulative impacts of other projects currently being pursued by the Department of Water Resources, specifically, the South Delta Improvement Program, the California Aqueduct-Delta Mendota Canal Intertie, water acquisitions for the Environmental Water Account, projects proposed under the Operations Criteria and Plan, and similar projects that will affect the resources of the Feather and Sacramento rivers and the Delta Bay Estuary.

Response: The geographic scope for resource topics other than anadromous fish species and geomorphology consists of the following locations and nearby lands: Lake Oroville, the Feather River,

Thermalito forebay, Thermalito afterbay, and the OWA. The above cited projects are outside of our geographic scope.

Comment 43: EPA comments that the draft EIS does not evaluate the potential cumulative effects from the project of any activity in the surrounding area besides hydropower operations. It states that the draft EIS lacks information on projected growth, development, and other activities within the identified geographic and temporal scope of the project, and the cumulative impacts that may result from those actions. EPA suggests that the final EIS use the California Department of Transportation Indirect Cumulative Impacts Analysis.

Response: We provided a detailed analysis of the potential effects of relicensing the Oroville Facilities on the socioeconomics of the affected communities in section 3.3.10.2. Commission staff reviewed the *Guidance for Preparers of Growth-related, Indirect Impact Analyses* provided at the website recommended by EPA (http://www.dot.ca.gov/ser/Growth-related_IndirectImpactAnalysis/gri_guidance.htm), but did not find the process described there to be applicable to this proceeding. That guidance specifically deals with the subset of indirect effects associated with highway projects that encourage or facilitate land use or development that changes the location, rate, type, or amount of growth—and are referred to in the guidance as “growth-related impacts.” According to that guidance, not every project will need a growth-related impact analysis; such an analysis typically will be needed in the environmental document for those highway projects that are built along a new alignment and/or provide new access. The guidance is specifically directed at evaluating projects that are expected to have growth-inducing impacts, rather than at something like a project relicensing, where the alternatives are to continue the project as currently managed (no action) or to continue the project managed in a different, but not dramatically different, way. Staff finds no reason to conclude that the various alternative measures being considered in this EIS would lead to any identifiable growth-inducing impacts, and we have not changed the text in response to this comment.

GEOLOGY, SOILS, AND PALEONTOLOGICAL RESOURCES

Comment 44: Section 3.3.1.2, *Ecological Committee (Proposed Article A100)* states that the Ecological Committee “would be an appropriate entity to manage the adaptive ecological measures that may be included in the project license.” SWC and Metropolitan comment that the role of the Ecological Committee is to advise DWR and the role of DWR is to manage the project. Since DWR is ultimately legally responsible for the adaptive management and implementation of license articles, it cannot be put in a position where its compliance is at the mercy of a third party over which the Commission has no enforcement power.

Response: We agree that DWR would be responsible for compliance with license articles; however, the Ecological Committee could assist with the implementation of the ecological measures in cooperation with DWR. Our analysis in no way materially changes the intent of Proposed Article A100, does not usurp the responsibility of DWR to adhere to license articles, and is in compliance with Section 4.0 of Appendix C of the Settlement Agreement. Based on SWC and Metropolitan’s comment, we removed the word “manage” from the text in that section of the EIS.

Comment 45: DWR, SWC and Metropolitan comment that the staff recommendation to include in the Riparian and Floodplain Improvement Program a provision to implement 50 percent of the selected projects within 10 years and the remaining within 12 years of license issuance does not consider the Explanatory Statement from page 23 of the Settlement Agreement. This statement describes how the Settling Parties plan to take advantage of the gravel extraction operations and that this will influence the timing of the implementation of the Riparian and Floodplain Improvement Program. DWR suggests that

information be included in the final EIS and that staff adhere to the timelines in the Settlement Agreement.

In addition, DWR., SWC, and Metropolitan comment that the implementation schedule presented in the Settlement Agreement was developed in consideration of the entire Lower River Habitat Improvement Program and to require an earlier schedule would fail to take into account the experience gained during the early years of the program and also the contributions that are likely to be achieved under other components of the Lower Feather River Habitat Improvement Program. NMFS comments that the primary purpose of this measure is to create needed habitat for anadromous fishes and other wildlife. It notes, that while it continues to support the Settlement Agreement, including Article A106, the changes recommended to implementation of the Riparian and Floodplain Improvement Program in the draft EIS should provide positive effects on NMFS' trust resource species in the project area within a shorter timeline.

Response: We originally proposed an earlier implementation schedule for the riparian and floodplain improvement projects to provide improved habitat conditions for fish resources in the project area in a more-timely manner and to complement actions in other proposed articles. Specifically, the gravel excavated in Proposed Article A106 could be used for augmentation in Proposed Article A102, and the excavated floodplain areas could also be improved as side channel habitat as a part of Proposed Article A103. However, we agree with DWR that the parties to the Settlement Agreement (including NMFS) need to gain knowledge on these complex processes through an adaptive management approach. Therefore, we now recommend the implementation schedule as outlined in the Settlement Agreement.

Comment 46: DWR comments that page 59 of the draft EIS states that floodplain habitat “would remain at existing levels, or continue to decline, for up to 15 years...” DWR is not aware of any data that suggests the floodplain habitat is degrading and therefore, recommends that the final EIS adhere to the Riparian and Floodplain Improvement Program timetable presented in the Settlement Agreement.

Response: The existing condition of the Feather River floodplain in the project area is the result of disconnected riverine processes, including the interrupted supply and delivery of sediment and large woody debris (LWD) through the system and decreased channel and floodplain interactions because of the project-altered flow regime. These processes were described and analyzed thoroughly in the draft EIS, and the isolation of the floodplain continues to worsen as the channel simplifies, coarsens, and incises (as shown by DWR's FLUVIAL-12 modeling results). Further, page 23 of the Settlement Agreement's Explanatory Statement references several of the altered physical and ecological processes that continue to adversely affect floodplain and riparian habitat. Lack of any action, as is discussed in the analysis cited by DWR, would cause further interruption of geomorphic and hydrologic processes necessary for healthy riparian recruitment and growth, and the isolation of that floodplain habitat, which constitutes a continued decline in condition.

Comment 47: DWR, SWC, and Metropolitan comment that section 2.3.5, *Staff Alternative*, contains a recommendation regarding the Gravel Supplementation and Improvement Program that DWR monitor all 15 riffles, if the initial monitoring of 10 riffles reveals that gravel suitability objectives are not being met. DWR comments that the intent of the riffle monitoring plan, as proposed in the Settlement Agreement, was that there would be a rotation of surveys among all riffles receiving gravel supplementation and that sampling all riffles during every survey period would not be the best use of resources.

Response: As stated in Proposed Article A102, DWR proposes to “monitor and maintain a minimum of 10 riffle complexes in the low flow channel so that approximately 80 percent of the spawning gravels randomly sampled in riffle complexes would be in the median size range preferred by Chinook salmon or steelhead.” Previous supplementation projects indicate that gravel retention time in the low flow channel

is short due to high sediment transport and the degree of gravel retention and transport will be water year and site specific (e.g., side channels versus the main channel). For these reasons, we previously recommended monitoring all 15 riffles each year. However, we now recognize that the parties to the Settlement Agreement developed the proposed monitoring rotation, which would allow for some monitoring at all riffles, and we concur with the proposed monitoring schedule as the best use of resources. As stated in the draft EIS (page 171), there are a variety of definitions of the optimum particle size that would benefit Chinook salmon and steelhead. This measure would be most effective if a common definition of the “median size range” were developed to guide monitoring implementation and quantify effectiveness, as is proposed for the stockpiling of spawning gravel under this article [A102(e)(4)].

Comment 48: DWR, SWC, and Metropolitan comment that the statement in section 3.3.1.2, *Gravel Supplementation and Improvement Program (Proposed Article A102)* that “the average dimension of the riffle created by this treatment would be 100 feet by 50 feet which would be smaller than the dimensions of riffles recorded in DWR’s studies” is inaccurate. DWR comments that the treated area will cover active portions of the riffle itself and extend additionally at least 50 feet upstream and 50 feet downstream of the riffle.

In addition, DWR comments that the proposed gravel replenishment program is not intended to replace the estimated sediment deficit. It disagrees with staff’s conclusion that the gravel replenishment program would provide 0.15 percent of the estimated deficit and provides modeling results from Fluvial 12 (Study Plan, G2 Task 7 report) that estimate replenishment at 20 percent. While the Proposed Action would place at least 8,300 cubic yards of gravel within the first 5 years after license issuance, DWR comments that this is a minimum amount of gravel to be used. Finally, DWR suggests that a more appropriate comparison for this analysis is the post-dam bedload transport through the low flow reach using the correct existing conditions baseline as done in Study Plan G2.

Response: The discrepancy in riffle dimensions seems to be based on our mischaracterization of Proposed Article A102, section (e)(2), in the draft EIS. In fact, it is now our understanding that the riffle dimensions would be the existing riffle size *plus* an additional 100 feet. We corrected our riffle size calculations in the final EIS, and note that this revision resulted in different conclusions related to the potential for the 8,300 cubic yards to cover the existing riffles in the manner specified in the proposed measure. We agree that at least 8,300 cubic yards of gravel could replenish about 20 percent of the sediment transported downstream. However, we also maintain that this amount of gravel represents 0.15 percent of the overall sediment deficit in the system.

We do, however, agree with DWR’s comments that the total augmented quantity could be more than 8,300 cubic yards and that the spawning-sized gravel to be augmented represents only a portion of the total bed load, and we adjusted the final EIS text accordingly.

Comment 49: DWR suggests that the analysis in section 3.3.1.2, *Channel Improvement (Proposed Article A103) and Structural Habitat Supplementation Programs (Proposed Article A104)* may not be accurate. The draft EIS cites a study by Henderson (2003) that tracked tagged LWD on the Sacramento River using telemetry and found that over the course of approximately 1 year nearly all tagged pieces of LWD stayed within the river channel, but that downed trees traveled an average of 6 miles downstream. DWR refers to a relicensing study that indicates that channel forming flows on the Feather River occur at 5 to 7 year intervals on average and that these channel forming flows occur more frequently on the Sacramento River which indicates that it would be unlikely that LWD on the Feather River would migrate at the rate recorded on the Sacramento River.

DWR also comments that the analysis in the draft EIS ignores that LWD placement will target only habitats suitable for rearing juvenile salmonids. DWR suggests that using number of LWD per mile is a misleading metric, since there are typically only 1 to 4 riffles per mile in the lower Feather River. Details such as exact LWD placement and anchoring methods were not included in the Settlement Agreement because DWR considered it premature to do so prior to development of a comprehensive Lower Feather River Habitat Implementation Plan. DWR suggests that the final EIS be revised consistent with this information.

Response: We agree that the rate of LWD transport in the Feather River is probably less than the larger Sacramento River; however, the 2003 Henderson study suggests movement in the Feather River would still be significant, as indicated in the draft EIS. We recognize that the details of LWD placement and anchoring methods would be developed as part of Proposed Article A104 implementation plan; however, our reference to the Henderson study results highlights the need for developing effective anchoring methods. As stated in the Settlement Agreement, proposed LWD supplementation is at the rate of a minimum of two pieces of LWD, boulders, or other material *per riffle*, for a total of 50 to 500 pieces over the 13-mile augmented reach. DWR says that analyzing “[t]he number of LWD pieces per mile is a misleading metric since there are typically only 1-4 riffles per mile in the lower Feather River” and point out that “this is common among low gradient alluvial rivers.” We’ve used the pieces per mile metric in the draft EIS to calculate the total number of pieces to be added under the plan. If we assume there are one to four riffles per mile as DWR says in their comment, then DWR’s proposed rate of augmentation translates to a minimum range of two to eight pieces of LWD or habitat material per mile over the 13-mile reach. We continue to conclude that this minimum level of LWD augmentation would not substantially improve fisheries habitat over time without effective anchoring to limit LWD movement.

Comment 50: SWC and Metropolitan comment that Appendix B, Article A102, should reflect that the recommendation to complete the gravel budget within 2 years should be attributed to DWR, as defined in the Settlement Agreement.

Response: We made this edit in appendix B in the final EIS.

WATER QUANTITY AND QUALITY

Comment 51: The Conservation League comments that the final EIS should analyze the effect of any changes to the operation of the upstream reservoirs that are needed to carry out the operation of the Oroville Facilities, as proposed. This analysis should also include the potential impacts of fluctuating lake levels and the availability of cold water. The EIS should also analyze whether the proposed project will exacerbate impacts associated with the recent changed operation of Oroville Facilities to help mitigate effects of the Bay Delta Estuary.

Response: As explained in the draft EIS under the cumulative effects analysis for water quantity, since the construction of the Oroville Facilities and other FERC-licensed projects upstream of the Oroville Facilities, project operations have affected water quantity throughout much of the Feather River Basin. The 2002 Biological Opinion is part of the existing conditions described in section 2.1.3. In section 3.3.2.2, we analyze the potential effect of the proposed operations on water temperature in project waters and conclude that the increased minimum flows to the low flow channel would result in cooler temperatures at Robinson’s riffle. We also conclude that water delivered to irrigators would be similar to existing conditions.

Comment 52: The Conservation League also comments that the draft EIS should include the impacts of the proposed project on Sacramento Valley water users, including any potential impacts on groundwater levels and groundwater replenishment.

Response: Impacts on groundwater in the Sacramento Valley and on Sacramento Valley water users was not identified as a project-related issue by stakeholders during scoping. DWR concluded in the final license application that no changes in water quality or water table elevations influencing agricultural resources are expected to occur. We agree with this conclusion and maintain that no major changes in water quality and water table elevations over existing conditions are anticipated as a result of implementing the provisions of the Settlement Agreement.

Comment 53: DWR comments that in section 3.3.2.1, *Water Quantity and Quality, Affected Environment*, there is a description of the contracts with all Feather River service area water users in general, but the 994,000 acre-feet of water commitment includes only contracts with Western Canal Water District and the Joint Districts Board. The draft EIS continues describing the diversion locations, but only describes the volume of diversion for the Thermalito Complex for the April through October period, and the Feather River and Thermalito afterbay diversions for the largest diversion volume on record. In addition, DWR suggests changing the sentence “The actual amount delivered varies from year to year and can exceed the above amount” by deleting “and can exceed the above amount” because water rights holders cannot divert more water than their water rights.

Response: Our information on Feather River service area water deliveries is based on the water use discussion in the preliminary draft environmental assessment (pages 5.4-3 and 5.4-46). We added a discussion of the full range of water deliveries (611,000 – 1,057,000 acre-feet) to the final EIS. DWR did not provide additional delivery information in its comments. Our figure of 150,000 acre-feet for the maximum monthly diversion during peak months is also consistent with DWR’s number on page 5.4-3 of the preliminary draft environmental assessment. We deleted the phrase “and can exceed the above amount” as suggested.

Comment 54: DWR comments that the flood control requirements for Lake Oroville in table 15 should be corrected. The full flood control storage space should be provided between October 15 and April 1 of each year. The full flood control storage space varies with the wetness index, 1 750,000 acre-feet of flood control space should be provided when the ground is wet (wetness index of 11 or greater) and 375,000 acre-feet should be provide under dry ground conditions (wetness index of 3.5 or less). Flood control space requirements prior to October 15 and subsequent to April 1 are determined by drawdown and filling rates, respectively. Prior to October 15, the reservoir can be drawn down at a rate of 25,000 acre-feet per day so that flood control operations effectively begin on September 15 of each year. Subsequent to April 1, the filling rate is 10,000 acre-feet per day so that the end of flood operations can be as early as May 8 or as late as June 15. Consequently, there are no flood control requirements from June 16 to September 14 of each year.

Response: We corrected table 15, as per DWR’s comments.

Comment 55: Friends of the River, Sierra Club, and the Citizens League note that the draft EIS states that Lake Oroville be operated to maintain up to 750,000 acre-feet of storage space to capture significant inflows for flood control (section 3.3.2.2). However, these three groups comment that this does not properly capture DWR’s flood-control space obligations and fails to recognize that operational floodwater management operations require a 900,000 acre-feet flood-space reservation to accomplish regulation of project-design outflows to no more than the project-design objective release.

Response: The license application states that the storage capacity is 750,000 acre-feet. We revised the text in section 3.3.2.2 of the final EIS to include the surcharge storage for a total of 900,000 acre-feet.

Comment 56: American Rivers, Sutter County, the California Sportfishing Protection Alliance, Friends of the River, Sierra Club, and the South Yuba River Citizens League disagree with the Commission’s decision not to address the impacts of flood control operations “because the Corps is primarily responsible for flood control operations.” American Rivers, Sutter County, Friends of the River, Sierra Club, and the South Yuba River Citizens League cite FPA section 10(a)(1) stating that it mandates flood control as one of the beneficial uses to be addressed in a comprehensive plan of development. While the Corps is responsible for flood control operations, commentors say that NEPA provides that the Commission will coordinate with other agencies that have regulatory jurisdiction over any impact of a project, prior to making its licensing decision. In addition, since the impacts of flood control, water supply, and power operation are cumulative, the Commission has an obligation to analyze the impacts of flood control operations and consider reasonable alternative measures to prevent or mitigate such impacts, even though it does not have direct authority to implement such measures. Friends of the River, Sierra Club, and the South Yuba River Citizens League also cite the Commission’s duties under Section 10(b) and 15(b) of the FPA, as well as the Commission’s Engineering Guidelines and 18CFR 4.51(g)(2).

American Rivers requests that the Commission affirmatively request the cooperation of the Corps, analyze the environmental impacts of existing flood control operations, consider reasonable alternative measures, and reserve its authority in the new license to require any necessary changes. Sutter County requests that the final EIS analyze the environmental consequences of flood control operations at Oroville, including the absence of the Marysville dam, the interim flood control rules that have been applied for the last 35 years, and the recent reports that address flood control issues (2002 Sacramento and San Joaquin River Basins Comprehensive Study; Yuba County Water Agency Technical Memoranda 2002a and 2002b; Yuba-Feather River Forecast-Coordinated Operations Program; and environmental review documents associated with the Yuba-Feather Supplemental Flood Control Project).

Sutter County also requests that the Commission issue several relicensing orders including: (1) make a formal request to the Corps for the Corps to immediately develop a revised operational plan for Oroville to establish flood-control management on the Feather River system that accounts for the absence of Marysville dam and full regulation of Yuba River, without the necessity for surcharge operations of or at the project above the ungated spillway; (2) direct the licensee to investigate the adequacy and structural integrity of Oroville dam’s ungated auxiliary spillway that may currently pose a risk to the project facilities and downstream levees in Sutter County and take all necessary actions to correct identified deficiencies; and (3) direct the licensee to investigate the adequacy and structural integrity of levees on Feather River, in the context of its hydroelectric, water supply and flood control operations and to repair, replace, and maintain those levees to provide appropriate levels of flood protection in light of license operations. Sutter County requests these license orders be issued in the event licensing action is delayed and annual licenses become necessary.

Response: In Congress’s original authorization of the project, the Corps acknowledged that the dam would provide considerable flood benefits by regulating a flood. In the original license, two existing articles address flood control. Article 50 states “The operation of the project in the interest of flood control as provided in Article 32 of the license shall be in accordance with the rules and regulations to be prescribed by the Secretary of the Army pursuant to Section 204 of the Flood Control Act of 1958 (Order amending license-major, Issued January 22, 1964).” Article 32 states “The licensee shall collaborate with the Department of the Army in formulating a program of operation for the project in the interest of flood control (Order issuing license-major, December 14, 1956).” As noted in our response to comment 24, we agree that DWR should continue to coordinate with the Corps and agree that an article similar to the existing article should be included in any new license issued for the project. As stated in the EIS, any dam safety issues associated with the emergency spillway are properly addressed through the Commission’s ongoing dam safety program, not the relicensing process.

Comment 57: DWR comments that the temperature objective in table 19 for the period from December 1 through March 30 should be listed as 55°F. In table 20, “hatchery pool” should be changed to “fish barrier pool.”

Response: The temperature objective for the period December 1, through March 31, is correctly stated as 55° F in table 19; however, we revised the period from December 1 through March 30 to read December 1, through March 31, and we changed “hatchery pool” to “fish barrier pool” in table 20.

Comment 58: DWR notes that, in section 3.3.2.1, *Pathogens*, Bedrock Park is not part of the Thermalito Complex. It is not a DWR facility, and is located outside of the project boundary.

Response: We revised the first paragraph on page 89 of the draft EIS to clarify that Bedrock Park is not part of the Thermalito Complex and is outside the project boundary.

Comment 59: Butte County comments that section 3.3.2.1, *Hazardous Materials*, is inaccurate with the statement “DWR reports there appear to be no significant hazardous materials or waste issues within in the FERC project boundary.” The County previously advised the Commission of illegal dumping, abandoned automobiles, and other hazardous materials illegally dumped or in use in the project area. In addition, the County cites several areas where the potential for a hazardous materials incident is high: Bidwell Canyon and Lake Oroville marinas, Foreman and Bloomer islands, the Hyatt Powerhouse, Thermalito Diversion dam, and the Thermalito Power Plant.

Response: We recognize that there is illegal dumping occurring within the project area, including the OWA, and address this issue in section 3.3.6, *Recreational Resources* and section 3.3.7, *Land Use and Management* of the final EIS. The statement quoted by Butte County in section 3.3.2.1, *Hazardous Materials*, refers specifically to hazardous waste and hazardous material associated with project operations.

Comment 60: DWR comments that footnote 43 should be reworded to reflect the fact that there are actually two sets of valves; one set for each of the two 72-inch diameter steel conduits. Each set of valves is comprised of a 72-inch spherical guard valve and a 54-inch fixed-cone dispersion valve. The discharge capacities vary with reservoir storage; the spherical valves and appurtenant structures were rated when installed at 2,700 cfs with 428 feet of head for a combined capacity of 5,400 cfs.

Response: We revised footnote 43 to clarify the description of the river valves.

Comment 61: Butte County comments the draft EIS should include the following improvements to the multi-jurisdictional Emergency Action Plan (EAP): (1) DWR should review the notification chart to identify who should be notified and by what method; (2) the EAP should identify and develop an installation plan for resources and equipment to allow for emergency notification; (3) DWR should provide a public education plan and public awareness program concerning the risks of the project; and (4) the costs borne by local agencies in carrying out the EAP should be recognized and appropriate resources provided.

Response: As explained in the draft EIS in section 3.3.10.2, *Early Warning Plan*, the appropriate vehicle for implementing an early warning plan and other improvements in early warning coordination and communication protocols is through the EAP required under Part 12 subpart C of the Commission’s regulations and not through a specific license article.

Comment 62: DWR comments that footnote 48 should be revised to reflect that a siren was installed at Oroville Dam as an Interim Project to alert recreationists and others in the diversion pool area downstream of Oroville dam that spillway releases are imminent.

Response: We revised the footnote to read that DWR installed a siren.

Comment 63: The Water Board comments that the conclusion drawn in the draft EIS that water temperatures generally meet the Basin Plan objectives in section 3.3.2.1, *Temperature* is not supported by evidence in the record. The Water Board cites 2 years of sampling data by DWR (2004 and 2005) that indicates water temperatures below the Thermalito outlet can be 11°F higher than that of incoming water. The Water Board notes DWR's conclusion that increased incidence of disease, developmental abnormalities, increased in-vivo egg mortality, and temporary cessation of migration (in adult Chinook salmon) could occur due to elevated water temperatures in some areas of the lower Feather River.

Response: We maintain that the temperature record supports our statement that the Basin Plan temperature objectives are generally met throughout the project. We do not dispute the fact that water is warmed in the Thermalito afterbay and subsequently released to Feather River, which can result in temperatures that exceed some Chinook salmon life stage index values; however, this only occurs in select areas of the river during part of the immigration and holding periods. We continue to conclude that temperatures downstream of the Thermalito afterbay outlet are typically below 68°F with only 9 percent of the temperature profiles in 10 pools exceeding 68°F, which is within the normal range for adult Chinook salmon during migration and holding period. Our statement is further supported by the fact that Chinook salmon are very abundant in the Feather River – an estimated 30,000 to 170,000 Chinook salmon spawn in the Feather River annually. Based on available evidence, therefore, this beneficial use of project-affected water is being met for coldwater fish migration.

Comment 64: The Water Board points out that the draft EIS incorrectly states that there is no current Office of Environmental Health Hazard Assessment (OEHHA) fish consumption advisory for the Feather River. OEHHA issued a draft health advisory including safe eating guidelines for fish from the Lower Feather River. EPA recommends that the final EIS disclose more exact information regarding the concentrations of metals (particularly mercury) detected in fish tissue, as well as the fish-tissue sampling study. They also comment that updated and detailed information about the status of Health Advisories (draft and final) in the Feather River watershed and the level of risk that bioaccumulation of mercury or PCBs in fish may present to human health and the health of other predators should be included in the final EIS. EPA requests that the Commission require DWR to release their data regarding Lake Oroville to the Water Board and the California/EPA Office of Environmental Health Hazard Assessment (OEHHA) so that it can be included in future Draft Health Advisories. Finally, EPA disagrees with the staff conclusion in the draft EIS that there is no evidence that operation of the Oroville Facilities has contributed to the elevated metals concentration in fish tissues.

Response: We added additional detail to the concentrations of mercury detected in fish tissue as well as the OEHHA draft fish consumption advisory to section 3.3.2.1 of the final EIS. Also, fish tissue sampling information is available from the license application on the Commission's website under docket P-2100_052. Proposed Article A114 – Public Education Regarding Fish Contamination would require DWR to consult with EPA regarding this very issue as the Public Education article would be developed in consultation with EPA, the Water Board, Regional Board, and Butte County Health Department, all of who would have the opportunity to review any proposed sampling schedule, methodologies, and results. We clarify in the final EIS that although the project is not a source of metal contamination, there is evidence that metals concentrations in fish tissues from samples taken from hatchery coho are significantly lower than those from coho salmon samples taken in Lake Oroville.

Comment 65: DWR comments that in section 3.3.2.2, *Water Quantity, Flow/Temperature to Support Anadromous Fish (Proposed Article 108)*, the reference to replacement or refurbishment of the river valves needs to be clarified to say that “the total combined capacity of both river valves varies depending on reservoir storage; however, the river valves have been operated with a maximum capacity of about 1,500 cfs as an emergency outlet for downstream temperature management (solely for the Feather River Fish Hatchery) and water supply purposes. Under the provisions of Section B108(a) of the Settlement Agreement, DWR will investigate the necessary minimum repairs or refurbishment to assure their ability to continue to be used reliably up to the 1,500 cfs flow.

Response: We revised footnote 43 to clarify DWR’s intent. Also see our response to comment 62.

Comment 66: Friends of the River, the Sierra Club, and the South Yuba River Citizens League comment that the draft EIS states that under Proposed Article A130, Flood Control, DWR would operate the project in accordance with rules and regulation prescribed by the Corps pursuant to section 204 of the Flood Control Act of 1958 and that this is consistent with the existing license requirements. These groups state that this license requirement has already been violated; major downstream levee breaks have occurred and people have died. They comment that the existence of requirements to follow Corps and Commission rules will not solve the problem of operators exceeding design release objectives to avoid surcharge operations; the problem is that operators are demonstrably reluctant to conduct Corps and Commission-required flood control operations in the absence of a spillway on the auxiliary spillway. This is a matter that is the Commission’s principal responsibility to address.

The draft EIS does not address how the existing structural deficiencies of the Oroville Dam facilities that affect the willingness of its operators to conduct operations required by existing Corps regulations will be addressed and if the Commission will consider this operational impact of a structural deficiency to be properly addressed by the dam safety program, or whether only the risk of loss of crest control from such operations is properly addressed by the program.

Response: We contacted the Sacramento District Corps office to discuss flood management at the Oroville Facilities (see telephone report with Mr. Townsley on March 21, 2007). The Corps is satisfied that DWR is operating the project during flood events in accordance with the Corps Water Control Manual and Field Working Agreement. Further, there is no evidence in the public record that indicates levee failure or loss of life attributable to DWR project operations.

Comment 67: According to Friends of the River, Sierra Club, and the South Yuba River Citizens League, footnote 46 of the draft EIS assumes that the Work Group is a reference to one of the work groups established for relicensing. They indicate that this is a reference to the group members of the Yuba Feather Work Group (Work Group), a stakeholder-based collaborative formed to work on flood management and related environmental restoration issues in the Yuba and Feather River watersheds. The Work Group is composed of the South Yuba River Citizen’s League, Friends of the River, Nevada County, Sutter County, Sierra Club, Yuba County Water Agency, and state and federal agencies comprising Cal Fed.

Response: We clarified in footnote 51 (formerly footnote 46) that we are referring to the Yuba Feather Work Group.

Comment 68: In Section 3.3.2.2, *Water Quality*, of the draft EIS staff concludes that waters in the project area generally meet the water quality objectives for temperature, dissolved oxygen, nutrients, pH, and metals. The Water Board comments that this statement is not supported by documentation in the draft EIS or other available information and cite DWR study report *SPF-10, Final Report: Evaluation Of Oroville Facilities Operations On Water Temperature Related Effects On Pre-Spawning Adult Chinook*

Salmon And Characterization Of Holding Habitat as evidence that it is unlikely that adult Chinook salmon can use the Feather River below the Thermalito afterbay outlet except as a migration corridor.

Response: We stand by our initial statements that water quality objectives are generally met in that there are a small number of instances where numeric objectives are exceeded. As for the comment related to metals within the Project area, we do recognize the recent report on fish tissue sampling and updated the text in the final EIS to include mercury concentrations and the threat to human health posed by consumption of fish high in mercury.

We discuss suitability of the Feather River in terms of Chinook salmon needs for migration, spawning habitat, and rearing in section 3.3.3.1, *Aquatic Resources*. Also, in response to the NMFS (2004) statement that refers to the high flow channel as a migratory corridor, we discuss DWR's (2004) findings between 200 and 2003 of spawned-out carcasses in the high flow channel. We discuss temperature effects in the Feather River relative to aquatic resource needs in section 3.3.3.2, *Aquatic Resources*.

As for the Water Board's comment that DO is insufficient, we point to table 22 of the draft EIS, which shows that there were very few (3 of 90) DO samples taken in the Feather River that indicated DO concentrations less than the state objective of 8 mg/l. Of the three that were less than the objective, one of those was related to the decomposition of salmon carcasses in October and the other two missed the objective by less than 2.0 mg/l.

Comment 69: DWR comments that in section 3.3.2.2, *Water Quality, Flow/Temperature to Support Anadromous Fish (Proposed Article A108)* the draft EIS indicates only the river valve would be used to meet Feather River Fish Hatchery temperatures. The three methods actually available include: eliminating pump-back, removing stoplogs at the Hyatt intake structure, or potentially using the river valves.

Response: We added language to ensure that all three methods are outlined in the section in question on page 98.

Comment 70: DWR comments that the physical modifications suggested on page 101 of the draft EIS to improve water quality in the North forebay is above and beyond the scope of the proposed facility modification(s), which are related specifically only to efforts to improve temperatures in the lower Feather River. DWR states that physically modifying the opening of the forebay to enhance circulation should not necessarily be characterized as an improvement, because increased circulation will likely result in a reduction of the recreational use water temperature there.

Response: We agree that the facility modifications described in A108.4 of the Settlement Agreement pertain to the high flow and low flow channels and not to the North forebay. Therefore, we revised the text in the final EIS to delete references to the suggestion to study facility modifications for temperature in the North forebay.

Comment 71: DWR comments that staff's description and underlying analysis of the Flow/Temperature proposal in section 3.3.2.2 of the draft EIS appear to reflect a misunderstanding of the Settling Parties' intention. The Settlement Agreement does not propose to increase the water quantity in the high flow channel. Rather, the water quality objectives for the high flow channel will be analyzed in the reconnaissance and feasibility study phases of the measure and may be modified for the testing phase, and ultimately be modified to something that can be achieved with facilities modification(s) and under the *current* high flow channel flow levels. Furthermore, DWR is not proposing to make all the structural modifications as stated in the draft EIS in Flow/Temperature to Support Anadromous Fish (Proposed Article A108). Rather, DWR has committed to implementing one or more facility modifications or other

actions that the feasibility study suggests are most effective in terms of temperature control and cost. Lastly, DWR comments that only the Feather River Fish Hatchery temperatures become license requirements no later than the end of year 10, following license issuance, not the low flow channel objectives. The low flow channel objectives become mandatory requirements only after completion of construction of any future facility modification(s) and the High Flow Channel temperatures only become requirements to the extent the facilities modification(s) can achieve those temperatures.

Response: We corrected the text on page 92 and page 96 of the draft EIS to reflect the language in the Settlement Agreement that DWR will investigate facility modifications to meet low and high flow temperature objectives through the investigation of the feasibility of structural modifications and not increases in flows to the high flow channel. As for temperatures in the low flow channel becoming license requirements no later than year 10 as stated on page 96 of the draft EIS, we clarified the settlement language in the final EIS. Neither of these clarifications change our analysis or conclusions.

Comment 72: With respect to Proposed Article 108, the SWC and Metropolitan note that there is no commitment to undertake a series of facilities modifications in order to achieve Table 1 (low flow channel) temperature values. The proposal calls for the construction of one of the identified facilities modifications in order to address these temperature values. In addition, the Settlement Agreement provides that should there be excess funds available, and should a facilities modification be identified that has the ability to address the temperature targets of Table 2 (high flow channel), that such facility modification will be explored and potentially constructed. However, meeting the temperature targets of Table 2 is second priority to meeting the temperature requirements of Table 1.

Response: We modified the text on page 96 so that the commitment in Proposed Article 108 is for one or more (not necessarily all) of the facility modifications to meet the proposed temperature objectives in the low flow channel. We understand that should excess funds be available and potential facilities modifications be identified that have the ability to address temperature targets for the high flow channel, such modifications and the temperature objectives would be second priority to those identified for the low flow channel. Also see our response to comment 76.

Comment 73: DWR comments that staff's analysis of the Feather River Fish Hatchery requires additional clarification with regard to dissolved oxygen (DO) levels. Low DO water from the river valves would not be a problem for the hatchery since the releases mix with the Thermalito Diversion Pool. The final EIS should note that there have been no DO-related problems at the hatchery reported during the life of the project.

Response: To put the current DO conditions into historical context we added language to the analysis that there have been no-DO related problems at the hatchery during the life of the project.

Comment 74: Western Canal Water District, Richvale Irrigation District, Butte Water District, Biggs-West Gridley Water District, and Sutter Extension Water District (the Districts) comment that the draft EIS contains no discussion of the project's current impacts on agricultural water diversions from the Thermalito afterbay. In section 3.3.2.2, the text describes the use of the water, but does not describe the ongoing impact on such use. The Districts suggest that the final EIS include a discussion of the current project impacts on such withdrawals and on rice yields. The Water Board and the Districts comment that the final EIS should discuss the impact of reduced water temperature on rice production and the physical changes that may be required at the Thermalito afterbay to control temperature for rice production. The impacts and benefits of alternatives to improve water temperature for rice production should be evaluated and included in the final EIS.

Response: The current operation of the Oroville Facilities has been addressed in many separate proceedings since the project was built, both with water rights holders and with other federal and state agencies to protect threatened and endangered species. To honor senior water rights, DWR distributes water according to a number of settlements and agreements as discussed in section 3.3.2.1. The amount of water DWR is committed to provide the water agencies is about 994,000 acre-feet per year, subject to provisions for reduction in supply under certain specific low-inflow conditions. Some of this diverted water is used for agricultural purposes within Butte County. Under the Proposed Action, DWR would continue to honor their settlement agreements with the senior water rights holders. Any issue between DWR and parties bound to the water diversion settlements related to the water would fall outside of the Commission's jurisdiction in this proceeding.

Comment 75: With regard to the impact of cold water on rice growers, DWR comments that the reference to specific temperatures and period of time included in discussion under the heading *Flow/Temperature to Support Anadromous Fish (Proposed Article A108)* of the draft EIS: "... (equal to or greater than 65°F during the 4-week planting season, and warmer than 59°F during the rest of the season until harvest or October 31)..." be deleted since the impacts of cold water on rice depend on the total hours of exposure of rice to cold water than on the temperature itself. Also, DWR comments that the sensitive time period for rice growth is from about May 1 to July 31 and that there are no impacts after July 1.

DWR also comments that although base flows in the low flow channel would increase by approximately 17 percent during the rice growing period, this would not correspond to an equivalent decrease in the Thermalito afterbay. Since the flow in the low flow channel is much less than the flow in the Power Canal, the 17 percent change results in less than 1 percent change in the Thermalito afterbay. DWR expects that the small changes of inflow would minimally affect the storage time of water in the afterbay.

Response: With respect to the suggested sentence for deletion, this is taken directly from the Feather River Diverters February 13, 2006, letter to the Commission, and as such, is part of their recommendation. However, we conclude that temperatures of water delivered to irrigators would be similar to existing conditions. As for the amount of flow increase to the low flow channel and corresponding loss to Thermalito afterbay we revised the text on page 98 of the final EIS to include the information.

Comment 76: DWR comments that a qualitative assessment of pump-back operations provided to the Commission in DWR's *Technical Response to Intervention of the Water and Irrigation Districts, Butte County, California* concludes that the potential for pump-back operations to affect water temperatures at the agricultural diversion is small. Furthermore, DWR comments there is no linear relationship between the temperature changes of incoming water to the temperature changes at the agricultural diversions. Furthermore, DWR comments that staff's conclusion that "any effects would be most pronounced during drought years when DWR's ability to make release above the minimum flows would be compromised" is incorrect. DWR states that the temperature of water released from Oroville reservoir during droughts would be increased when measured against normal and wetter conditions and therefore, it is likely, the temperature of water entering the Thermalito afterbay would be warmer, which would decrease the magnitude of impacts on rice farming with respect to water temperature.

Response: We considered DWR's comments regarding potential temperatures within Thermalito afterbay and at the agricultural diversions and agree that temperatures within the afterbay are non-linear. As for staff's analysis of effects during drought years we clarified the text in the final EIS that any positive effects (warmer temperature) would be most pronounced during drought.

Comment 77: The Water Board also suggests that the final EIS include the impact on water quality and recreation of large algae blooms in Lake Oroville.

Response: Review of the license application and supporting resource studies (water quality and recreation) did not uncover any issues or comments regarding large algae or any blooms in Lake Oroville. As for the perceptions of algae in Lake Oroville, the recreation study (Recreation Surveys R-13, December 2004) conducted on-site interviews with 2,583 people and only one comment (collected at the Feather River Fish Hatchery) was related to algae (*The water looks to have too much algae in it*). As such, there is not enough evidence on the record to justify an algal bloom problem and subsequent discussion of impacts to water quality and recreation from large algae blooms at Lake Oroville.

Comment 78: The Water Board comments that the final EIS should include impacts to water quality from the construction of the weir that is described in Article A105 of the Settlement Agreement.

Response: In the final EIS, we recommend that DWR use best management practices during the construction of the fish weir to minimize potential effects to water quality. Final construction plans would be reviewed by Ecological Committee and would require Commission approval. The Commission would revise, and if necessary modify, the measures designed to minimize any risks to water quality during construction.

AQUATIC RESOURCES

Comment 79: DWR and NMFS comment that, in section 3.3.3.1, *Aquatic Resources*, the draft EIS indicates status listing for green sturgeon as California ESA or federal ESA. DWR notes that this species was listed in 2006 under FESA as threatened. This change should also be made to table 25. In addition, NMFS comments that table 25 should cite the final listing rule 71, FR 17757, April 6, 2006. The final EIS should also include corrections to pages 123 and 376 with regard to the listing of green sturgeon.

NMFS also comments that DWR and the Commission should work together to provide an analysis of possible impacts on green sturgeon; an ESA determination for green sturgeon; an analysis of the effects of the modified Staff Alternative for the Gravel Supplementation and Habit Improvement Programs with respect to green sturgeon; and an analysis of the effects of Thermalito afterbay discharge into the lower river (high flow section) on water temperatures for green sturgeon holding and spawning.

Response: We modified the final EIS to show the 2006 ESA listing of green sturgeon, and included an ESA determination for this species. We provide an independent analysis of project effects in the final EIS, including the effects on green sturgeon. We will send NMFS a letter adding this information to our Biological Assessment and ask NMFS to consult on it.

Comment 80: DWR requests that the final EIS revise references to upstream habitats to reflect the very real uncertainty about sustainable suitability of historic habitat for steelhead and spring-run Chinook salmon upstream of Lake Oroville. Specifically they refer to a statement in section 3.3.3.1, *Tributaries of Lake Oroville* that reads “the four major tributaries generally provide suitable habitat for all life stages of Chinook salmon and steelhead.” DWR comments that this statement is a generalization which implies an undeserved level of certainty about the quality of habitat above Lake Oroville. In addition, in section 3.3.3.1, *Feather River*, DWR comments that the draft EIS implies that the project is solely responsible for blocking upstream migration into historic spawning habitat in the upper Feather River. DWR suggests that all statements regarding Lake Oroville’s role in blocking upstream habitat should be revised to provide a more accurate historical context. DWR comments that the project has contributed to loss of upstream habitat, but is not the sole or even primary source for loss of historic habitat.

Response: We agree that the Oroville Facilities are not responsible for the loss of all potential upstream anadromous habitat; however, the fish barrier dam does prevent access to a significant amount of potential tributary habitat. We added a new figure 15 to the final EIS to show the fish passage barrier to habitat upstream of the fish barrier dam.

Comment 81: DWR comments that on page 112, the statement that "...The estimated potential losses of nutrients and organic matter were found to be substantial, but the significance of the losses was difficult to evaluate because of limitations in the available information, including imprecision of the estimates for potential spawning densities and insufficiently low detection levels of measured nutrient concentrations in the upstream tributaries." is not entirely accurate. DWR states that additional data collection for nutrient concentration at lower detection levels was presented in SP-W1. It indicated that the upstream tributaries were not nutrient deprived.

Response: We have added the additional nutrient study results from SP-W1 to section 3.3.3.1 of final EIS. However, this clarification does not affect our conclusions in the final EIS.

Comment 82: DWR, SWC, and Metropolitan comment that section 3.3.3.1, *Low Flow Channel and High Flow Channel* contains a statement that may not be entirely accurate. The draft EIS states that the high flow channel is considered a migratory corridor for adult spring-run Chinook salmon, and few, if any, of these fish are thought to hold or spawn there (NMFS, 2004). DWR's studies indicate that about one-third of the spawning is taking place in the high flow channel (Final Report Evaluation of Potential Effects of Oroville Facilities Operations on Spawning Chinook Salmon SP-F10, Task 2B). However, it is difficult to separate the spring run and fall-run Chinook salmon.

Response: We reviewed both the NMFS information and the DWR information in SP-F10, Task 2B in response to your comment. The study plan shows 16 to 26 percent of the spent Chinook salmon carcasses are found in the high flow channel, and we incorporated that information into the final EIS.

Comment 83: DWR comments that the draft EIS states that after a flood event in 1997, DWR repaired a levee in the OWA with a culvert that connects directly to the Feather River into the OWA, which has resulted in areas of the OWA being permanently inundated. DWR comments that this is an inaccurate description. DWR installed a levee notch which allowed flood flows to access the OWA "D" area. Apparently, the culvert was used during construction and not removed upon project completion, but has little to do with water levels in the OWA "D" area. Further, these wetlands are not permanent. The levee repair does not provide any direct surface water connection as the description implies. In 2006, high flows altered the pond outlet channel and water elevations in the OWA have dropped correspondingly. The final EIS should clarify that there is no direct, surface water connection at this upstream portion of the OWA and that the pond elevations within this portion of the OWA are in dynamic transition (as a result of both physical and biological events), not a fixed state.

DWR also comments that the water draining out of the OWA at this area functions essentially as a very small tributary and, unlike a diversion canal or pump, such discharge inputs are not screened. Salmonids could volitionally enter the OWA ponds through this culvert, but there is no evidence to suggest that this actually occurs or that it is a significant problem. Salmonids only enter the OWA during extreme flow events that overtop levees separating the OWA from the river. During extreme flow events, salmonid stranding and mortality in the OWA undoubtedly does occur, but this is beyond the control of the Licensee. The final EIS should clarify that surface waters of the Feather River do not flow into the OWA and that there is no evidence that a significant OWA salmonid mortality problem could exist under normal (i.e. non-flood) conditions.

Response: Thank you for clarifying the current situation in the OWA. We corrected references to surface water connections between the Feather River and the OWA in sections 3.3.3.1 and 3.3.3.2 of the final EIS.

Comment 84: DWR comments that in the Fish Species Overview, the text should be corrected to reflect that brook trout have not been stocked in the forebay since 2004. In addition, the draft EIS states that “Chinook salmon are discussed in Section 3.3.5, Threatened and Endangered Species.” However, that section only discusses spring-run Chinook salmon. DWR, SWR, and Metropolitan suggest that an account of fall-run Chinook salmon within the study area should be included in Fish Species Overview section. Spring-run Chinook salmon are listed under the ESA, but fall-run Chinook salmon are a species of primary management concern for economic and recreational reasons.

Response: We revised the discussion of brook trout stocking in section 3.3.3.1 *Affected Environment, Fish Species Overview* and include fall-run Chinook salmon in the final EIS.

Comment 85: On page 135, the draft EIS states that rainbow and lake trout are caught periodically and brown trout are commonly caught. DWR comments that none of these fish are commonly caught; rainbows are periodically caught, lake trout and brown are rarely caught.

Response: The information in our draft EIS is from DWR’s preliminary draft environmental assessment (page 5.5-5) that says, “Lake Oroville’s coldwater fishery is primarily composed of coho salmon and brown trout, although rainbow trout and lake trout are periodically caught” with reference to Appendix G-AQUA1, *Aquatic Resources Affected Environment*. However, Appendix G-AQUA1.3.2.1, *Lake Oroville Fish Species and Potential Effects on Coldwater Pool Availability and Water Surface Elevation Fluctuations* (SP-F3.1, Task 2A, 3A) states brown trout and rainbow trout are observed infrequently and lake trout are uncommon in creel census and electrofishing surveys. The Study Report is probably a more reliable source of information since it is a primary source, and the DWR preliminary draft environmental assessment is an extrapolation from that report, and therefore we made that change in the final EIS.

Comment 86: DWR comments on a statement on page 136 that states that water disinfection at the Feather River Fish Hatchery would help prevent disease transmission to ESA-listed salmonids which may result from a coldwater fish stocking problem. Despite intensive efforts DWR’s studies found no evidence that diseases originating at the Feather River Fish Hatchery negatively affect ESA-listed salmonids or any other fish species (DWR, 2004s). The purpose of water treatment at the hatchery is to protect hatchery production from disease catastrophic loss, not to protect wild salmonids. The final EIS should be corrected. The Water Board also comments that the final EIS should include a discussion of the impacts of Ceratomyxosis on anadromous fish in the Feather River and other fish in Lake Oroville.

Response: We agree with DWR that the proposed disinfection system would protect hatchery production from catastrophic disease loss and revised the final EIS to reflect this conclusion. However, we also expanded our discussion of ceratomyxosis on anadromous fish in the final EIS.

Comment 87: DWR comments that the description of Proposed License Article A111 in the draft EIS is incorrect relative to the provision to provide a stocking program for Lake Oroville. No reference is made in the proposed article to stocking the Thermalito forebay. As such, analysis of genetic introgression associated with rainbow trout escaping the forebay should be moved to another area of the document. DWR does not stock rainbow trout in the forebay; this is done by DFG.

Response: We revised the discussion of genetic introgression to delete any reference to DWR stocking rainbow trout in Thermalito forebay as part of Proposed License Article A111.

Comment 88: Mr. Flynn asks that the Commission describe the procedures that would be used for consideration and potential approval of an anadromous habitat expansion agreement.

Response: DWR states in its comments on the draft EIS that the final Habitat Expansion Agreement negotiations were completed after issuance of the draft EIS and the agreement will be signed and filed with the Commission after DWR coordination with PG&E, licensee of the three upstream project is completed. The Commission may consider the final agreement as part of its licensing decision. If you would like more information regarding the Habitat Expansion Agreement, the draft document is part of the Settlement Agreement available on-line at: www.ferc.gov.

Comment 89: DWR comments that the proposed minimum flows in the high flow channel are identical to those in the 1983 agreement between DWR and DFG and that no changes to the minimum flows in the high flow channel are proposed. This is contrary to the statement in section 3.3.4.2 on page 177 on the draft EIS that states the proposed minimum flow increases in the high flow channel would be based on the preceding April to July unimpaired runoff in the discussion of Flow/Temperature to Support Anadromous Fish in section (Proposed Article A108).

Response: We deleted the word “increases” in the discussion of *Flow/Temperature to Support Anadromous Fish (Proposed Article 108)* in section 3.3.5.2 of the final EIS and expanded our description of this measure.

Comment 90: DWR comments that the language used in section 5.1.1, *Staff Alternative (DWR’s Proposal with Staff Modifications)* to describe Proposed Article A108 should be revised to be more consistent with the Settlement Agreement language.

Response: We corrected the first bullet for Proposed Article A108 to read from September 9 to March 31 to be consistent with the settlement.

Comment 91: In section 5.1.2.3, *Feather River Fish Hatchery Improvement Program (Proposed Article A107)*, DWR disagrees with the conclusion that Coho salmon are an unsuitable replacement for the coldwater fishery in Lake Oroville because they are not a “native” species. DWR comments that since Lake Oroville is a non-natural feature and the cold water stocking program is an artificial stocking program, the emphasis on “native” species is not warranted. Furthermore, DWR notes that the warmwater fishery in Lake Oroville is based entirely on non-native fishes. DWR also comments that comparison of current hatchery water temperature requirements and those included in the Settlement Agreement indicates that the hatchery water temperature targets in the Proposed Action are not cooler than those currently provided to the hatchery. However, table 1 (not table 1 in the draft EIS) targets would be cooler than the current water temperature requirements at Robinson Riffle, which would result in decreased water temperatures at the hatchery prior to the implementation of the facilities modification(s).

When discussing the Feather River Fish Hatchery Improvement Program, the DWR comments that draft EIS says the new Feather River Hatchery temperature requirements would provide cooler water for the inland fish stocked in Lake Oroville (recreational angling) and the anadromous fish stocked in the river (simulating natural production). This is not an accurate statement for recreational fish stocking in the reservoir. The current Coho salmon are not raised at the main Feather River Hatchery grounds; rather they are raised at the Feather River Hatchery Thermalito Annex facility on Hwy 99. The warmer water at this location is more protective for these fish, which are susceptible to certain diseases that are more virulent at cooler temperatures. This points out a major fallacy about water temperatures at the FRH that colder is always better.

DWR comments that the draft EIS further makes the statement that Coho salmon do not appropriately address the project effects because Coho salmon are not native to this river system. This is misleading because the reservoir fishery is not intended to address the project effects; these effects are addressed by the anadromous hatchery production. The reservoir fishery is actually a recreational enhancement to the project rather than an environmental mitigation. The species used in the recreational fishery are selected based on their recreational value, cost, and in a manner which minimizes potential environmental impacts. The reason Chinook salmon were used in the past was because they best met the previously mentioned criteria.

Also, DWR is not clear on how staff determined the \$371,000 annualized budget for this measure. The annual budget to produce fish at the Feather River Hatchery is closer to \$1.5 million per year, and this does not include monitoring, which will cost at least an additional \$600,000 per year.

Response: We acknowledge the self-sustaining warmwater fishery in Lake Oroville area consists of non-native species. Within the project waters the highest diversity of fish species occurs in the lower Feather River (40 species) followed by Lake Oroville (28 species). A majority of the species overlaps between these two waterbodies, with a larger number of riverine and anadromous species in the lower Feather River (e.g., steelhead, shad) and mostly introduced game species in Lake Oroville (e.g., lake trout, coho salmon, bass). Although we expressed some reservations in the draft EIS about stocking non-native coho salmon, we understand the circumstances related to disease concerns that led to this decision. We revised the final EIS to reflect this and to state that if fish diseases are controlled in the future, DWR's stocking objective is to return to stocking native salmonids in Lake Oroville.

We added your statement regarding the effects of measure A108 on hatchery water temperatures to the *Flow/Temperature to Support Anadromous Fish* (Proposed Article A108) discussions on draft EIS pages 177 and 354. The draft EIS statement you reference from page 353, does not say the new hatchery temperature requirements in A107 would provide cooler water to Lake Oroville; it says that cooler hatchery water would reduce risk of disease and produce healthy fish for stocking (recreational angling) and releasing (simulating natural production). The cost of this measure has been resummarized, and includes capital, levelized O&M, and annualized costs. These costs are strictly for a new measure; any existing costs to produce fish would be in the No Action alternative. We estimated O&M costs as \$1,043,250 (65% of \$1,605,000) per year over the four year period which should adequately include the monitoring costs. The levelized cost of O&M is \$262,600 as shown in appendix B. Combining this with our corrected annualized capital cost, results in a total annual cost of \$566,100.

Comment 92: DWR comments that with respect to item 20 in section 5.1.1, *Staff Alternative (DWR's Proposal with Staff Modifications)*, that the OWA plan will include both terrestrial and aquatic resources.

Response: We revised item 20 in section 5.1.1 to include aquatic resources.

TERRESTRIAL RESOURCES

Comment 93: Interior comments that the reference to black-tailed deer as an important big-game species in section 3.3.4, *Wildlife Species*, should be changed to state that it is an important recreational harvest species. They also comment the reference to waterfowl as the most important (both commercial and recreational) group of wildlife should be changed to the most productive.

Response: We revised section 3.3.4 in the final EIS to state that the black-tailed deer is an important recreational harvest species and that waterfowl are the most productive group of wildlife as suggested.

Comment 94: DWR comments that on page 155 the draft EIS states that the proposed continued enforcement of a 5-mile-per-hour boating speed limit on the Thermalito afterbay north of Highway 162 would limit the potential effects of recreational boating on grebes. The potential impact from recreational boating is to nesting birds, and no nest colonies exist north of Highway 162. Thus, there will be little or no benefit to nesting grebes north of Highway 162.

Response: We revised the final EIS to state that the 5-mile-per-hour boating speed limit on the Thermalito afterbay would benefit nesting waterfowl as opposed to grebes.

Comment 95: DWR comments in section 3.3.4.2, *Oroville Wildlife Area Management Plan (Proposed Article A115)* that DPR does not do any maintenance within the OWA and that no transmission line rights-of way exist within the OWA. In addition, North Thermalito forebay is not in the OWA.

Response: We revised section 3.3.4.2 to clarify that the DPR does not provide maintenance within the OWA, that there are no transmission lines within the OWA, and that the proposed RV campground at North Thermalito forebay is not within the OWA.

Comment 96: Butte County comments that the staff suggestion in section 3.3.4.1, *Oroville Wildlife Management Plan (Proposed Article A115)*, that the County would have the opportunity to provide input on the OWA Management Plan, and therefore does not need to be a separately consulted party is ill-conceived. The County comments that this separates from the planning process the very individuals who have full knowledge of the area and of its needs. In addition, the County notes that DWR and the state agencies it relies upon to manage the OWA have failed in their responsibilities and the OWA has become a site of increased dumping and criminal activity.

Response: We revised section 5.1.2.4 to include Butte County as a consulted party.

Comment 97: DWR disagrees with the reference to poor management in section 5.1.2.4, *Oroville Wildlife Management Plan (Proposed Article A115)*. It suggests that overlapping land management jurisdictions for the OWA have resulted in difficulties at times, but not poor management.

Response: We appreciate your comment; however, staff's position is that a licensee has responsibility to properly manage the resources.

Comment 98: In section 5.1.2.4, *Invasive Plant Management (Proposed Article A126 and Forest Service 4(e) Condition No. 18)*, DWR comments that Lake Oroville should not be included in the statement "We determined that fluctuating water levels in the Thermalito Complex, Lake Oroville and in the Low Flow Channel promote proliferation of noxious plant species along the wetland margins, river banks, and adjacent floodplain." DWR notes that its studies did not find that noxious weeds were a problem in the Lake's fluctuation zone.

Response: The relicensing study, "SP-T7 Noxious Terrestrial and Aquatic Plant Species Draft Final Report" dated June 2004 states that fluctuating water levels in the Thermalito Complex and in Lake Oroville...encourage the proliferation of non-native noxious weed species along the wetland margins, river banks, and in the adjacent floodplain. Although we agree that noxious weeds are less plentiful in the Lake Oroville fluctuation zone than within the Thermalito Complex, based upon this relicensing study we conclude that we have not mischaracterized project effects on noxious weeds.

THREATENED AND ENDANGERED SPECIES

Comment 99: In section 3.3.5.1, *Fish Species*, DWR comments that there are 4 ESUs of Central Valley Chinook salmon, not three as indicated in the draft EIS.

Response: There are four runs and three ESUs of Central Valley Chinook salmon. The fall-run/late-fall-run ESU was explained in draft EIS table 25 footnote g. More detail on the relationship of all four runs to the three ESUs has been added to the final EIS in section 3.3.3.1, *Aquatic Resources, Affected Environment*. Also see our response to comment 89.

Comment 100: In section 3.3.5.1, *Wildlife Species*, Interior comments that since species lists are provided upon initiation of consultation, (which has just occurred), it recommends updating the species list. EPA and Mr. Flynn comment that the final EIS should include a discussion of the project's compliance with Section 7 of the ESA. They suggest that the document should provide an update of the status of consultation with FWS regarding impacts to the species discussed in the draft EIS. The final EIS should include the Biological Opinion, if it has been issued by FWS.

Response: We requested formal consultation with FWS on October 24, 2006. On January 25, 2007, FWS filed a request for additional information in order to initiate formal consultation. This letter did not indicate any additional species in the project area. A discussion of compliance with section 7 of the ESA was included in section 5.5.2, *Endangered Species Act* in the draft EIS and has been updated in the final EIS. The final EIS has been updated reflecting the most recent information in the consultation process, including the Biological Opinion issued by FWS on April 9, 2007.

Comment 101: In section 3.3.5.1, *Vernal Pool Invertebrates*, the draft EIS states that DWR is going to abandon and then revegetate, by December 2006, all roads that DWR determines are no longer necessary and needed to facilitate project operations or management. DWR comments that it has since completed this task. Oroville Field Division, Civil Maintenance abandoned one road segment near vernal pools and it is fully vegetated.

Response: We revised section 3.3.5.1 of the final EIS to state the DWR has determined which roads are no longer necessary and one road segment has been abandoned and revegetated; however, this information does not affect our conclusions in the final EIS.

Comment 102: In section 3.3.5.2, *Gravel Supplementation and Improvement Program* (Proposed Article A102), DWR comments that the draft EIS states that most steelhead spawning occurs in the low flow channel because it provides the coldest and therefore most suitable temperatures. DWR comments that this is inaccurate and inconsistent with study results (SP-F10 Task 3A). Steelhead spawn in winter when temperatures are suitably cold everywhere in the lower Feather River. The best explanation for the distribution of steelhead spawning appears to be an affinity for the Feather River Fish Hatchery itself, or for upstream most in general (SP-F10 Task 3A).

In addition, later in the same analysis, the draft EIS states gravel supplementation would have no beneficial effect on spatial segregation of spring- and fall-run Chinook salmon. DWR comments that this is a non sequitur, since segregation of salmon spawning is not the goal of gravel supplementation. Rather, the fish segregation weir and the habitat expansion program are intended to correct this problem. However, gravel supplementation will benefit spring-run Chinook salmon once the segregation weir is in place by improving the quality and quantity of available habitat.

Response: The order of the text has been changed in the final EIS to reflect that the lower water temperatures are beneficial to Chinook salmon, not steelhead and that steelhead spawn when temperature

is not an issue. Other factors that influence steelhead spawning and rearing habitat selection were added to this section. We agree with the statement that the gravel supplementation is not intended to correct spatial segregation. Please also see our response to comment 116.

Comment 103: SWC and Metropolitan comment that in section 3.3.5.2, *Gravel Supplementation and Improvement Program (Proposed Article A102)*, the draft EIS states that the Hatchery ditch may be the best location for long-term supplementation benefits. Yet the next sentence states that gravel supplementation would be more likely to have long-term, beneficial effects between RM 53.5 and 64.0 which is 0.8 miles below the project boundary. Later in the analysis the draft EIS makes comparisons between the 8,300 cubic yards to be placed in the first 5 years and pre-project levels and states that an allocation of 550 cubic yards per riffle makes smaller riffles than existing conditions. They comment that no quantitative information is provided to assess the accuracy of these statements. The final EIS should provide additional data to show how these calculations were made, as well as noting that no gravel supplementation is planned for outside the project boundary. Also, the effects of betterments should be compared to current conditions, not pre-project conditions.

Response: We revised the discussion in section 3.3.5.2 to clarify the location where gravel supplementation would provide benefits. Our calculations for gravel supplementation are included in our response to comment 51. Please also see response to baseline conditions comments 125.

Comment 104: In section 3.3.5.2, *Fish Weir Program (Proposed Article A105)* DWR makes several comments:

1. Habitat access should be revised to more accurately reflect the historic impacts to the river. Hydroelectric development was preceded in the 1800s by aggressive mining techniques that included complete diversion of the North Fork Feather River through a pipeline so that the miners could access the riverbed. This quite effectively blocked fish passage and access to habitat above Oroville for many years prior to hydro development. Moreover, PG&E maintained a seasonal flashboard dam downstream of the current Highway 162 bridge until DWR built the Oroville Facilities.
2. The fish-monitoring weir will not be used for segregation of Chinook salmon spawning runs, rather segregation of spring-run will require a new structure and an egg taking station for fall-run.
3. In the staff analysis section for the Fish Weir Program, the phrase “fish that return between September 1 and 15” should be replaced with “fish that arrive in May and June” and that the word “untagged” should be used to before the word Chinook in the sentence “Chinook salmon returning after September 15 are considered to be fall-run fish.”
4. In this section, the Feather River Fish Hatchery spring-run Chinook salmon are not included in the ESU. This is incorrect. Natural and hatchery-origin Feather River spring-run Chinook salmon are both listed in the Central Valley spring-run ESU. This fact is characterized correctly in other parts of the draft EIS.
5. Replace the word “small” in the sentence “Recent results indicate a small percentage of the early run Feather River fish hatchery fish spawn naturally in the low flow channel” with “significant”. According to DWR, the number of salmon (apparent spring-run) spawning in the Feather River far exceeds the number that enter the Feather River Fish Hatchery.
6. Replace the first sentence of the last paragraph on page 173 with “Currently in the Central Valley, spring-run Chinook salmon are threatened and fall-run Chinook salmon populations are

significantly depressed from historical levels. However, the Feather River contains robust populations of both species which will exceed pre-project levels.” Staff’s first statement in the staff analysis for this section that “Historically the Feather River fish hatchery did not reproductively isolate or maintain the genetic integrity of the spring- and fall-run Chinook salmon stocks” is not accurate. DFG did attempt to maintain the genetic integrity of the spring- and fall-run, and many of their spawning protocols were based on this.

7. The purpose of the egg-taking station is to allow continued artificial propagation of fall-run Chinook salmon by the Feather River Fish Hatchery, not to provide “genetic material.” The egg taking station would only be necessary after the segregation weir is deployed.

Response: The historic information in your first comment has been included in the final EIS. Please also see our response to comment 80.

The Settlement Agreement Explanatory Statement states that if appropriate and agreed to by NMFS, the counting [monitoring] weir may be used for partial temporal and/or spatial segregation of the spawning fish prior to construction of the second phase [segregation] weir, as noted in the draft EIS on page 173.

The Settlement Agreement ((f) page A-11) states that Phase 2 Plan will also evaluate the installation of an egg-taking station, if appropriate, to collect fall-run Chinook salmon eggs for transport to the Feather River fish hatchery. In the draft EIS (page 173), we stated that an egg-taking station would provide genetic material, if needed (i.e. if appropriate), to perpetuate Feather River fall-run Chinook salmon stock. The need for an egg taking station will be determined based on the results of the A105 Phase 1 Plan, and the genetic study in the Feather River Hatchery Improvement Program (A107), as stated in our analysis on draft EIS page 173.

We made your suggested word changes, the connection to the composition of the spring-run Chinook salmon ESU, and revised the text in the final EIS to state that DFG did attempt to maintain the genetic integrity of the spring- and fall-run Chinook salmon.

We replaced the first sentence of the last paragraph on page 173 with a statement similar to your suggestion; however, until the genetic analyses are completed we cannot conclusively state that the Feather River contains robust populations of both spring and fall runs of Chinook salmon.

Comment 105: In the *Staff Analysis* of section 3.3.5.2, *Hatchery Water Temperature*, DWR suggests replacing the words “cooler water” with “water temperature”. Both warmer and colder waters are useful for managing disease. Mortality resulting from IHN is reduced at temperatures in excess of 59°F, which is why the Feather River Fish Hatchery has often moved its fish to its annex facility during IHN outbreaks. This change should also be reflected in section 5.1.2.3. In addition, DWR comments that the statement that cooler temperatures are also correlated with better growth and survival rates of coldwater species due to improved physiological conditions makes an inaccurate generalization about growth and survival benefits associated colder waters. DWR comments that it is true that in excess of some maximum temperature (e.g., 68°F) growth and survival will decline rapidly, but generally growth and survival is enhanced at warmer temperatures which lie below this critical threshold.

Response: We changed the identified text from “cooler water” to “water temperature” in the final EIS and added information about maximum temperature threshold information.

Comment 106: In section 3.3.5.2, *Chinook Salmon and Steelhead*, SWC and Metropolitan comment that while spring-run Chinook salmon historically sought out cooler water higher in the watershed prior to the construction of the fish barrier dam, they could not migrate much further upstream of Lake Oroville

because of the pre-existing blockage to cooler water habitat by man-made or natural blockages that pre-date the construction of the Oroville Facilities.

Response: See response to comment 80.

Comment 107: DWR comments that the draft EIS is incorrect on page 177 in *Flow/Temperature to Support Anadromous Fish*, when it states that Oroville dam, other project facilities, and associated operations have altered instream flow and water temperature, adversely affecting anadromous salmonids in the Feather River and that elevated water temperatures in the low and high flow channels have had adverse effects on anadromous salmonids and other coldwater fish. DWR cites a DFG report that shows there are more fish in the river now than before the project was built and concludes that, if anything, the facilities have had a beneficial impact on the fisheries.

Response: The Settlement Agreement states that, during the study plan process, the water temperatures in the low flow channel and the high flow channel were identified as potential contributing stressors for anadromous salmonids, and references SP-F10, tasks, 3B, 4B, 2C, and 1D. We concur with the study plan findings that elevated water temperatures and altered flows in both channels have adversely affected anadromous salmonids by causing thermal stress, increased redd superimposition, increased risk of disease, and loss of juvenile rearing habitat.

We also agree that there are higher numbers of anadromous fish in this section of the river as a direct result of hatchery mitigation production at the Feather River fish hatchery and the fish barrier dam that were built as part of the Oroville Facilities and these points are addressed in more detail under Proposed Article A108 in the final EIS (also see our response to comment 117). However, this production also causes over-crowding, increased stress, and pre-spawning mortality in the naturally spawning fish due to limited spawning habitat in the river. Those are the reasons Settlement Agreement Proposed Article A108 was developed, to decrease the current adverse effects associated with altered flows and increased water temperatures in the low flow channel.

Comment 108: In section 3.3.5.2, *Chinook Salmon and Steelhead*, DWR comments while it is true that some potentially stressful temperatures were observed, it needs to be clarified that was not a typical condition in the high flow channel and especially not in the low flow channel. In addition, angling pressure and over-crowding should be identified as contributors to observed high pre-spawn mortality.

Response: We added more complete information from SP-F10, Task E, regarding low flow and high flow channel temperatures to the final EIS. Angling pressure and over-crowding have also been added to the final EIS text as contributors to high pre-spawn mortality.

Comment 109: DWR notes that on page 179 of the draft EIS the staff incorrectly references DWR's report, SP-F10 Task 3A. According to DWR, the report makes it clear that the absence of significant steelhead rearing downstream of Thermalito afterbay outlet is a direct result of the unsuitable temperatures often found there. DWR comments that it is incorrect to say that the report concludes that because there is little or no steelhead rearing downstream of the outlet, it is unlikely that high temperatures substantially adversely affect steelhead rearing.

Response: The draft EIS is referring to a quote from the SP-F10, Task 3B, report conclusions in G-AQUA1.8.3.2 that states, "Because snorkel surveys on the Feather River indicate that there is little or no steelhead rearing below the Thermalito afterbay outlet (DWR and USBR, 2000), it is unlikely that high water temperatures that occur below the outlet would have significant adverse effects on steelhead rearing in the Feather River." However, The SP-F10, Task 3B Interim Report (DWR, 2003) states that because daily summer water temperatures often exceed 70°F (21.1°C) below the Thermalito afterbay outlet, it is

unlikely that steelhead would rear in High Flow Channel if suitable rearing habitat was available with cooler water temperatures. Thus, current knowledge regarding juvenile steelhead rearing locations suggests that most steelhead rearing appears to be concentrated between the fish barrier dam and the Thermalito afterbay outlet, and specifically in the upper section of this reach. Snorkel surveys confirmed that the area below the Thermalito afterbay outlet harbors little to no rearing steelhead (DWR et al., 2000). We corrected our text to reflect the Interim Report conclusions.

Comment 110: DWR comments that the draft EIS appears to comment negatively on the “protracted timeline” for implementing the proposed measures in the Flow/Temperature to Support Anadromous Fish Program and indicates there may be an unmitigated impact on ESA listed salmonids. DWR states that upon license issuance, immediate positive benefits will accrue in the form of Proposed License Articles A108.1(a) and A108.1(b). Furthermore, the complexity of the hydraulic interactions between DWR’s facilities, those of South Feather Water and Power Agency, and the DWR’s obligations to make water deliveries to agricultural interests in the area require significant study prior to implementation of any facility constructed to improve temperature conditions for fish. The facilities modification timeline in the Settlement Agreement reflects the best judgment of the scientific and engineering communities and premature implementation of facilities modifications could result in less than optimum performance. SWC and Metropolitan echo these comments. Lastly, DWR comments that there are no unmitigated impacts to salmonids measured against the baseline conditions or the no project condition. They request that the final EIS reflect these clarifications.

Response: We agree that some immediate benefits would be realized from the proposed measures, including increased minimum flows (A108), upon license issuance. However, many of the proposed enhancements would not be implemented until years after license. The proposed timeline for implementation of facilities modifications and the testing period after license issuance (up to 10 years and at least 15 years, respectively) lead us to conclude that measure A108 may not provide timely or complete protection of ESA-listed Chinook salmon and steelhead in the high flow and low flow channels. Also see our response to comment 125.

Comment 111: The Conservation League comments that the final EIS should include an analysis of whether proposed project operations will inhibit the restoration and full recovery of salmon, steelhead, and Delta smelt, as well as the ecosystem of the Feather River, Yuba River, Sacramento River, and the Delta. In addition, the Conservation League notes that the EIS must disclose whether the proposed project will prevent achievement of restoration goals established in Central Valley Project Improvement Act and the CALFED Bay-Delta Program’s 2000 Ecosystem Restoration Plan and Multi-species Conservation Program.

Response: The measures proposed in the Settlement Agreement and the Habitat Expansion Agreement are intended to maintain hatchery productivity, expand and improve aquatic, riparian, and floodplain habitats over baseline conditions, reduce straying, maintain the genetics of Feather river Chinook salmon stocks, reduce the risk of potential disease transmission from hatchery to wild stocks. The Settlement Agreement would increase the minimum flows included in the 1983 agreement between DWR and DFG; the other terms of the 1983 agreement would not be changed.

Flows through the Delta are maintained to meet Bay-Delta water quality standards arising from DWR’s water rights permits (DWR, 2004s). These standards are designed to meet several water quality objectives such as salinity, Delta outflow, river flows, and export limits. The purpose of these objectives to attain the highest water quality is reasonable, considering all demands being made on the Bay-Delta waters. In particular, they protect a wide range of fish and wildlife including Chinook salmon, Delta smelt, striped bass, and the habitat of estuarine-dependent species. Therefore, we conclude that as proposed, the measures in the Settlement Agreement and Habitat Expansion Agreement would not inhibit,

and are expected to enhance, the overall the restoration and full recovery of salmon, steelhead, and Delta smelt, as well as the ecosystem of the Feather River, Yuba River, Sacramento River, and the Delta. See also our responses to comments 117 and 123.

Comment 112: The Water Board comments that the draft EIS does not adequately describe the impacts of the current project on spring-run Chinook salmon. While Article A105 of the Settlement Agreement requires DWR to develop a weir construction and operations plan consistent with the project biological opinion(s), actual construction of the weir is not required until 12 years after license issuance. The Water Board suggests that the final EIS include the impact of waiting 12 years to install the weir and the potential impact of the weir on all species of fish in the Feather River.

Response: The weir program is intended to segregate Feather River spring-run and fall-run Chinook salmon only if there is sufficient reason to do so, based on the results of the genetic testing in Hatchery Management Improvement Program (A107) and monitoring the Phase I Plan of the Fish Weir Program (A105). In the interim, the monitoring weir that would be installed within three years of license issuance may be used to segregate the Chinook salmon runs, as needed to protect and conserve spring-run stock. The weir would operate during the Chinook salmon spawning season (late summer/fall), and would not be expected to affect other species. This information has been added to the final EIS. Also see our responses to comment 104.

Comment 113: Although the draft EIS concludes that the proposed measures to support anadromous fish will improve water quality, except under the most extreme conditions, the Water Board comments that it is impossible to analyze the water temperature impact of potential facility modifications being developed by DWR on anadromous fish. The final EIS should disclose that the impact of the proposed project on anadromous fish is unknown.

Response: Our analysis indicates that the proposed measures could improve water quality under most conditions. Any unanticipated impacts of the proposed measures would be revealed through long-term monitoring and evaluation, as proposed in the Settlement Agreement.

Comment 114: DWR comments that the draft EIS alternates between applying the incorrect pre-project baseline and the applying the correct existing conditions baseline in its analyses. Specifically, DWR points to the statement on page 171 of the draft EIS that says “Gravel supplementation would have no beneficial effect on the spatial segregation of the naturally spawning spring-run and fall-run Chinook salmon because the dam blocks upstream migration and concentrates spawning in the low flow channel.” DWR comments that this statement implies comparison of the Proposed Action to pre-project conditions. In addition, DWR comments that this statement is misleading because the Gravel Supplementation and Improvement Program addresses other aspects of anadromous salmonid spawning habitat restoration and enhancement. DWR points to another example of alternating between applying the incorrect pre-project baseline on page 190 wherein the draft EIS cites unavoidable adverse impacts on anadromous fish of the dams remaining in place. DWR comments that this is an inappropriate without dam or pre-project frame of reference.

DWR comments that comparison of the Proposed Action to the appropriate baseline condition would indicate a beneficial effect on spring-run Chinook salmon and steelhead in the Feather River and Central Valley and that if existing conditions were the baseline, then any enhancements DWR provides could not, by definition, adversely affect the species.

Response: As indicated in the draft EIS, our baseline for comparison of alternatives is existing conditions. However, under NEPA cumulative effects analysis, we must also consider the continuing impacts of the project (e.g., the dam blocks fish passage). We agree that the gravel supplementation

would benefit spring- and fall-run Chinook salmon by providing more habitat than the baseline condition because the runs are not spatially segregated and are utilizing the same spawning habitat in the low flow channel. We edited the final EIS to clarify this issue.

Comment 115: DWR comments that the draft EIS fails to acknowledge how successful the Feather River Fish Hatchery has been in meeting its mitigation goals. In addition, the draft EIS claims that hatchery operations introduced and spread diseases that affected stocked or native salmonids. DWR comments that this was a one-time occurrence and that the current stocking program is designed to prevent this occurrence in the future. Furthermore, DWR states that the draft EIS fails to fully acknowledge the various improvements and enhancements identified in the Settlement Agreement. DWR suggests that the final EIS should also acknowledge the strong collaborative relationship between DWR and DFG in all aspects of the hatchery operations.

Response: We agree that the Feather River Fish Hatchery has been successful in meeting fisheries production mitigation goals (see also our response to comment 109), and we state this point more clearly in the final EIS.

In section 3.3.3.1 we stated that there was a severe outbreak of IHN at the hatchery in 1998, 2000, and 2001, and that problem has not occurred since changes in the anadromous stocking program were made. We reiterated that point in the draft EIS under the Settlement Agreement Proposed Articles A107 (section 3.3.5.2) and A111 (section 3.3.3.2).

The hatchery facilities improvements and management changes proposed in Settlement Agreement Articles A105 Weir Program and A107 Hatchery Improvement Program are addressed in section 3.3.5.2 of the final EIS and in responses to comments 50, 106, 107, 114, DWR-A26, and 104. The collaborative relationship between DWR and DFG is noted in the final EIS.

Comment 116: In section 3.3.5.2, *Other Coldwater Fishes*, DWR would like the final EIS to reflect that minimum flow requirements in the high flow channel would not change with implementation of the Proposed Action. Additionally, operations are not expected to change the frequency and magnitude of flow fluctuations. Therefore, the frequency with which green or white sturgeon could ascend Shanghai Bench would not be altered under the Proposed Action.

Response: The high flow channel minimum flow requirements are addressed in comment 89, above, and have been corrected throughout the final EIS. We agree that the frequency with which green or white sturgeon could ascend Shanghai Bench would not change under the Proposed Action.

Comment 117: In section 3.3.5.2 (page 180), of the draft EIS, Mr. Flynn questions the statement that if any future actions could affect federally listed plant species, DWR would consult with FWS prior to implementing these actions. Mr. Flynn would like to know why the Commission would not be required to initiate consultation under section 7(a)(2) of the ESA under this circumstance. In addition, he comments that DWR's proposal to conduct additional surveys prior to any future activities that could affect federally listed plant species and its subsequent consultation with FWS to consider appropriate protection activities may not serve as adequate protection for the continued existence of these species. He would like to know how DWR's consultation with FWS would eliminate the Commission's responsibility to ensure compliance with the ESA.

Response: Formal consultation under section 7(a)(2) of the ESA may in fact be required after licensing, should future actions not approved in the license have the potential to adversely affect listed plant species. DWR's consultation with FWS on the need for protection measures may avoid effects on listed species and thus the need for section 7 consultation.

Comment 118: In section 3.3.5.2, *Bald Eagle*, Interior comments the phrase “and then consulted on by FWS” should be added at the end of the sentence “Within the primary zones at all five nesting territories, all proposed activities would have to be reviewed by FWS, DFG, DPR, BLM, and PG&E.” In addition DWR comments that neither informal consultation nor the draft biological assessment stipulated any time limits on construction-related activities related to wintering bald eagles and none are required for the highly mobile wintering population. Therefore, the statement that construction-related activities would be scheduled after nesting season and before wintering bald eagles arrive, should be deleted from the final EIS.

Response: We agree with DWR and revised section 3.3.5.2 of the final EIS to add the need to consult with FWS and to delete the reference to wintering bald eagles.

Comment 119: Commenting on section 3.3.5.2, *Giant Garter Snake*, DWR states that neither FWS, nor DWR in the Biological Assessment, suggest that herbicides cannot be used within giant garter snake habitat. DWR comments that herbicide use will be essential to control purple loosestrife. Within the draft biological assessment, rodenticide use is limited, but no restrictions are placed on other pesticides. The final EIS should reflect this.

Response: Both the draft biological assessment and the Settlement Agreement indicate that rodent control activities would be avoided except in certain circumstances. Additionally, the draft biological assessment states that invasive species removal within giant garter snake habitat would be limited to manual removal and individual treatment with appropriate herbicides. We revised the final EIS to clarify the pesticide and herbicide restrictions within giant garter snake habitat.

Comment 120: Plumas comments that the draft EIS fails to adequately address the potential impact of changes in operations of the Oroville Facilities and the State Water Project that may be mandated as a result of federal and California laws protecting endangered species. Plumas County also suggests that any license issued should include conditions related to doubling the State Water Project exports from the San Francisco Bay/Sacramento-San Joaquin Delta from the historic average of two million acre-feet per year to four million acre-feet per year. The Conservation League comments that the draft EIS does not address the degree to which the project will contribute to reduced freshwater flows and changes in the timing and temperature of flows to the lower Feather River, the Sacramento River, and the Bay Delta Estuary. It suggests that lake level fluctuations that facilitate changed conditions in the Delta during winter and summer should be analyzed. The State Water Contractors and the Metropolitan Water District comment the Bay-Delta impacts of State Water Project Operations are beyond the scope of the Proposed Action to relicense the Oroville Facilities.

Response: We concur with the State Water Contractors and the Metropolitan Water District that because the Oroville Facilities do not alter flows in the Feather River below Thermalito afterbay, the operations have no impact on Bay-Delta issues being addressed by CALFED process and other means, and that the FERC relicensing is not the appropriate forum for addressing these issues. Federal actions addressing the Bay-Delta issue are being handled by CALFED and other processes, and the operation of Oroville Facilities are included in the Operating Criteria and Plan (OCAP) Biological Opinions being prepared under ESA section 7 to address the combined impacts of operations of the Central Valley Water Project and State Water Project on listed species in the Bay-Delta. Under all the alternatives, we would expect average annual Feather River service area deliveries under existing conditions and year 2020 conditions¹

¹ This value is higher than calculated using historical USGS records because it reflects the current level of demand. DWR estimates the range as 613,000 acre-feet per year to 1,057,000 acre-feet per year

to remain 994,000 acre-feet, and average annual South Delta deliveries to increase from the existing 3,051,000 acre-feet to 3,247,000 acre-feet in year 2020. Although annual flows in the Feather River downstream of Thermalito afterbay would remain similar over time, there is a seasonal change in flow distribution with higher flows from May through August and lower flows from September through April under year 2020 conditions as compared to existing conditions.

Comment 121: The Conservation League comments that since the Oroville Facilities are operated by DWR as part of the State Water Project and its compliance with the California Endangered Species Act is currently under consideration by the Alameda Superior Court, the analysis of the project should be delayed until the court decides whether the operation of the State Water Project is in compliance with California law. The Conservation League also notes that both FWS and NMFS re-initiated consultation on the Biological Opinions for the OCAP and since operation of the Oroville Facilities are included in the OCAP Biological Opinions, further analysis of the proposed project and preparation of subsequent drafts of the EIS should be delayed until these Biological Opinions are complete and the findings are incorporated into the environmental analysis.

Response: The continued operation of the Oroville Facilities as a whole may be the subject of a California state legal proceeding, but we do not agree that we should delay our NEPA analysis of the hydroelectric portion of these facilities. If the OCAP should be modified either as a result of the re-initiated consultation on Biological Opinions or an outcome of the court proceeding, the hydroelectric portion of the facility operation could be adjusted accordingly, as long as such modifications are consistent with the license condition. If not, reopener clauses in the license would enable the license to be amended, as appropriate.

Comment 122: Sections 3.3.5.2 and 5.5.2 of the draft EIS state that the project, with the terrestrial habitat protection and enhancement measures proposed in the Settlement Agreement and recommended under the Staff Alternative would likely have a beneficial effect on the bald eagle, giant garter snake, California red-legged frog, Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and valley elderberry longhorn beetle. Yet the draft EIS concludes that the project may be likely to adversely affect these same species. DWR, EPA, and Mr. Flynn ask that the Commission clarify these statements.

Response: As discussed in sections 3.3.5.2 and 5.5.2, although the recommended protection and enhancement measures would likely be beneficial to the federally listed species discussed, various recommended aquatic and recreation protection and enhancement measures could potentially adversely affect the same species. Under the ESA, even if the overall effect of relicensing the project is expected to be beneficial, if all adverse effects cannot be avoided, even if minor or minimal, the proper determination is “likely to adversely affect.” For example, giant garter snake habitat would potentially be adversely affected by several aquatic and recreation protection and enhancement measures, such as the channel improvement program, gravel supplementation and improvement program, fish weir program, and development of recreation facilities; however, implementing the recommended protection and enhancement measures would be beneficial to giant garter snakes by prohibiting or restricting habitat disturbing activities. Section 5.5.2 has been revised to clarify our findings for all the discussed species.

Comment 123: Mr. Flynn notes that the draft EIS omits staff’s conclusions regarding the impacts on the valley elderberry longhorn beetle and instead, repeats the conclusions regarding the impacts on vernal pool invertebrates. He asks that the final EIS include the missing conclusions.

under current conditions and clarifies that the 994,000 acre-feet per year applies to contracts with Western Canal Water District and the Joint Districts Board.

Response: We included our conclusions regarding the valley elderberry longhorn beetle in the final EIS.

Comment 124: With regard to the reservation of section 18 authority (Proposed Article A109) as discussed in section 3.3.5.3, *Cumulative Effects on Threatened and Endangered Species*, Interior comments that the purpose of the Habitat Expansion Agreement is to identify, evaluate, select, and implement actions to expand spawning, rearing and adult holding habitat for anadromous populations in the Sacramento River Basin as an alternative to the resource agencies of other parties seeking fish passage on the Feather River or its tributaries. The exercise of the reservation of authority expressed in Proposed Article A109 must be consistent with the terms of the Habitat Expansion Agreement, which limits that exercise to certain situations. Furthermore, Interior comments that the agreement between DWR and PG&E is an underlying agreement, not the Habitat Expansion Agreement itself.

Response: We have not received the final Habitat Expansion Agreement; however, the pertinent information from the draft Habitat Expansion Agreement (DWR, 2006a) has been added to the final EIS in response to your comment.

Comment 125: Section 3.3.5.4 of the draft EIS addressed the impact of the project on Chinook salmon and steelhead populations in the Feather River and concludes that the Settlement Agreement and other staff recommendations “would ameliorate many of these unavoidable adverse impacts as compared to current conditions.” The California Sportfishing Protection Alliance comments that the “Habitat Expansion Agreement for Central Valley Spring-Run Chinook Salmon and Central Valley Steelhead (Appendix F of the Settlement Agreement) does not adequately mitigate the impacts to anadromous fish from the hydroelectric projects on the Feather and North Fork Feather Rivers.” The California Sportfishing Protection Alliance comments that the \$15,000,000 cap on mitigation is not enough and the cap, as proposed, violates the fish passage requirements of the FPA, as well as the recently issued the Commission’s Settlement Guidelines. The California Sportfishing Protection Alliance proposes that the licensee fund an endangered salmonid restoration program, centered on the north end of the Sacramento Valley.

Response: We understand that the Habitat Expansion Agreement is intended to fully mitigate for any presently unmitigated impacts due to the blockage of fish passage of all fish species caused by the Feather River hydroelectric projects (DWR, 2006a, Appendix F, 12A.) However, as discussed in the EIS, this agreement has not been filed with the Commission and is not included in the scope of our analysis in the final EIS.

The Commission is not compelled under the FPA to mitigate for the original construction of the Oroville Facilities. We find that the measures included in the Settlement Agreement as modified by staff would enhance anadromous fisheries over current conditions.

RECREATIONAL RESOURCES

Comment 126: In section 3.3.6.1, *Other Areas of Recreational Importance in the Project Vicinity*, DWR comments that the draft EIS notes there are several miles of dirt roads, logging roads, and four-wheel drive tracks and trails in the Plumas National Forest. DWR comments that the Plumas National Forest Plan reports “3,700 miles of system roads and 1,200 to 2,000 miles of un-inventoried low standard roads.”

Response: We appreciate the additional information on the miles of system roads and un-inventoried standard roads in the Plumas National Forest and revised the final EIS to state that there are many miles of dirt roads, logging roads, and four-wheel drive tracts and trails in the Plumas National Forest.

Comment 127: Butte County comments that under *Access to the Oroville Facilities* in section 3.3.6.1 of the draft EIS, staff does not include a discussion of the project's burden on local access roads, county roads, and local highways, particularly related to serious traffic problems and road overcrowding. Butte County states that this topic is not substantively addressed or analyzed anywhere in the draft EIS and no measures are proposed to address either the current traffic problems experienced in Butte County or to estimate the future burden on these access roads as a result of the project. Butte County contends that the final EIS should recognize that, as project visitation increases over the term of a new license, so too will adverse effects on local roads.

Response: In section 3.3.7.1 under *Vehicular Access and Roads*, the draft EIS provides a discussion of roads used to access the project, including road conditions. In section 3.3.10.2 under *Road Construction and Maintenance Plan*, the draft EIS addresses the economic effects of the project with respect to roads and road maintenance. According to DWR's September 2003 final study report on Vehicular Access (R-1), traffic congestion on busy weekends was considered to be a temporary constraint to vehicular access, and the Recreation Work Group did not recommend any access road improvements as part of DWR's proposal. In section 5.1.2.5, *Recreation*, of the draft EIS, we recommend approval and implementation of DWR's proposed Recreation Management Plan. The plan includes a recreation monitoring program, which provides opportunities for assessing the effects of recreational use on the project area's resources and reporting those effects on interested parties as well as the Commission. However, DWR's responsibilities for access road improvements would continue to be limited to roads within the project boundary; if used solely for project access.

Comment 128: DWR comments that, under the heading *Recreation within the Project Boundary*, in section 3.3.6.1 of the draft EIS, the average drawdown of Lake Oroville averages more than 50 feet. It averaged 112 feet from 1990 to 2002. Although it ranges from 50 to 75 feet during peak recreation season, the top of this annual range is not always from a "full" (900 feet) pool elevation, so the resultant drawdowns can seem to be of greater footage.

Response: We modified our discussion of Lake Oroville in section 3.3.6.1 of the final EIS to more accurately describe the annual average drawdown of the reservoir and the reservoir drawdown during the peak recreation season.

Comment 129: DWR makes several comments regarding table 42: the Lime Saddle group campground will accommodate 48 people (8 people at one time/site), only the boat-ramp portion of the Enterprise Area is closed when water elevation falls below 830 feet; the Feather River Nature Center is outside of the project boundary and DWR has no responsibility or significant affiliation with it; however, the Sewim Bo trail does emanate/terminate near the Center; only 8 of the 10 picnic sites at the South forebay day-use area are accessible; and DWR has provided an information/interpretive panel at the Model Aircraft Flying facility. DWR notes similar errors in the measures listed in the Staff Alternative in section 5.1.1 of the draft EIS: the name of the visitor center is the Lake Oroville Visitor Center; DWR is not responsible for the Feather River Nature Center; and the South Thermalito forebay is missing from the list.

Response: We appreciate the clarifications and made the appropriate modifications to table 42 and the measures listed in the Staff Alternative in section 5.1.1 of the final EIS.

Comment 130: DWR requests that Camp Area G be deleted from figure 16. DWR notes that camping was prohibited from this area in 2003, due to safety and access concerns.

Response: We appreciate DWR's clarification and modified figure 16 to remove Camp Area G.

Comment 131: DWR comments that the reference to Enterprise as a car-top boat ramp should be corrected in section 3.3.6.1 of the draft EIS, under the heading, *Project Recreation Facilities at Lake Oroville*. DWR points out that access there is free, but only the other five launches names are actually termed “car-top boat ramps.”

Response: We appreciate the information and modified our description of the Enterprise boat launch in section 3.3.6.1 of this final EIS to clarify that it is not considered a car-top boat launch.

Comment 132: DWR points out that in section 3.3.6.1 of the draft EIS, under the heading *Thermalito Forebay*, the “sunset to sunrise” speed limit mentioned is for Lake Oroville, not Thermalito forebay. DWR states that the South forebay recreation area and the water surface are open for day-use only.

Response: The information on speed limits on the South forebay was taken directly from page 5-5 of the March 2004, final study report on Reservoir Boating (R-7). However, we updated our discussion of the Thermalito forebay in section 3.3.6.1 of the final EIS to state that the water surface of the Thermalito forebay is only open for day-use.

Comment 133: DWR comments that undeveloped camping, not dispersed camping, is available in the vicinity of the Thermalito afterbay outlet because the area available for camping is delineated by signs.

Response: We modified the text referring to the camping area near the Thermalito afterbay outlet to clarify that it is delineated by signs.

Comment 134: DWR comments on staff’s discussion of the OWA in the draft EIS including the scope of DFG’s responsibility at the Oroville Facilities. DWR notes that user fees are currently not charged there and points out that hunting for all species is allowed in the OWA.

Response: We revised section 3.3.7.2 in the final EIS to indicate that DFG coordinates with DWR and other agencies to ensure that regulations are enforced in the OWA. We also revised the text to state that user fees are currently not collected and that hunting of all species is allowed in the OWA.

Comment 135: Butte County questions the statement in section 3.3.6.1, *Oroville Wildlife Area* that DFG is responsible for operating and maintaining recreational facilities, posting and maintaining boundary signage and fencing, enforcing codes, and patrolling for illegal uses. Butte County comments that this statement is inaccurate because DFG curtailed its patrol of the OWA in April 2004 and ceased wildlife and recreation management at the project due to lack of funding. Butte County also comments that DFG, to Butte County’s knowledge, does not coordinate with other management agencies in the OWA to ensure that regulations are enforced. The only consistent law enforcement presence in the OWA is provided by the Butte County’s Sheriff’s Office. The county comments that the Settlement Agreement would not adequately address these problems and that the proposed addition of 5.5 DFG positions is completely inadequate to police this 11,870-acre area because the proposed new staffing would not provide for 24/7 law enforcement patrol operations and would not eliminate the need for Butte County law enforcement services. Under the heading *Protection of Vernal Pools (Proposed Article A117)* in section 3.3.6.2, staff states that DWR would protect vernal pools by increasing patrols and/or enforcement related to OHV use. Butte County comments that staff does not explain how DWR would do this.

Response: We discuss DWR’s proposed management plan for the OWA in the draft EIS and note that, among other things, the plan would identify roles and responsibilities for area management, including visitor safety and law enforcement. In section 5.1.1, *Staff Alternative*, of the draft EIS, we recommend including development of the OWA management plan in any license issued for the project. This plan would be approved, and its implementation would be monitored, by the Commission. Any inadequacies

identified during the implementation of the plan would be addressed in a timely fashion. In section 3.3.4.2, *Terrestrial Resources*, of the draft EIS, we discuss DWR's intention to coordinate with DFG to patrol and enforce vehicular closures as part of its proposal to protect vernal pools. Vernal pools included in the OWA should be addressed by the OWA management plan.

Comment 136: Cathy Hodges takes issue with the statement in the draft EIS that horses are not allowed in the OWA except during special permitted events and points out that Section 551(j)(33)(E) of DFG's state and federal area regulations for waterfowl and upland game hunting indicate that horses are allowed in the OWA but are restricted to roads open to vehicles and within 25 feet of exterior boundary fences and that bicycles and horse-drawn carriages are restricted to roads open to vehicles. DWR also provides this information.

Response: The statement in the draft EIS that horses are not allowed in the OWA except during permitted special events was taken directly from page 5-84 of the June 2004, final study report on the Assessment of Recreation Areas Management (R-5). However, we appreciate the clarification and modified our discussion under *Oroville Wildlife Area* in section 3.3.7.1 of the final EIS to specify where horses are allowed in the OWA.

Comment 137: DWR states that our description of that portion of the low flow channel within the project boundary is incorrect and offers suggested text to correct the description: the sentence that states that the last 1.25 miles of the low flow channel, before it enters the OWA, are within the FERC project boundary should be changed to read "the last 1.25 miles of the low flow channel before it joins the Thermalito afterbay outlet, are within the FERC boundary." DWR asserts that the sentence as stated in the draft EIS does not accurately reflect the relationship between the river and the project boundary.

Response: We modified the description in our final EIS so that the sentence describing the relationship between the low flow channel and the project boundary is correct.

Comment 138: DWR points out that the Sewim Bo trail does not include the word "river" as part of its name and also notes that the Feather River Nature Center is not part of the Oroville Facilities.

Response: We appreciate the clarifications and made the appropriate modifications to our references to both the Sewim Bo trail and the Feather River Nature Center in the final EIS.

Comment 139: DWR suggests replacing the phrase "Thermalito Complex" with "Thermalito forebay and afterbay" under the heading *Trail and Trailheads* in section 3.3.6.1 in the draft EIS.

Response: Page 16 of the draft EIS includes a list of commonly used terminology used in the EIS to describe project-related geographic areas. Thermalito Complex is defined in this list as the project features and lands associated with the Thermalito forebay and Thermalito afterbay.

Comment 140: Cathy Hodges comments that the trail use information in the draft EIS is inaccurate and confusing. Specifically she mentions:

1. Staff's discussion of the Sewim Bo trail under the heading *Project Recreation Facilities at the Feather River* in section 3.3.6.1 states that the Sewim Bo trail is hiking only but table 43 lists the trail as multi-use; Ms. Hodges states that the trail use designation may be further complicated if hiking/equestrian grant money was used to construct the trail. Ms. Hodges also notes that the trail is not depicted on figure 17.

2. Some of the hiking/equestrian trails appear to be shown with some small portions combined with multi use designation, which was not approved under the current Recreation Plan.
3. Two sections of parallel trail from the north side of Oroville dam to Burma Road are both identified as “Freeman trail.” Ms. Hodges notes that one of these sections is a mountain bike downhill race course.
4. Figure 17 identifies several sections of trail as “other trails” which do not appear to have identified use designations and were never approved under the current Recreation Plan.
5. Table 43 indicates that the Brad Freeman trail has a bicycle/hiking use designation, when, in fact, certain sections of the Freeman trail are overlaid on top of gravel or dirt roadways which were also commonly used by other trail users for many years.
6. The proposed improvements at the Lakeland Boulevard trailhead do not appear to be listed. Ms. Hodges notes that the parking area there can accommodate at least 30, and probably more, vehicles with trailers, rather than the 15 trailer parking capacity listed in the draft EIS.
7. The multiple-use loop trail around the Thermalito diversion pool that was discussed by the 2001 trails task force is not mentioned in the EIS.
8. The reasonableness of conducting trail studies during the winter in addition to the spring, summer, and fall seasons, particularly if the winter weather is mild.

Response:

1. We modified our discussion under the heading *Project Recreation Facilities at the Feather River* in section 3.3.6.1 of the final EIS to indicate that the Sewim Bo trail is primarily used by hikers but is also used by equestrians and bicyclists; we do not have any information on the funding used to construct the trail. We also modified figure 17 in the final EIS to include this multiple-use trail.
2. We note that about 1,700 feet of the Dan Beebe and Brad Freeman trails follow the same alignment for a short distance on the south side of the Thermalito diversion pool. It is our understanding that a portion of the Brad Freeman trail was washed out down to bare bedrock in 1998, necessitating the shared use of these two trails for a short distance. We recognize that this use may not have been formally approved by the Commission but DWR informed the Commission of this situation in a September 10, 2001, filing, and it has been in place for some time.
3. We have not obtained any other information on a mountain bicycle downhill race course at the Oroville Facilities so we are unsure which of the parallel sections of trail shown on figure 17 is actually the Brad Freeman trail. However, both sections of trail should be designated bicycling/hiking use.
4. We recognize that some of the trails shown on figure 17 were not included in the approved project Recreation Management Plan and not formally approved by the Commission. In a letter filed on March 9, 2002, DWR informed the Commission that DPR planned to begin trail construction in 2003 in the then-undeveloped Potter’s Ravine area northeast of Oroville dam spillway. We can find no other documentation on the Commission’s record of the other

trails at the Oroville Facilities. However, the trails are currently in existence and should be described in the EIS so that we may have a clear understanding of what exists at the project.

5. We realize that portions of the Brad Freeman trail were previously available for equestrian use and note that in its April 2003 request for an amendment to its approved recreation plan, DWR acknowledged that the Brad Freeman trail had been shared use since its development. However, that was not its approved use according to the project recreation plan, and upon issuance of the Commission's August 17, 2004, order denying DWR's request for amendment, DWR is implementing the terms of the approved recreation plan.
6. Table 43 of the draft EIS indicates that about 10 vehicles with trailers may park at the Lakeland Boulevard trailhead access site. Proposed improvements to the Lakeland Boulevard trailhead access site are listed in table 47. Other recommendations for the Saddle Dam and Lakeland Boulevard trailhead access sites, including those made by Ms. Hodges, are discussed under the headings *Proposed Recreation Facilities and Improvements at Lake Oroville (Within 10 Years of License Issuance)* and *Proposed Recreation Facilities and Improvements at Thermalito Diversion Pool (Within 10 Years of License Issuance)* in section 3.3.6.2 of the EIS.
7. A multiple-use loop trail around the Thermalito diversion pool was not proposed by DWR or recommended by any other entity and is therefore not discussed in the draft EIS. However, table 47 in section 3.3.6.2 of the draft EIS lists DWR's proposed demonstration mountain bike trail. Also, table 48 lists DWR's proposal to evaluate the feasibility of providing two new multiple-use trails around the south side of the North forebay and around the north side of the South forebay, creating a loop around the entire forebay and connecting to the Brad B. Freeman trail.
8. In section 5.1.2.5, *Recreation*, of the draft EIS, we recommend that DWR conduct additional surveys and collect additional data within the first 2 years of license issuance during the high use seasons of spring, summer, and fall. We also recommend that DWR develop information with public input representing the various user groups.

Comment 141: DWR comments that figure 17 (page 3 of 3) should list the Bidwell Canyon trail specifically rather than include it as an "other trail" because it is significant enough in its own right.

Response: Figure D-1 in appendix D of DWR's Settlement Agreement Recreation Management Plan did not list the Bidwell Canyon trail specifically but included it as an "other trail," and we duplicated that approach in figure 17.

Comment 142: DWR provides the following comments on table 43: DWR proposes allowing equestrians on all of the Bidwell Canyon trail; there are about 25 parking spaces (2 ADA), 0 restrooms, and 0 trash receptacles available at the Sewim Bo trail; 0 restrooms and 0 trash receptacles are available at the OWA trails; and 1 portable toilet is available at the Lakeland Boulevard trailhead.

Response: We appreciate the clarifications and made the appropriate modifications to table 43 in the final EIS.

Comment 143: DWR states that our characterization of attributing some of the recorded trail use to animals because of improper instrument height in section 3.3.6.1 of the draft EIS under the heading *2002-2003 Estimated Annual Use, Trail Use*, gives the impression that the instruments were installed

incorrectly. DWR points out that, in some cases, specific field conditions required installing the instruments close to the ground.

Response: We appreciate DWR's explanation of the reason why instruments may have been installed closer to the ground and modified our discussion of annual trail use to reflect this explanation.

Comment 144: DWR disagrees with staff's recommendation to delay implementation of the proposed non-motorized trails program in the recreation plan pending a new user and conditions survey of the trails. DWR points to a misinterpretation of user data, indicates that the comprehensive non-motorized trails program does not propose to convert all project trail designations to multiple-use trails, and suggests that language be added to the EIS that the Commission denied DWR's application for an amendment to formal changes in trail designations made by DPR in 2002, pending the results of the Alternative Licensing Procedure. DWR requests that staff reconsider and withdraw its recommendation for additional surveys prior to implementation of the non-motorized trails program.

Response: We revised the final EIS to state that DPR changed trail designations for portions of the Brad Freeman Trail and Bidwell Trail to multiple use in 2002. We also revised section 5.2.1.5, *Recreation*, to clarify that the non-motorized trails program does not propose to modify all of the current project trail designations to multiple use. Regarding the interpretation of use data, we reviewed the user data provided in the survey reports and determined that the data did not represent existing conditions and was not a reliable basis on which to make any final decision on the change of use designations. We continue to recommend that DWR perform additional surveys before making any changes in the existing trail designations. Finally, we agree that the Commission's order of August 17, 2004, stated that a change in designations would be premature given the ongoing relicensing procedure. However, in its order of January 21, 2005, the Commission clearly noted that its August 17, 2004, decision was not meant to prejudge the merits of any future proposals for shared use of project trails resulting from the relicensing.

Comment 145: DWR suggests mentioning that most campers are engaged in other activities, like boating, fishing, and trail use under the heading *2002-2003 Estimated Annual Use, Camping and Other Overnight Use*, in section 3.3.6.1 of the EIS.

Response: We disagree with the need to discuss day-use activities at the Oroville Facilities in a section of the document devoted to overnight use. Other recreational activities noted by DWR are captured under those specific headings.

Comment 146: DWR points out that recreational use surveys were not conducted in the remote areas of the Lake Oroville State Recreation Area where hunting is permitted. DWR also notes that there is very little land available for hunting around the lake within the Lake Oroville State Recreation Area, and most hunting likely occurs on adjacent public and private land.

Response: We appreciate DWR's clarification of hunting opportunities at the Lake Oroville State Recreation Area and modified our discussion of hunting in this area.

Comment 147: Vicki Hittson Weir and George Weir of Pathfinder Quarter Horses submitted two American Horse Council Foundation reports: "The Economic Impact of the Horse Industry on the United States" and "The Economic Impact of the California Horse Industry." The Weirs also submitted the results of the Resource Action (PM&E) Identification Form for the Lake Oroville Recreation Area Trails System for the record. They strongly support the need for separate-use trails at Lake Oroville and do not support the Settlement Agreement Recreation Management Plan.

In addition, Pathfinders supports the Commission's recommendation for 3 years of study prior to any conversion of trails beyond the 1994 Recreation Plan. It also supports the Commission's request for a trails condition inventory and trails maintenance plans. Its requests that all documentation of evidence of trail use, trails maintenance schedules, and all user comments be presented to the Oroville Recreation Advisory Committee and representatives of the equestrian community when requested.

The California Equestrian Trails & Land Coalition supports the need for hiking/equestrian only trails and submitted its June 2005 Safety Considerations for Multi-use Trails. William O. Davis, on behalf of the Action Coalition for Equestrians, Equestrian Trail Riders, and Oroville Pageant Riders, also supports the need for separate-use trails. He comments that not every trail is suitable to multi-use and there is real value in preserving special experiences for each user group. Several of the equestrian groups appreciate the recommendation that further trail user studies be conducted prior to making any conversion decisions.

Response: We appreciate all of the information that has been filed and added the location of your recommended equestrian facility to the final EIS. We note that other entities previously provided the Commission with the California Equestrian Trails and Land Coalition Safety Guidelines and we discuss them in section 3.3.6.2 of the draft EIS under the heading *Trails and Trails Management*. As discussed in section 5.1.1, *Staff Alternative*, we recommend additional trail user studies prior to changing the current trail uses.

Comment 148: The California State Horsemen's Association, Region 2, states that it supports the Recreation Management Plan as included in the Settlement Agreement and notes that the draft EIS appears to ignore the decisions made by the Trail Focus Group that formed the basis of the Recreation Management Plan. The California State Horsemen's Association, Region 2, believes there should be a firm attempt to provide safe and unbiased use of the trails in and around the Oroville Facilities and notes that any changes to the trails should include adequate renovation to ensure the safety of all users. With regard to trail use, the Lake Oroville Bicyclist's Organization comments that, after the agencies have taken reasonable steps to reduce hazardous conditions, they should not be held accountable for the actions of potentially irresponsible trail users.

Response: We did not ignore the recommendations made by the Trails Focus Group as section 3.3.6.2 of the draft EIS shows. We concluded that it would be premature to change all trail designations to multiple use as outlined in DWR's draft Comprehensive Non-Motorized Trails Program included in its proposed Recreation Management Plan. We find insufficient recreational data on which to base any final decision to change trail designations to multiple use based on the concerns of commentors, our 2004 finding that the current recreation plan provides for a unique equestrian experience, the absence of a trail condition inventory, and the apparent existence of trail maintenance problems. We agree with the need to provide safe trails and in our draft EIS recommend that DWR provide information on the condition of the project trails and include monitoring trail conditions in its Recreation Management Plan. Monitoring trail conditions would ensure that project trails are suitable for their designated uses (e.g., sufficient trail width and clearing). We also recommend surveying both the existing trail users and potential trail users.

Comment 149: Tony Rushing comments that recreational opportunities that do not require motorized crafts at Lake Oroville should be enhanced. Mr. Rushing suggests further developing all current access points, including Enterprise and Stringtown boat launches, Bidwell Marina, Loafer Creek, and the Spillway boat launch. Mr. Rushing notes that Foreman Creek is ideal for day use and should be the first area to be further developed rather than limiting access there.

Response: In the draft EIS, we recommend some recreational enhancements at Lake Oroville that do not require the use of motorized crafts including installing picnic tables and pole stoves/grills, providing parking areas, and replacing or providing restrooms. We also recommend conducting a study to

determine the feasibility of providing a swimming lagoon or pool at Lake Oroville to address times when the reservoir level is below elevation 850 feet msl. Please see table 46 in the draft EIS for a detailed list of all of the improvements proposed at Lake Oroville. Note also that we recommend implementation of DWR's proposed Recreation Monitoring Program, as described in section 3.3.6.2 of the draft EIS, which provides a framework for assessing project recreational facilities and provides the opportunity for consulting with interested parties and adjusting recreational facility development. We recommend closing Foreman Creek to recreational use until DWR develops a plan to protect cultural resources and install recreational facilities, including picnic tables and restrooms.

Comment 150: Cathy Hodges comments that the final EIS should include a study of the potential economic benefit to the local community from the availability and development of equestrian trails.

Response: Commission staff does not generally prepare economic analyses of particular recreational activities at a project. Specifically for this project, we do not see the need for a full economic study to help us decide whether changes need to be made to the trail designations. Rather, the relevant criteria include factors such as the activity's relationship to project purposes, whether there is an unmet demand for the activity, and whether the activity can be accommodated at a reasonable cost and without undue conflict with other resources, including plants, animals, soils, water, and other recreational resources.

Comment 151: Cathy Hodges comments that no mitigation is proposed in the draft EIS for the potential future loss of hiking/equestrian trails. Ms. Hodges notes that there is also no mention of mitigation for an additional campground in the Loafer Creek area that was proposed during relicensing, and would affect trails in the area.

Response: There is no information in DWR's draft Recreation Management Plan on a proposed additional campground in the Loafer Creek area; two new group RV campsites have been proposed near the existing Loafer Creek group campground and their construction would not affect any trails in that area. However, DWR proposes constructing a new campground loop (30 to 38 campsites) at the Bidwell Canyon campground adjacent to the existing loop. If this improvement is approved, we realize that the Bidwell Canyon trail may need to be relocated. Any modifications to trail locations would be addressed by DWR in its Comprehensive Non-Motorized Trails Program. If DWR determines that it cannot locate the new campground loop in the Bidwell Canyon campground, it proposed providing 15 new RV/tent campsites between the north and south loops of the Loafer Creek campground. It does not appear that construction of these sites would affect any trails in the area. Additionally, we recommend that DWR include monitoring trail conditions in its Recreation Management Plan to ensure that project trails are suitable for their designated uses. If trail designations are modified in the future, it would be as a result of monitoring.

Comment 152: The Water Board and Butte County note that our discussions of the *Comprehensive Water Quality Monitoring Program (Proposed Article A112)* and *Public Education Regarding Risks of Fish Contamination (Proposed Article A114)* in sections 3.3.2.2 and 3.3.6.2 of the draft EIS conclude that several swimming areas at the Oroville Facilities are contaminated by pathogens with concentrations often exceeding water quality objectives. The Water Board and Butte County comment that the draft EIS does not identify or mandate effective mitigation measures. Butte County comments that the final EIS should specify that DWR should not only monitor water quality and provide warnings, but should take immediate corrective actions to remedy water quality problems.

Butte County comments that the recommendations supported by staff are inconsistent with each other because Section 5.1, *Comprehensive Development and Staff Alternative*, of the draft EIS states that the alternative recommended measures "would improve socioeconomic conditions and recreational opportunities at the project." Butte County suggests that the need to post signs warning of contamination

of the water on a continuous basis, with no mandate to improve water quality, will not improve recreational opportunities. Butte County also suggests that DWR should develop more swimming areas with easy access and appropriate amenities in other parts of the project.

Response: As discussed in section 5.1.1, *Staff Alternative*, of the draft EIS we recommend that DWR develop a comprehensive water quality monitoring program to monitor organic and inorganic constituents and physical parameter levels that may affect beneficial uses for surface waters (Proposed Article A112). We also recommend that DWR monitor bacteria levels at eight public swimming areas and provide public notice and/or education (Proposed Article A113). We discuss how public education and deterring waterfowl presence at the swim area could reduce bacteria loading. Through regular monitoring, as required by a pathogen monitoring plan, bacterial contamination at the swim areas would be identified and the appropriate warnings be provided; however, due to the location of the swimming area, it may not be possible to eliminate the need to post public notices at the swim areas. We note in table 46 in the draft EIS that DWR proposes to conduct a swimming and day-use feasibility study (swimming lagoon or pool onsite or at an alternative location) to address times when the reservoir level is below 850 feet msl.

Comment 153: DWR notes that the January 2005 Recreation Management Plan was largely based on the work of the Recreation and Socioeconomics Work Group, and then was further developed through settlement negotiations resulting in the March 2006 Settlement Agreement Recreation Management Plan.

Response: We appreciate DWR's clarification of the development of the Recreation Management Plan and modified our discussion of it to reflect the information provided.

Comment 154: Under the heading *Recreation Management Plan Programs* in section 3.3.6.2 of the draft EIS, staff notes that the Commission's regulations (18 CFR §2.7) allow licensees and operators of recreational facilities to charge reasonable fees to users of such facilities, thus proposing that the current DPR boat launch fees are "reasonable." Butte County comments that the draft EIS does not provide information upon which to base this conclusion. In addition, Butte County comments that the draft EIS lacks a discussion of the totality of the circumstances under which the project is managed and fails to explain why such grossly disparate management of the Oroville Facilities is reasonable.

Response: We obtained additional information on user fees from the California state parks and Shasta Lake websites and include this information in the final EIS. The annual user pass for Lake Oroville may be used at 96 other state parks besides Lake Oroville, but the Shasta Lake annual pass may only be used at Shasta Lake. Additionally, the annual user pass for Lake Oroville is good for one year from the date it is purchased, and the annual user pass for Shasta Lake is only valid for the calendar year. For these reasons, the cost of an annual pass needed to launch a boat at Lake Oroville is reasonable. We also note that the one time day-use fees for these two areas are similar: \$9.00 at Lake Oroville and \$8.00 at Shasta Lake.

In sections 3.3.6.1, 3.3.7.1, and 3.3.9.1 of the draft EIS, we describe the responsibilities of the various agencies managing portions of the Oroville Facilities. However, as licensee of the Oroville Facilities, DWR is ultimately responsible for maintaining the project facilities according to the current project license.

Comment 155: DWR notes that DPR sets fees in the Lake Oroville State Recreation Area and suggests listing DPR as the entity who would review and assess fees consistent with day-use and camping fees at other, comparable units of the State Park System under the heading *Recreation Operations and Maintenance Programs* in section 3.3.6.2 of the draft EIS. DWR also notes that the annual pass for launching/parking at Lake Oroville (with similar privileges at about 95 other state park units) was lowered to \$165.00 in January 2006 from \$200.00. DWR contends that an annual user pass at Shasta

Lake is not “similar” in that it does not allow access to other reservoirs, lands, and facilities. DWR also notes that footnote 77 should reflect that the new MOU will not be finalized until the terms of license issuance are clear; it is proposed to be added as an appendix to the Final Recreation Management Plan.

Response: We recognize that DPR sets the fees at the Lake Oroville State Recreation Area. However, as the licensee for the Oroville Facilities, DWR is ultimately responsible for managing the project facilities and in that capacity provides oversight of any actions taken by any other agencies in the project area, including setting user fees. We appreciate DWR’s correction of the cost of the annual pass for Lake Oroville and its explanation that the pass may be used at other state park facilities. We modified our discussion of annual passes in the final EIS to reflect this information, as well as additional information we obtained from the California state parks and Shasta Lake websites. We also appreciate DWR’s clarification of the status of the Memorandum of Understanding between it and DPR.

Comment 156: DWR comments that the references to annual reporting under the heading *Recreation Monitoring Program* in section 3.3.6.2 and under the heading *Recreation Monitoring* in section 5.1.2.5 of the draft EIS, are incorrect. DWR points out that the Settlement Agreement Recreation Management Plan proposes biennial reporting to the Commission and the Recreation Advisory Committee, the same frequency established by the Commission in 1994 and followed currently.

Response: We appreciate the clarification and modified our discussion of the proposed reporting frequency in DWR’s proposed Settlement Agreement Recreation Management Plan in the final EIS.

Comment 157: The California Sportfishing Protection Alliance comments that requiring the members of the Recreation Advisory and Ecological Committees to sign the Oroville Settlement Agreement to participate is unacceptable. Under the heading *Recreation Management Plan Review and Revision Program* in section 3.3.6.2 of the final EIS, DWR suggests acknowledging that Butte County would need to sign the Settlement Agreement to become a member of the Recreation Advisory Committee. DWR makes a similar suggestion for footnote 88.

Response: We will consider the issue of membership of advisory committees established under the Settlement Agreement in any order issued for the project.

Comment 158: DWR suggests adding the Roy Rogers trail to table 46 since it has proposed changing the use designation on a short reach of this trail to allow bicycles to access the Loafer Creek Campground from the Saddle Dam trailhead, without encroaching in the vicinity of the Loafer Creek Equestrian Campground.

Response: We included all of the proposed trail modifications in table 50, *Current and proposed trail designations for project trails*. A footnote to the table indicates that a portion of the Roy Rogers trail would be opened to bicycle use. However, we also added the Roy Rogers trail to table 46 in the final EIS, so that all of the proposed recreational improvements actions at Lake Oroville are listed there.

Comment 159: DWR notes that the Lakeland Boulevard and Saddle Dam trailheads are day-use areas that are open from dawn to dusk, so use after dark is discouraged; overnight use and parking are not appropriate at these locations. DWR points out that it has already improved the sites with hitching posts for horses and explains that tying horses to trees in these areas is prohibited by California Public Resources Code Section 4359(b). DWR believes that the existing restrooms, which are typical of non-beach type day-use areas, are adequate for current and projected future use. DWR also notes that the statement that no restrooms are available at the Lakeland Boulevard trailhead is inaccurate because it maintains a portable restroom there. DWR notes that a new and accessible vault restroom is proposed for the nearby new Diversion Pool day-use area in the Settlement Agreement Recreation Management Plan.

Finally, DWR states that its use data from 2001-2004 do not indicate that equestrian use is higher in the off-season but points out that the Settlement Agreement Recreation Management Plan includes monitoring protocols and triggers that reflect off-season use.

Response: We recognize that the Saddle dam and Lakeland Boulevard trailhead access sites are day-use areas. However, equestrians are more likely to use these access sites in the cooler months when there are fewer hours of daylight and may need to load their horses and gear in the late afternoon as the sun is going down. Therefore, we continue to see a benefit to providing lighting in the parking lots of these locations. We appreciate DWR's clarification regarding the portable restroom at the Lakeland Boulevard trailhead access; we modified our discussion of this site to include this information. We also appreciate the information DWR provided from the California Public Resources Code and include this citation in our discussion of these trailhead access sites. We recognize that table 7.3-1 in DWR's Settlement Agreement Recreation Management Plan defines the recreation season for trailheads as April and May in the spring and September and October in the fall. We do not have access to the 2001-2004 use data that DWR cites because it has not been filed in the public record. We were unable to differentiate equestrian trail users from other trail users during our review of DWR's February 2004, final study report on Existing Recreation Use (R-9).

Comment 160: DWR provides the following comments on table 50: Potters Ravine trail is currently designated as multiple-use with the exception of a short pedestrian-only segment near Spillway Cove, and the service road bicycle access to Saddle dam is currently closed to the public (not proposed, but not yet constructed, as indicated in the table).

Response: We appreciate the clarifications and made the appropriate modifications to table 50 in the final EIS.

Comment 161: The Lake Oroville Bicyclist's Organization comments that, under the heading *Trails and Trail Management* in section 3.3.6.2 of the draft EIS, it is not accurate to imply that all multi-use trails are wider than single-use trails. The group also comments that the language in footnote 82 suggests a recommendation of a 6-foot minimum for multi-use designation.

Response: In the chapter on mountain bike trails in its 1991 Trail Handbook, DPR states that "mountain bike trail standards should accommodate multiple-use or in some cases be limited to mountain bicyclists and restricted to other use (i.e., hiking). In general, trails need to be wider, have greater sight distance, have more passing room between users, and have less slope." In another paragraph, DPR states that "trail tread widths of 60 inches allow for passing of two user groups on the trail surface." The guidelines cited in footnote 82 are from the California Equestrian Trails and Lands Coalition and recommend a trail width of a minimum of 6 feet to allow equestrians and bicyclists to safely pass.

Comment 162: The Lake Oroville Bicyclist's Organization comments that the staff analysis in section 3.3.6.2, *Environmental Effects: Trails and Trail Management* excluded relevant information and failed to meet the National Environmental Policy Act's requirements for thorough, objective analysis. The Lake Oroville Bicyclist's Organization further comments that staff is incorrect in its assertion that some recreational data used by DWR in the preliminary draft environmental assessment may be inaccurate because data were collected when trails were managed for multiple use instead of their approved designation. They argue that project trails were being operated as permitted by the Commission during the study period.

Response: The analysis of trail management is based on the best available information from recreational trail studies conducted by DPR and DWR and was updated as new information became available. Analysis in the final EIS has been modified to include updated information on trail mileages and

conditions provided in DWR's year 2 progress report on Recreational Facilities and Operations Effects on Water Quality – Recreational Trails (SP-W3) filed with the Commission on January 26, 2007. In response to 2002-2003 study data, we do not argue that trails were operated outside of permitted designation, but that trail use estimates may not reflect the estimated use at the project as it is currently licensed. Further, DWR states in its report that the data, as collected, did not permit accurate estimation of proportional trail use presented in the preliminary draft environmental assessment. We continue to recommend further monitoring of trail use under the Recreation Management Plan and an additional trail condition inventory prior to changing trail use designations.

Comment 163: The Lake Oroville Bicyclist's Organization comments that the trail condition inventory recommended in section 5.1.2.5, *Recreation: Trail Condition Inventory* is unwarranted. They argue that Proposed Trail Maintenance Changes in Appendix D of the Recreation Management Plan propose monitoring trail conditions and need for special maintenance per the draft RMP Recreation Monitoring Program.

Response: We agree that monitoring of trail conditions per the Recreation Monitoring Plan is recommended in Appendix D of the Recreation Management Plan. However, the final EIS section 5.1.2.5, *Recreation: Trail Condition Inventory* states that although recreation monitoring indicators and standards listed in table 7.3-1 of the Recreation Management Plan include monitoring trail *use*, they do not include monitoring trail *conditions*. We continue to recommend incorporating trail condition inventories similar to reporting on visitor use and capacity into the Recreation Management Plan.

Comment 164: DWR notes that staff mentions both 37 and 27 comment letters filed in opposition to the proposed trails plan and supposes that one of the numbers is a typographical error.

Response: We acknowledge our error in mentioning 27 filings; the Commission received 37 filings in opposition to the proposed trails plan.

Comment 165: DWR states that the Bidwell Canyon trail (from Saddle dam trailhead north several miles) is proposed to be multiple use (i.e., opened to equestrians) even though it is currently open to hiking and bicycling only. DWR is not sure that this is conveyed correctly in figure 18. DWR also comments that the Dan Beebe trail may have been constructed as a narrow, single-track trail where two horses could not travel side by side due to circumstances and constraints at the time but thinks that it is misleading to state that the trail was "designed" this way. The Lake Oroville Bicyclist's Organization points out that in his August 31, 2001, letter to the Commission, Raymond D. Hart, Deputy Director at DWR states that the Dan Beebe trail was originally designed as a four-foot-wide trail and that trail users have become accustomed to a narrower trail due to sporadic trail maintenance. DWR also contends that it is more appropriate to use the guidelines developed by DPR than the ones draft by the California State Horsemen's Association.

Response: We modified page 2 of figure 18 of the final EIS to clearly indicate that the Bidwell Canyon trail is proposed to be multiple use. Since we have been unable to locate any other historical information on the design and/or the construction of the Dan Beebe trail other than the information cited, we propose that using either "design" or "construct" is equally correct in this case and it is unnecessary to modify the text. We agree with DWR that incorporating DPR's updated guidelines into the recreation management plan is appropriate, and we revised the text in section 3.3.8.2 to clarify this.

Comment 166: DWR points out that the section of the Bidwell Canyon loop trail accessible to bicyclists is also available to hikers and that we should add that user group to our discussion of this trail under the heading *Trails and Trail Management* included in section 3.3.6.2 of the EIS. DWR believes this is necessary to provide a more accurate comparison of the sections of the loop trail.

Response: We modified our discussion of the Bidwell Canyon trail under the heading *Trails and Trail Management* in section 3.3.6.2 of the final EIS to clearly indicate that hikers are allowed on the entire trail.

Comment 167: DWR comments that it is incorrect and misleading to state that equestrians and bicyclists do not share trails and states that they do so successfully in many places throughout the United States. DWR also notes that the majority of hiking/biking trails at the Oroville Facilities are not flat, paved trails, rather they are often unpaved, gravel roads such as around Thermalito afterbay.

Response: Staff's statement that equestrians and bicyclists do not share trails was intended to be specific to the Oroville Facilities. We modified our discussion in the final EIS to make that more clear. We also had an opportunity to review DWR's year 2 progress report on Recreational Facilities and Operations Effects on Water Quality – Recreational Trails (SP-W3), which DWR filed with the Commission on January 26, 2007. In this report, DWR provides detailed information on the locations of the trails throughout the project area and the composition of the surfaces of those trails. We modified our discussion of the trail surfaces in the final EIS, based on the information provided in this report.

Comment 168: DWR comments that the demonstration mountain bicycle trail nominated as an interim project was dismissed by the Interim Projects Task Force because of its complexity. DWR notes that it needs to acquire rights-of-way outside of the project boundary for the demonstration mountain bicycle trail, which may affect the timing of its development. DWR also points out that it has proposed investigating the feasibility of constructing a new 2- to 4-mile trail. If feasible, construction of the trail may occur with some supplemental benefits funds for trail segments outside the project boundary, but is contingent upon topographic, jurisdictional, and ownership/easement constraints. DWR also notes that this trail may not be feasible at all. DWR also comments that staff has overstated the possibility of physical changes to the Dan Beebe trail. DWR states that most changes to trails are hardly permanent, which is why trails and adjacent vegetation need to be maintained. The Lake Oroville Bicyclist's Organization comments that DWR never proposed to construct the demonstration mountain bicycle trail, only to further investigate its feasibility. The group also notes the preponderance of documentation showing that the Dan Beebe trail has been maintained to local multiple-use trail standards since 2001 and that this level of maintenance will continue regardless of user designations. The group comments that bicycle use on project trails has only been restricted from 1989 to 2002 and from 2004 to the present, not "historically" as stated in the draft EIS.

Response: We appreciate DWR explaining the reason why the demonstration mountain bicycle trail was not completed as an interim project and realize that DWR proposes exploring the feasibility of completing such a trail in its Recreation Management Plan. We also realize that in March 2001, DPR modified the Dan Beebe trail so that it is consistent with the standards for Class I trails in the 1991 DPR Trail Handbook and DPR's 1996 "Vegetation Management Guidelines for Trails and Roads." These standards address safety issues, aesthetic considerations, and accessibility for various types of skill levels and activities. According to DPR's standards, the Dan Beebe trail tread would need to be widened and the lines of sight increased to meet multiple use trail standards. We continue to conclude that these changes would be undesirable to equestrians and may be unnecessary if the trail proposed by DWR is completed.

We are not sure why the Lake Oroville Bicyclist's Organization asserts that bicycle use on project trails has only been restricted from 1989 to 2002 and from 2004 to the present. In DWR's Recreation Plan, which the Commission approved in 1994, DWR notes that the existing project trails were used primarily by horseback riders. In its August 31, 2001, filing with the Commission DWR notes that the Dan Beebe trail was built in the 1960s and is intended for equestrians and hikers.

Comment 169: DWR comments that the regional data that were available at the time of the relicensing studies had several major limitations in terms of its geographic basis and activity definitions and therefore, staff was unable to adequately express the regional recreation demand data germane to trails in the project area in the draft EIS. DWR discusses more recent data provided by the National Survey of Recreation and the Environment (NSRE) indicating that 28.3 percent of all people 16 years of age and older participate in mountain bicycling, as compared to 8.6 percent of people 16 years of age and older who participate in horseback riding on trails. DWR believes that this information is much more representative of the project area and provides a much stronger basis for demand conclusions.

DWR also suggests that staff's conclusion that there may be only slightly greater demand for more bicycle trails than equestrian trails is based on an incomplete interpretation and understanding of the survey results presented in table 51. DWR notes that even though the survey data appear to indicate a moderate level of demand for additional unpaved bicycle trails and equestrian trails throughout the project area, this demand level is greater than actual demand because less than 10 percent of the survey respondents were participating in mountain biking or horseback riding.

Furthermore, DWR comments that it is incorrect to state that most equestrian-only trail elimination would occur in the vicinity of the Thermalito diversion pool. DWR notes that it has proposed converting only about 4 to 5 miles of trails to multiple-use there. DWR asserts that the Commission's conclusion that "there is almost equivalent demand for equestrian and bicycle trails at the project" is not supported by available data (including the NSRE data that it referenced). DWR also states that the number of equestrian riders deterred from using the trails when the designations were changed is negligible, and the claims perhaps even false. With regard to its data collection, DWR notes that most data errors tend to overstate visitation and the Commission's assumption that use might have been measurably different during the study period is unreasonable. DWR notes that its "proportional trail use data" were, in part, based on survey responses, not infrared trail counters.

Response: We reviewed the August 2006, *Recreation & Tourism Statistics Update* available through NSRE's website (www.srs.fs.fed.us/trends/RECUPDATES/recupdates.html) and note that in the vicinity of the Plumas National Forest, of the individuals aged 16 and older who were surveyed from 2000 and 2004, 28.3 percent participated in mountain bicycling and 8.6 percent participated in horseback riding on trails. NSRE notes that this participation could have occurred in any outdoor setting (national forest, park, private land, etc.). NSRE also reported national trends in outdoor activity participation from September 1999 to February 2004 and while it found that in general, participation in outdoor recreation activities had increased in that time period, participation in mountain bicycling and horseback riding on trails remained steady during that time period with neither activity increasing or decreasing. We note that the percentage of the population participating in mountain bicycling was higher (21 percent) than the percentage of the population participating in horseback riding on trails (8 percent), which would reflect the regional information provided by NSRE. This information shows that regionally and nationally, more people participate in mountain bicycling than participate in horseback riding on trails. However, based on information on the record for this licensing proceeding, we surmise that both mountain bicycling and horseback riding trails at the Oroville Facilities are in demand and we continue to conclude that there is an equivalent demand for equestrian and bicycle trails in the project area.

With regard to DWR's concern with the information presented in table 51, we can assume that the information reported by DWR in its study report R-13 was equally inflated for all locations cited (sub-areas). Therefore, even though the numbers appear to show a moderate demand for all trails, the actual demand also may be low for all trails.

We realize that only about half of the Dan Beebe trail, which is currently designated for hiking and equestrian use, is located at the Thermalito diversion pool and modified our discussion of demand for

trails at the Thermalito diversion pool to indicate that only about half of the trails there are designated for equestrian use. DWR notes that it proposes to open the Burma Road/Brad Freeman trail to equestrians at the Thermalito diversion pool. It appears that means that DWR will reopen this section to equestrian use since it indicated in its April 2003 amendment request application that this section of trail was shared use, allowing hikers, bicyclists, and equestrians.

We are not sure why DWR suggests that equestrians may have actually used trails that bicycles were using when they filed letters with the Commission indicating that they did not. We have no other information except for the information on the record for this proceeding. We recognize that DWR's proportional trail use data were not related to the infrared trail counters; in the draft EIS we clearly state that DWR reported that the data, as collected, did not allow it to accurately determine the proportion of each type of trail use, which led us to question the proportional trail use estimates.

Comment 170: DWR states that it convened various trail users groups to discuss trail designations because both bicyclists and equestrians wanted more access, not just bicyclists as staff suggests. DWR also notes that it is incorrect to deduce that "appeal to bicyclists" is the rationale it used when crafting proposed trail designations. DWR states that stakeholder advocates and the settling parties included equestrians who seek more loop-travel opportunities and a greater selection of project trails to access, as well as thoughtful non-users who advocate the best use of the project's recreational resources. The Lake Oroville Bicyclist's Organization comments that the need or demand for improved access to existing project trails is documented in the January 2005, Oroville Facilities Relicensing Recreation and Socioeconomics Study Reports Addenda and Errata.

Response: In its February 26, 2002, letter to the Commission, DWR points out that the 41-mile long loop mountain bicycle trail at the Oroville Facilities is fairly flat and is located on fire roads and the gravel levee roads adjacent to the Thermalito forebay and afterbay, which are located in grasslands with little shade during the summer. DWR states that DPR had been approached numerous times by mountain bicyclist organizations requesting access to the rest of the existing trail system, where the trails are more scenic and technically more challenging. DWR also cited DPR policy that all new trails would be built to multiple use standards. We recognize that there may be loop travel opportunities at the Oroville Facilities but also note that many equestrians informed us that they are not willing to place their horses in an environment where they could contact asphalt or other hard surface. We continue to recommend that before making changes to the existing trail designations, DWR revise the Recreation Management Plan and the draft Comprehensive Non-Motorized Trails Program to allow for the inclusion of trail maintenance standards and data collection that reflects existing trail designations, including: (1) a trail condition inventory relative to the trail maintenance standards within the first year of the license; (2) visitor use surveys (on-site and mail-back, including methodology to focus on multiple use and user conflicts); (3) additional trail use data; (4) surveys of users who are not using the trails to determine latent demand; (5) trail feasibility investigations (as proposed); and (6) use all of this information to make final recommendations regarding a need to change the trail designations.

Comment 171: DWR contends that the shared-use trails connecting the three disconnected sections of equestrian/hiker-only trail sections in its proposal are short, not unlike a section of shared trails that exists here under current conditions. DWR also points out that the short, paved sections of trail are available to equestrians and that it retained equestrian access over the paved Oroville dam at the equestrians' request. DWR realizes that paved areas are not ideal for equestrians but believes that they are tolerable and are currently used in short lengths. DWR also states that equestrians would not need to travel over the spillway for a loop opportunity even though they are allowed to; they could use the Freeman and Beebe trails on the south side of the diversion pool. DWR states that its Proposed Action would increase loop trail opportunities for equestrians and notes that a loop trail opportunity would be created by opening Burma Road (Freeman trail) to equestrian use in this part of the Lake Oroville State Recreation Area.

Response: Under DWR's proposal, the 4.0 mile-long Roy Rogers trail would remain the primary hiking/equestrian trail. A short section of this trail would be opened to bicycle use, which must be the short connecting segment described by DWR in its comments. The only other section of trail available only to hikers and equestrians is the Sycamore Hill section of the Dan Beebe trail which is quite a distance from any other hiker/equestrian only trails. We recognize that paved sections of trail would be available to equestrians under the Proposed Action, and we modified our discussion of trails to clarify that those sections would not be desirable to many equestrians. Again, as stated in the draft EIS, we cannot determine at this time, what, if any, changes to make in trail designation.

Comment 172: DWR comments that it has completed Study Plan W3 (Phase 2) that evaluates erosion and trail conditions and that monitoring of trails and erosion will continue as proposed. DWR notes that the report was finalized after the license application was submitted and will be filed prior to issuances of the final EIS. DWR also notes that DPR reviewed the condition of all of the trails in the Lake Oroville State Recreation Area in 2006 for maintenance needs. DWR comments that the case histories provided by equestrians opposed to the proposed trail designations and cited in the draft EIS are exaggerated and not relevant to project trails. The Lake Oroville Bicyclist's Organization comments that staff is disingenuous to imply that the Settlement Agreement Recreation Management Plan lacks either maintenance standards or a trail condition inventory. DWR states that the project has a documented, safe history with respect to trail user safety and it disputes any assertion that its data are inadequate. DWR is not aware of equestrians with disabilities encountering problems on project trails, and believes that the implementation of the Settlement Agreement Recreation Management Plan will provide ample resources for this user group.

Response: DWR filed its year 2 progress report on Recreational Facilities and Operations Effects on Water Quality – Recreational Trails (SP-W3) with the Commission on January 26, 2007. We modified our discussion of the condition of the project trails in the final EIS to include the information provided by DWR. DWR has not provided DPR's list of maintenance needs for the project trails. In the draft EIS, we stated that we would not debate whether user conflicts on the trails would or would not occur, but concluded that the proposed trail designations, at a minimum, could create the potential for conflicts. We also are not aware of any equestrians with disabilities encountering problems on the project trails, but note that a safe environment should be provided for that user group.

Comment 173: In response to staff's recommendation that DWR revise the Settlement Agreement Recreation Management Plan to establish standards for maintaining developed recreation facilities, including trails, DWR notes that maintenance standards, including trail maintenance standards, exist and will be a component of the Final Recreation Management Plan by reference. DWR comments that trail maintenance standards are included in DPR's Trails Handbook and are already included in the Settlement Agreement Recreation Management Plan in section 8.0, *References*. Under the heading, *Maintenance*, in section 3.3.6.2 of the draft EIS, DWR comments that the current DPR Trails Handbook and related guidelines provide a reasonable "consistent measure" for managing project trails. DWR notes that it would be appropriate to follow these standards when and if they are superseded, but doesn't think that waiting for their uncertain development is warranted or reasonable.

Response: We modified our discussion of the trail maintenance standards in the final EIS to note that the current Trails Handbook is incorporated into the Recreation Management Plan by reference. However, we continue to conclude that any updated guidelines should be made available as part of the Recreation Management Plan or as an appendix to the plan.

Comment 174: DWR notes that the 1944 legislation, staff cites, which established the California Riding and Hiking Trails Project, was repealed in 1974. DWR notes that the citation makes no mention of the

Beebe trail. Based on a personal communication, DWR points out that the Dan Beebe trail was surveyed for development by DPR employees in 1960 or 1961. Finally, with regard to the statement that staff can find no evidence on record to support historic designation of particular trails, DWR comments that it would be helpful to clarify that the Commission could neither find evidence that the trail exists from or was constructed because of 1944-era legislation.

Response: DWR correctly notes that the Equestrian Land Conservation Resource did not mention the Dan Beebe trail specifically in its discussion of the California Riding and Hiking Trail, which we found on its website (www.elcr.org). In fact, the Equestrian Land Conservation Resource does not mention any specific segments of the California Riding and Hiking Trail. However, based on several filings with the Commission, including one from George Cardinet, who was one of the framers of the California Riding and Hiking Trail laws, we are comfortable connecting the Dan Beebe trail to the California Hiking and Riding Trail.

Comment 175: Under the heading *Fish Weir Program (Proposed Article A105)* in section 3.3.6.2 of the draft EIS, DWR notes that angling closures may result from seasonal operation of the weirs also, as well as from their installation. The expectation of improved angling opportunities is contingent upon future angling regulations and DWR notes that the temporary adverse effect described in the draft EIS could be locally permanent, also depending on future angling regulations.

Response: We modified our discussion of the Fish Weir Program in section 3.3.6.2 of the final EIS to note that future angling regulations and implementation of the fish weir program may negatively affect angling opportunities in the Feather River channel.

Comment 176: Under the heading *Flow/Temperature to Support Anadromous Fish (Proposed Article A108)* in section 3.3.6.2 of the draft EIS, DWR disagrees that the proposed flow increases (i.e. an additional 100 cfs baseline, an additional 200 cfs during spawning periods and potentially up to 900 cfs for temperature control purposes) are minimal. In addition, for geographic name consistency, DWR notes that Mile Long Pond and One Mile Pond are the same. DWR points out that the name One Mile Pond is more conventional and suggests that it be used in this instance.

Response: We agree that the proposed increases in minimum flow release are significant relative to fisheries habitat, but continue to find the increases minimal relative to the effects on recreational boating. We revised the final EIS to refer to One Mile Pond.

Comment 177: Under the heading *Oroville Wildlife Area Management Plan (Proposed Article A115)* in section 3.3.6.2 of the draft EIS, staff suggests that it would be more efficient to re-evaluate the OWA plan every 6 years. DWR notes it may be more practical to coordinate the schedule with DFG updates. DFG has a 2-3 year cycle for regulation changes, and DWR suggests using this shorter recurring period which could coincide with the 6-year period recommended in the draft EIS.

Response: We agree that it would be more practical to coordinate the re-evaluation of the OWA plan with DFG updates. Providing DFG updates every 2 or 3 years would still allow the Recreation Advisory Committee to synchronize its updates of the Recreation Management Plan with the OWA plan and we recommend this update in the final EIS.

Comment 178: In section 3.3.6.2, *Minimization of Disturbance to Nesting Bald Eagles*, DWR comments that other bald eagle territories are partially within the project boundary and that Potter Ravine bald eagle nest territory has been abandoned during the last two nest seasons.

Response: According to the Draft National Bald Eagle Management Guidelines (FWS 2006), over most of the United States, after 5 years of disuse, the probability of an alternate bald eagle nest becoming active is considered remote enough that protection from disturbance is no longer necessary. Therefore, although the Potter Ravine nest territory has not been used for the last two nest seasons, the EIS continues to consider it an active nest territory. Section 3.3.6.2 has been revised to include mention of the other bald eagle territories.

Comment 179: DWR notes that dog trials may still occasionally be allowed in certain locations of the project under Special Use Permit and suggests changing “eliminating” this recreational opportunity to “reducing” this recreational opportunity under the heading *Protection of Giant Garter Snake (Proposed Article A119)* in section 3.3.6.2 of the draft EIS.

Response: We appreciate DWR’s additional information and modified our discussion of the effects of protecting giant garter snake habitat on recreation.

Comment 180: Butte County and several Butte County residents comment about the need to maintain recreational access to Foreman Creek. Mary Keiser comments that, while she understands the need to protect sensitive cultural sites at Foreman Creek, a complete closure of the community park should not be considered. She comments that the maintenance of Foreman Creek has been minimal, at best, and suggests that the state has not devoted resources to Foreman Creek because it is not a revenue-producing public area. Butte County and others comment that there is little “no cost” access to Oroville Lake and that one of the only free access sites is at Foreman Creek. Its closure would further reduce the “no cost” options to access recreation at the project. Several Butte County residents expressed similar concerns; adding that sensitive cultural areas should be segregated, while maintaining public access to Foreman Creek. Butte County suggests that DWR be required to provide another access road into the Foreman Creek area or be required to develop other recreational facilities on Lake Oroville which provide shallow water opportunities similar to those currently provided at Foreman Creek.

Response: We understand that the Foreman Creek access affords inexpensive access to Lake Oroville and is important to residents in the immediate vicinity. DWR proposes to develop a plan to improve the recreational facilities at Foreman Creek and confine usage to designated areas. While the draft plan is very specific relative to the recreational upgrades, it is vague relative to how cultural sensitive areas would be protected. We continue to recommend a short-term closure of the Foreman Creek access to allow the development of a plan that would detail how cultural resources would be protected. We indicate in our discussion in section 5.1.2.7 that the plan should consider whether development of comparable recreational opportunities elsewhere in the vicinity of Foreman Creek would be warranted.

Comment 181: DWR requests that staff reconsider its recommendation to close Foreman Creek to recreation while a plan to protect cultural resources is developed. DWR cites actions that have already been taken, with the Commission’s approval, to minimize the impacts on cultural resources, including the restriction of vehicle access to designated areas and roads which relieve the vast majority of recreation disturbances to sites in the fluctuation zone. SWC and Metropolitan also comment that staff should reconsider its recommendation to close Foreman Creek to recreation while a plan is developed. SWC and Metropolitan support DWR’s proposal for improvements to Foreman Creek. Berry Creek Rancheria of Maidu Indians comments that DWR’s proposal for continued recreation at Foreman Creek would not adequately protect cultural resources. Specifically the Tribe points to the fact that cultural resources are concentrated along the car-top boat ramp and that restricting use of the boat ramp or rerouting access would not prevent damage to these resources. The Tribe supports the closure of the boat launch at Foreman Creek, but comments that this should not be a temporary measure, but a permanent one. In light of these comments, the Tribe suggests that the issue moving forward is whether or not another boat launch is needed in light of existing recreational facilities. If an additional boat launch is needed, it

should be placed west or north of the Foreman Creek campground so as not to affect cultural resources. Berry Creek Rancheria, Mooretown Rancheria, and Enterprise Rancheria also comment that the recreational facilities at Foreman Creek are one of 35 in the project area. Viewed in light of the project area as a whole, the recreational amenities at Foreman Creek are hardly noteworthy and their closure would have a minimal impact on recreation in the project area.

Response: As discussed in section 5.1.2.7 of the draft EIS, we would prefer to see the recreational capacity at Foreman Creek maintained but not at the expense of further degradation of cultural resources. Whether the site should be closed permanently would depend on whether DWR and the consulting parties can develop a plan for Commission approval that would allow implementation of recreational improvements while protecting or segregating cultural sites. As noted in our response to comment 180, our recommended plan should consider whether development of comparable recreational opportunities elsewhere in the vicinity of Foreman Creek would be warranted.

Comment 182: DWR comments that contrary to the statement in section 3.3.6.3, *Unavoidable Adverse Effects*, planting activities do not usually interfere with recreational activities. DWR suggests adding a paragraph identifying brood pond construction as an unavoidable short-term adverse impact on afterbay recreation, as the afterbay water surface elevation would need to be drawn to allow construction for an extended period.

Response: We added discussions of brood pond construction to sections 3.3.6.2 and 3.3.6.3 of the final EIS.

Comment 183: DWR notes that group overnight capacity at the Oroville Facilities is 273 people, not 115 as listed in section 5.1.2.5 *Recreation*, of the draft EIS. DWR asserts that OHV use does not occur on project lands and also notes that target shooting is limited to contracting public agencies and is not available to general recreational visitors.

Response: We appreciate DWR's clarification of the capacity for group overnight camping at the Oroville Facilities and modified our discussion in the final EIS to reflect the correct number. We realize that OHV use is officially prohibited in the OWA but based on information from DWR's January 2004 Assessment of the Impact of Recreation and Public Use (R-11) note that it occurs at all OWA dispersed use areas and the Old Nelson Bar Road dispersed site. Furthermore, DWR's year 2 progress report on Recreational Facilities and Operations Effects on Water Quality – Recreational Trails (SP-W3), noted off-road vehicle damage at the Thermalito afterbay and damage to trails at Potters Ravine and the Thermalito diversion pool due to ATVs. We are aware of opportunities outside of the project area for both OHV enthusiasts (the Clay Pit State Vehicle Recreation Area) and target shooters (the Rabe Road shooting range) and note them in our final EIS.

LAND USE AND MANAGEMENT

Comment 184: Butte County comments that the analysis in section 3.3.7.2, *Effects on Land Ownership, Management, and Use*, regarding Proposed Article B111 that supports the Proposal for OWA Funding, but does not require it to be included in the project license, will likely lead to business as usual whereby OWA is left without funding for wildlife management staff. In addition, Butte County comments that the draft EIS does not address the environmental and public health threats created in the OWA by illegal dumping which in turn harbors vectors (rats, mosquitoes, etc.).

Response: The staff's position, consistent with statements in the draft EIS in section 3.3.7.2, *Effects on Land Ownership*, and section 3.3.10.2, *Law Enforcement, Criminal Justice, and Crucial Asset Protection*

Expenses, is that OWA funding under Proposed Article B111 would provide for wildlife management staff funding, which would be an improvement over the current condition.

Comment 185: DWR comments that table 53 should be updated in the final EIS to note that the term of the lease with John Campbell has been renewed.

Response: We revised table 53 in section 3.3.10.2 in the final EIS to indicate that John Campbell's cattle grazing lease has been renewed.

Comment 186: DWR comments that in section 3.3.7.1, *California Department of Fish and Game*, it should be clarified that DFG has never managed fish and wildlife habitat of the Lake Oroville State Recreation Area. Furthermore, DFG has done no habitat management of the OWA for several years.

Response: We clarified DFG's role in the management of fish and wildlife habitat in section 3.3.7.1 of the final EIS.

Comment 187: DWR comments that in section 3.3.7.1, *Gravel Harvesting*, it should be noted that DFG does not regulate gravel harvesting in the OWA. They are DWR leases regulated by DWR.

Response: We corrected this information in the final EIS.

Comment 188: DWR comments that Proposed Measure B102, discussed in section 3.3.7.2, *Fuel Load Management*, would include Forest Service lands consistent with the Forest Service's 4(e) condition.

Response: We clarified in the final EIS that the fuel load management plan would include Forest Service lands consistent with Forest Service 4(e) condition 19.

CULTURAL RESOURCES

Comment 189: DWR makes several comments about the treatment of ethnographic resources in section 3.3.8. DWR asks that the final EIS mention the ethnographic inventory prepared by Far Western Anthropological Group and that the final EIS should clarify what is meant by a more temporally cultural chronology as described in the section Southern Cascades. DWR also requests that the final EIS note that the Round Valley Reservation is in Mendocino County to give the reader some perspective about how far the American Indians were forced to walk. Finally, DWR comments that the reference to the "Konkow Tribal groups" may be misconstrued as the Konkow Valley Band of Maidu. DWR indicates that it would be more accurate to say "local Konkow Maidu Tribal groups." In addition, the accurate reference for the Mechoopda Tribe is Mechoopda Indian Tribe of Chico Rancheria.

Response: In section 3.3.8.1 under the heading *Investigations Related to DWR's Relicensing Effort* we do include and cite the ethnography inventory prepared by the Far Western American Group as DWR 2004n. The word "limited" was omitted from the phrase "temporally limited cultural chronology" and we corrected this in the final EIS. We added the location of the Round Valley Reservation in Mendocino County. We revised the reference to the local Konkow Maidu Tribal groups and to the Mechoopda Indian Tribe of Chico Rancheria in the final EIS as suggested.

Comment 190: DWR comments that in *Historic Background*, the reference to "Lava Beds District" should be reworded because mining districts were formally established in the region, as were certain community districts; the Lava Beds did not match either of these concepts. It was simply a geographical area south of Oroville.

Response: We agree that the current text suggests a formal place name or a formal district designation. We revised the text to clarify that the mining camps were in an area known locally as the lava beds area.

Comment 191: DWR asks that in the section, *Cultural Resources Identified within the Project's Area of Potential Effects*, of the final EIS, it should be noted that DWR is committed to the establishment of a curation facility in the Oroville area. DWR is supportive of and is encouraging management with or by the Tribes, but the latter is not required, as implied in the text.

Response: We agree and revised the final EIS to clarify that it is preferred but not required that the curation of the artifacts be managed by the Tribes.

Comment 192: On page 290, DWR comments that the paragraph that references the inventory strategy lists many areas that currently are used for recreation and maintenance, etc. that were included in the archaeological survey. Two areas of considerable cultural importance that were surveyed, but are not listed, are Enterprise boat ramp and the Foreman Creek recreation area. Both locations should be identified here. The list also identifies the Bloomer boat-in campground but not the other boat-in campgrounds at Foreman Creek, Craig Saddle and Goat Ranch, all of which were surveyed. It would be better to list them all or simply include "all boat-in campgrounds."

Response: The list of management-specific parcels included in the inventory strategy was taken verbatim from the survey report (DWR, 2005f). The significance of the Foreman Creek and Enterprise boat ramps areas is discussed under the same section of the draft EIS under the heading *Ethnographic Resources*. We added a footnote to the discussion to explain that the Enterprise boat ramp and Foreman Creek recreation area were also inventoried along with other boat-in campgrounds associated with the project and are discussed in greater detail under *Ethnographic Resources*.

Comment 193: DWR comments that section 3.3.8.2, *Historic Properties Management Plan*, contains two errors. First, although the three federally recognized tribes in Oroville were invited to be involved in the development of the HPMP; the Tribal Unity Council was not involved. Second, Mechoopda is a federally recognized Tribe. The final EIS should reflect these corrections.

Response: We revised section 3.3.8.2 of the final EIS to clarify which tribes participated in the development of the HPMP. The draft EIS clearly identifies the Mechoopda is a federally recognized tribe in the second paragraph under the heading *Historic Properties Management Plan*.

Comment 194: DWR notes that consistent with page 4-3 of the draft HPMP members of the California Archaeological Site Stewardship Program will assist DWR with the monitoring sites, but they will not be doing all of that work as indicated in section 3.3.8.2, *Historic Properties Management Plan*.

Response: We understand that the members of the California Archaeological Site Stewardship Program would be assisting DWR in routine monitoring and that DWR would do the non-routine monitoring, as stated in the draft EIS. However, we revised the final EIS to emphasize this point.

Comment 195: DWR disagrees with the statement in the draft EIS that DWR is subject to the requirements of the Native American Graves Protection and Repatriation Act (NAGPRA). Archaeological studies conducted prior to and during dam construction were completed under the auspices of DPR. All human remains and items of cultural patrimony removed from within the project boundary at that time have been and are currently curated with DPR. DPR has full responsibility for these NAGPRA issues and has abided by the regulations for NAGPRA. DWR has worked to assist the Tribes with repatriation of remains and materials taken from sites during dam construction. Other elements of NAGPRA apply to the discovery of human remains specifically on federal and tribal lands.

Federal land holdings within the project limits are under the jurisdiction of BLM and the Forest Service. Those agencies, however, have not delegated NAGPRA responsibilities for those properties to DWR. There are no tribal lands within the project APE.

Response: We revised the text to clarify that DWR is not subject to NAGPRA relative to reburials from the original construction of the dam.

Comment 196: Berry Creek Rancheria, Mooretown Rancheria, and Enterprise Rancheria comment that the draft EIS properly recognizes the importance of Foreman Creek to the Tribes and how the cultural resources at the Creek are threatened by public access and recreational use. The Tribes comment that the only way to protect these resources is through permanent closure of Foreman Creek for the following reasons: (1) Foreman Creek is sacred to the Tribes, and not appropriate for recreation; (2) cultural resources cannot be protected by mere “restrictions” or “regulations” imposed on recreation or by additional study; (3) impact avoidance is the preferred, and legally required, method to protect cultural resources; and (4) closing Foreman Creek would have a minimal impact on recreation. The Tribes propose creating a cultural easement for the Foreman Creek area that would allow access to cultural sites without interfering with the operation or maintenance of the project. The draft EIS fails to analyze this recommendation that was included as Exhibit C to Berry Creek’s Motion to Intervene and Comments, dated January 30, 2006. The cultural resource protection easement would grant certain rights to Berry Creek, with all remaining rights retained by DWR.

Response: As discussed in section 5.1.2.7 of the draft EIS, we would prefer to see the recreational capacity at Foreman Creek maintained but not at the expense of further degradation of cultural resources. Whether the site should be closed permanently would depend on whether DWR and the consulting parties can develop a plan that would allow implementation of recreational improvements while protecting or segregating cultural sites. Our recommended plan should consider whether development of comparable recreational opportunities elsewhere in the vicinity of Foreman Creek would be warranted. We continue to conclude that DWR’s land management decisions developed as part of the plan could provide adequate resource protection for this area. Regarding Berry Creek Rancheria’s recommendation of a cultural easement, the final EIS analysis concludes that it would be premature to conclude that a cultural easement would be warranted.

Comment 197: EPA comments that the draft EIS does not address the comments from the four federally recognized Tribes that request DWR pay the costs associated with restoring and re-burying artifacts and remains previously removed from the area.

Response: We respectfully disagree with EPA that we did not address this issue and point to the last paragraph under the *Staff Analysis* of the HPMP where we discuss that fact the DWR is currently working with the Tribes to identify lands for reburial. DWR would be responsible for paying for implementation of the HPMP, including the costs associated with curation of any artifacts obtained during relicensing studies or implementation of approved environmental enhancements. DWR would also be responsible for paying for any reburials resulting from relicensing the project. The reburials associated with the original construction of the project would be the responsibility of DPR.

Comment 198: EPA comments that the final EIS should provide information on how DWR plans to protect cultural resources, particularly when public access is encouraged in close vicinity to cultural and historic sites. Specifically, the final EIS should identify specific measures for protecting Foreman Creek, including restricting public access and off-highway vehicle use. Tribal members who spoke at the public meeting indicated that they do not advocate closing the Foreman Creek access area. They want to preserve the access, but also protect the cultural sites affected by continued use of the access area.

Response: The draft EIS discusses DWR's proposal to develop a plan to improve the recreational facilities at Foreman Creek and notes that the plan does not provide specifics on how DWR intends to protect cultural resources. In the draft EIS, staff recommends restricting public access and off-highway vehicle use near culturally sensitive sites and recommends that the site be closed until a plan that provides the specifics on the protective measures is completed. The plan would include consideration of more specific alternative locations for access in the vicinity of Foreman Creek.

Comment 199: EPA comments that the final EIS should reference the HPMP and summarize measures that would cumulatively reduce the threat of destruction of cultural resources. The final EIS should discuss the development of site-specific treatment plans for areas of known concern and include a timeline for resolving conflicts.

Response: The draft EIS provides a detailed discussion of measures proposed in the draft HPMP that are designed to avoid or mitigate any effects on cultural properties. The draft HPMP describes the procedures for the development of site-specific treatment plans for priority areas.

Comment 200: Section 3.3.8.3 includes language that states that the measures included in the HPMP for the Oroville Facilities would cumulatively reduce the rate of destruction of cultural resources. EPA comments that specific examples of the measures included in the HPMP are not discussed in the draft EIS. EPA comments that the final EIS should provide a discussion of the cumulative effects of the project when considered with other past, present, or reasonably foreseeable projects. The document should also propose mitigation for all cumulative impacts and clearly state the lead agency's mitigation responsibilities, as well as the mitigation responsibilities of other entities.

Response: The draft EIS provides a detailed description of the measures included in the HPMP that are reasonable given the site-specific needs and that are consistent with the Advisory Council on Historic Preservation and the Commission's guidelines for the development of HPMPs. The coincidence of the relicensing of several hydroelectric projects on the Feather River at about the same time provides an opportunity for the implementation of measures to protect and enhance cultural properties in the larger region. We discuss the cumulative effects on cultural resources in section 5.2 of the EIS and state that the measures included in the upstream projects, along with those proposed at the Oroville Facilities, would cumulatively reduce the rate of destruction of cultural resources.

Comment 201: Enterprise Rancheria requests that the Commission impose a license condition on DWR that requires it to work with the Tribe and BLM for the purpose of restoring and adding lands, while providing an economically viable Rancheria. (BLM owns large quantities of lands contiguous to the project area and the remaining trust lands of Enterprise Rancheria.)

Response: The existing baseline for analysis is current environmental conditions, rather than tribal pre-project conditions, and the loss of land associated with the original construction is not subject to further analysis at this time.

Comment 202: Section 5.1.2.7, Historic Properties Management Plan provides several staff recommendations with regard to DWR's proposed HPMP. SWC and Metropolitan comment that it would seem appropriate to defer review of evaluation protocols and revision of the HPMP in light of the fact that the Programmatic Agreement will involve consultation with the State Historic Preservation Officer, Advisory Council on Historic Preservation, and others regarding the appropriate level of evaluation to mitigate project impacts.

Response: We agree and note that the Programmatic Agreement would be executed prior to any license issuance and would stipulate the development and implementation of a final HPMP.

AESTHETIC RESOURCES

Comment 203: DWR requests that staff reconsider and delete its recommendation to reseed the face of the Oroville dam with poppies. DWR notes that it has made previous, unsuccessful attempts to reseed the face of the dam at a cost of approximately \$10,000. Based on that experience, DWR has concluded that California poppies are not adequately self-sustaining in this location to produce the desired effect. Furthermore, based on previous experience with this endeavor, the \$900 estimated cost in the draft EIS is unrealistic.

Response: In section 5.1.4, *Additional Measures Recommended by Staff*, of the draft EIS, we recommend DWR develop a plan to continue reseeding the Oroville dam with wildflowers or other plantings. We realize that the initial cost was higher than our estimated cost, but our recommendation is for occasional supplementation of bare areas on the dam on an as-needed basis to continue providing the aesthetic benefit. Therefore, we continue to recommend seeding the face of the dam with self-sustaining plants and increased the capital cost to \$11,000 in the final EIS.

SOCIOECONOMICS

Comment 204: Butte County comments that the draft EIS displays a clear and systematic bias toward the data submitted by DWR, while ignoring a series of studies submitted by Butte County, including the following:

- Butte County, California's Response to the May 2006 Reports of CH2M HILL and TCW Economics (June 26, 2006)
- Comments of FMY Associates, Inc. on Filings Submitted by California Department of Water Resources and State Water Contractors (June 2006)
- Memo from Dr. Jon Ebeling to Paul McIntosh, Butte County Chief Administrative Officer (June 20, 2006)

The County incorporates by reference its June 26, 2006, filings into its comment letter and comments that the draft EIS is deficient in not addressing this previous filing. On the whole, Butte County comments that the draft EIS largely ignores the socioeconomic impacts of the project on Butte County, systematically underestimates the costs the County incurs in providing governmental services to the project, and overstates the positive benefits of the project to the County. Butte County comments that the licensee should be required to pay its fair share of the costs of providing governmental services to the project, as well as attempt to mitigate the ongoing adverse impacts of the project on the County's socio-economic health by providing a low cost power allocation and payment in lieu of taxes.

Response: We address specific comments made by Butte County concerning the socioeconomic analysis in specific responses below. We revised the language in the final EIS to correct factual errors. However, we do not agree that the staff's analysis reflects a bias in favor of data submitted by DWR.

With respect to the three documents noted by Butte County, staff did review the studies while preparing the draft EIS, and considered the information that was relevant to our analysis. Much of the information in the three documents involved critiques of information in other parties' submittals. Where the original information was not relevant to the draft EIS analysis, the critique was not used either. In some cases, where the draft EIS reflects the information provided in the three documents but we failed to provide the citation; we added the appropriate citations in the final EIS. Additionally, we reviewed the three documents again in light of the County's comments on the draft EIS, and in several cases revised the text

of the final EIS to reflect the position of the County and its consultants. Those cases are discussed below in response to specific comments.

As stated in the draft EIS, section 5.1.2.8, *Socioeconomics*, both payments in lieu of taxes and the potential distribution of low cost power are issues beyond the scope of this EIS.

Comment 205: Butte County comments that in section 3.3.10.1, *Population*, the draft EIS does not include adequate consideration of the impact of population growth in the Sacramento Valley on Butte County over the next 40 to 50 years. In addition, the EIS should consider increases in the downstream population and the impact of this growth on demand for water for both irrigation and consumption, which could affect the way the Oroville Facilities are used.

Response: Draft EIS section 3.3.10.1, *Population*, does note expected population growth in the Sacramento Valley, and notes an expected doubling of the Butte County population in the next 40 years. In response to this comment, we added an additional statement to the section concerning the expected absolute growth in the Sacramento Valley population.

Comment 206: Butte County comments that draft EIS section 3.3.10.1, under the headings *Employment and Economic Base* and *Income*, does not include consideration of employment and income information provided to the Commission by the County in pages 6 through 15 of its submittal *Socio-Economic Impacts of the Oroville Facilities Project on Butte County, California* and pages 6 through 12 of FMY Associates' *Socio-Economic Impacts of the Oroville County, California Facilities Project on Butte County, California*.

Response: The draft EIS does not include every fact submitted by the County in various filings. However, the draft EIS clearly reflects the same information provided by the County in the two referenced reports: average incomes in the county are lower than regional, state, and national averages; the percentage of the population living below the poverty level is well above average; and the population ranks high in terms of income from government transfer payments, including public assistance. We see no need to revise the text of the final EIS to elaborate further on these points.

Comment 207: Butte County comments that section 3.3.10.1, *Fiscal Condition of Local Jurisdictions*, deals primarily with the allocation of sales tax revenues while ignoring the other aspects of Butte County's poor fiscal health. In addition, Butte County comments that this section fails to address the lack of property tax revenues accruing to the County. Butte County also comments that the draft EIS does not include information provided by the County in the form of reports from the California Commission on State Mandates

Response: We changed the heading of section 3.3.10.1, *Fiscal Condition of Local Jurisdictions* to *Sales Tax Revenue of Local Jurisdictions* to more accurately reflect the topic discussed in that section. We added to section 3.3.10.1 *Fiscal Condition of Butte County*, to include more information about the poor fiscal health of Butte County.

Comment 208: Butte County comments that it agrees with the findings presented in table 63, and suggests that these findings should be better reflected in the rest of the EIS. Similarly, Butte County states that the findings in table 64 with regard to the lack of any measurable spending by recreation users in the unincorporated areas of Butte County do not appear to inform the rest of the EIS.

Response: As noted in the County's comment, tables 63 and 64 in the draft EIS clearly show that most agency and recreation-related spending at the project accrues to the city of Oroville and other jurisdictions

rather than to Butte County. We revised the text in section 5.1.2.8, *Socioeconomics*, to reiterate this point in our conclusions.

Comment 209: In section 3.3.10.1, *Recreation and O&M Related Employment and Earnings*, the draft EIS reports that project-related spending annually supports about 1,053 jobs and \$25.8 million in earnings in the County. Butte County strongly challenges the accuracy of this claim and comments that no evidence or data is supplied in the draft EIS to support it. Furthermore, Butte County comments that the evidence it provided in the studies filed with the Commission refutes this fact. Butte County also comments that the draft EIS does not address jobs and income lost due to the project, including those at Big Bend Power Plant, logging industry jobs, commercial/retail jobs associated with the community of Las Plumas, and other jobs that were lost due to the inundation of local land to create Lake Oroville.

Response: In the draft EIS, DWR cites study report R-18 as the source of project-related jobs and earnings estimates, and the study report supplies ample documentation of how the estimates were arrived at; it is not necessary to repeat that documentation in the EIS. The study was based on a study plan agreed to by the Recreation and Socioeconomic Work Group, and our review of the work group meeting minutes, while noting a few questions and comments that arose during the draft study review period, does not indicate objections to the study plan or study report. With respect to jobs lost when the project was constructed. Given the Commission's policy that the baseline for analysis is current environmental conditions, rather than pre-project conditions, the loss of jobs associated with original project construction is not subject to further analysis at this time.

Comment 210: Butte County disagrees with the statement in the draft EIS that project-related public services provided by local government are primarily the responsibility of the city of Oroville and Butte County. Butte County indicates that the city of Oroville has no primary responsibility for any of the public services provided to the project and is too small to lend support to the County.

Paul McIntosh, Chief Administrative Officer for Butte County; and Perry Reniff, Sheriff-Coroner of Butte County, the Harvey M. Rose Accounting Corporation, and Butte County comment that the draft EIS erroneously states that DPR is the primary provider of law enforcement and emergency response services in the project area. Butte County states that, in the state of California, the Sheriff is a constitutional officer and the chief law enforcement officer for the county in which he or she is elected, although the California Highway Patrol, DFG, DPR, and the Butte County Sheriff's Office share law enforcement responsibilities within the project boundary. DPR comments that DPR has the lead law enforcement responsibility on state park lands, including the Lake Oroville State Recreation Area. DWR comments that the California Highway Patrol has the duty and responsibility of providing protection to state property, including Oroville dam, and that the California Highway Patrol provides regular patrols of the dam and other critical project facilities.

Butte County states that the South County Interagency Fire Protection Agreement does not cover the project area, and that the County has primary responsibility for fire protection and emergency services to the project area. DWR comments that in practice the Butte County Fire Department, CDF, and Oroville Fire-Rescue Department cooperatively respond to calls within the project area, including the Lake Oroville State Recreation Area, and that primary responsibility for fire protection and emergency service calls in the area is divided among the agencies depending on the location of the incident and the availability of fire units to respond to the call, regardless of primary jurisdictional responsibilities

Butte County, Mr. McIntosh, and Mr. Reniff comment that, in actuality, the true responsibilities for law enforcement and emergency response for providing public safety at the Oroville Facilities falls to Butte County. In addition, the County, Mr. McIntosh, and Mr. Reniff comment that Butte County bears the overwhelming cost of providing these services, while DWR comments that it pays the county \$191,000

annually to patrol the water surface of Thermalito afterbay. Mr. McIntosh requests that the Commission consider this information in the final EIS and require the licensee to pay its share of the costs required to keep visitors to the project safe.

Response: We revised the text of section 3.3.10.1, *Public Services*, to clarify the responsibilities of various parties as we understand them. However, this did not alter our analysis or conclusions. With respect to requiring the licensee to pay a share of the County's costs of providing services to project users, we revised the text in section 5.1.2.8, *Socioeconomics*, to clarify that state and local tax law does not fall under the Commission's jurisdiction, and that payments in lieu of taxes are beyond the scope of this EIS.

Comment 211: Butte County comments that although the city of Oroville, Butte County Fire, and El Medio Fire District do work cooperatively through the South County Interagency Fire Protection Agreement, the Planned Response Areas of that Agreement do not cover the project area. Furthermore, Butte County states that CDF is not a party to that Agreement as noted in the draft EIS. Primary responsibility for fire protection and emergency services to the project area is provided by Butte County. CDF has primary responsibility for wildland fires in the areas within the State Recreation Area surrounding Lake Oroville. The final EIS should reflect this.

Response: We revised the text of section 3.3.10.1, *Public Services*, in the final EIS to reflect these corrections. However, this did not alter our analysis or conclusions.

Comment 212: In their comments on the draft EIS, SWC and Metropolitan submitted a study prepared by CH2M Hill that presented an analysis of income support payments to residents of Butte County. Butte County submitted a response to that report, noting that some of the data were incorrect and that the analysis was flawed. Additionally, Butte County included in its comments information concerning the County's position that the low-cost housing vacated by construction workers following project construction led to an increase in the demand for health and human service programs in the County. In its response, DWR cited other information and noted that the County's analysis was flawed.

Response: We reviewed the report submitted by SWC and Metropolitan and the critique submitted by Butte County, as well as the analysis of health and human services impacts submitted by the County and the critique submitted by DWR, but do not find that any of these documents are relevant to this relicensing proceeding. We did not revise the text of the EIS to reflect any of these submittals.

Comment 213: Michael L. Ramsey, the District Attorney for Butte County comments that the draft EIS has dramatically underestimated the resources expended on criminal justice that arise from referrals to his office from various law enforcement agencies for criminal activities which arise within the Oroville facilities. Mr. Ramsey states that the 150 referrals from DPR alone cost the district attorney's office nearly \$100,000. This is only a small portion of the cases referred out of the project area and does not include the cases referred by other agencies or the costs to other agencies. He also comments that a lack of adequate law enforcement patrol resources within the project boundaries lead to less crime prevention and more prosecution. Mr. Reniff, the Sheriff Coroner of Butte County, also comments on this topic and suggests that, in order for the Butte County sheriff's office to provide a minimum level of security for the Lake Oroville Dam Operations Center, it would be necessary to provide a staff of 12 deputy sheriffs and 2 sergeants. He provides an annualized cost for these services of \$1,565,853, with additional startup expenses of approximately \$30,000.

Response: In response to these comments, we refer the commentor to section 3.3.10.2 of the draft EIS, *Law Enforcement, Criminal Justice, and Crucial Asset Protection Expenses*, where all of these topics are discussed. We note that the staff's estimate of \$216,400 in project-related criminal justice expenses,

while not as large as the County's estimate of \$664,585 (see draft EIS table 67), does recognize that the County incurs significant expenses in providing criminal justice services related to project visitors. Even the staff's lower estimate would be sufficient to cover the \$100,000 in cost noted by Mr. Ramsey. As noted in the same section of the draft EIS, DWR retains a private security contractor to patrol Lake Oroville dam.

Comment 214: Curt Josiassen, Chairman of the Butte County Board of Supervisors, cites the need for recognition of the fiscal impacts of the project on Butte County and acceptable methods to address and relieve these impacts.

Response: The draft EIS addresses the fiscal impacts associated with Butte County's services in section 3.3.10.2, *Butte County Recommendations*, and the staff conclusions are presented in section 5.1.2.8, *Socioeconomics*.

Comment 215: Butte County comments that the draft EIS undercounts the number of road miles used by project visitors and personnel, ignores the County's June 26, 2006, response concerning road costs incurred by the County, undercounts the County's costs of maintaining roads, fails to account for the incremental toll that project-related vehicles take on county roads, ignores the environmental benefits of paving or sealing substandard roads, and ignores traffic problems caused by the project.

Response: We reviewed the County's position, expressed in several filings, including the June 26, 2006 filing, and respectfully disagree with the County's position with respect to the entity that is responsible for paying for construction and maintenance of roads outside the project area that are used both by project visitors and by county residents and others not visiting the project. It is long-standing Commission practice to recognize the local government's responsibility for non-project use of roads outside the project boundary, and not to address maintenance of those roads in the project license. With that in mind, the staff does not see the need to include the County's additional information to the EIS.

Comment 216: Butte County comments that the draft EIS gives improper weight to project benefits that the draft EIS itself refers to as being "conjectural," "rough," and "speculative," including benefits related to flood protection, water supply, and increased property values. Butte County and its consultants, including FMY Associates, Inc. and Harvey M. Rose Accountancy Corporation, comment that the draft EIS does not use much of the information provided by those parties in the County's June 26, 2006, submittal to the Commission, but relies instead on flawed studies prepared by CH2M HILL and TRW. FMY Associates comments that the draft EIS seems to have accepted DWR and its consultants' reports that property values increased in Butte County because of the existence of the Oroville Facilities, and that this is not correct.

Response: We continue to maintain that the discussion of flood protection, water supply and property values in draft EIS section 3.3.10.2, *Payments in Lieu of Taxes*, is of sufficient interest to be included in the final EIS, but also continue to refer to these estimates as being based on less rigorous study than other information on the record. We revised the final EIS to reflect more of the information provided by the county and its consultants concerning the estimates, and also revised the text of section 5.1.2.8, *Socioeconomics*, to be consistent with the analysis. We revised our concluding statements to clarify our position that the project likely has a negative fiscal impact on the county.

Comment 217: Butte County comments that in section 3.3.10.2, *Emergency Operations Center* of the draft EIS staff concludes that Butte County's Emergency Operations Center does not face a flood risk from dam failure or the operations of the Oroville Facility. Butte County comments that this is not true, while Friends of the River, Sierra Club, and the South Yuba River Citizens League express concern with the conclusion that "even during the 1997 flood, a low probability event, the Emergency Operations

Center was not damaged.” Assuming that the Center is downstream of Oroville dam, the commentors state that they find this draft EIS statement troubling because: (1) the release from Oroville dam was only 10,000 cfs more than the 150,000 cfs objective release and the city of Oroville had been notified to expect pass-through releases of up to 300,000 cfs. The commentors suggest that this is likely a consequence of the reluctance of Oroville’s operators to conduct regulated surcharge operations. They comment that having the Emergency Operations Center in a location where it could be inundated by pass-through releases can adversely affect operations even if such a facility is not flooded. They also comment that deciding the true probability of the 1997 event is at best an exercise in speculation. They comment that federal recommendations (including executive orders) for siting critical infrastructure such as emergency operations centers are to avoid areas subject to even low probability flooding—and certainly avoiding susceptibility to standard project floods (the Oroville design flood), which could not be successfully regulated by Oroville dam without the operational use of the ungated spillway according the Corps Reservoir Regulation Manual, something that DWR’s operators appeared to be unwilling to do in 1997.

Response: We note that the draft EIS does not say that the Emergency Operations Center faces no risk from dam failure, rather that it faces “no appreciable risk.” While the consequences of dam failure would be catastrophic, the likelihood of dam failure is itself quite remote (see draft EIS section 3.3.10.2, *Emergency Operations Center*). Although the County indicated in earlier filings that DWR advised the County of the potential need for an evacuation of the Emergency Operations Center during the 1997 flood event, the rationale for such an evacuation alert is not clear to us. The risk of conventional flooding appears minimal because the Emergency Operations Center is located well away from the river, and its elevation is well above the power canal.

Operation of the Oroville Facilities provides considerable flood regulation relative to the pre-dam condition. According to the Corps’ *Post Flood Assessment for 1983, 1986, 1995, and 1997*, Central Valley California (Corps, 1999) flood control operations at the Oroville Facilities reduced the 1997 flow from 302,000 cfs to 160,000 cfs at the dam. The dam and Feather River levees are credited with preventing \$1,058,440 in damages.

Comment 218: The Community Action Agency of Butte County, Inc. comments that the staff overstates the benefits of the project to tourism and local residents in the draft EIS. Furthermore, it comments that the staff’s estimate made in section 3.3.10.2, *Net Fiscal Effects*, of \$732,900 net fiscal effect to the County budget is misleading. The Agency comments that the impact will be much larger due to the fact that the majority of the County’s budget is restricted. The General Fund is used for critical safety and law enforcement needs of the county for which resources have been inadequate for many years. The Agency also comments that while it is commendable that the project proposes to establish a Supplemental Benefit Fund (section 3.3.10.3) to be administered within the city of Oroville, it is insufficient to address even some of the impacts created by the project.

Response: In addition to this comment, we also have information from the Commission on State Mandates (2005), submitted with the comments of Paul McIntosh, Chief Administrative Officer for Butte County; indicating that the County has limited flexibility with respect to discretionary spending. Citing the County’s application to the Commission on State Mandates, the Commission notes that the County’s discretionary spending for FY 2004-05 equaled about 65 percent of general purpose revenue, or about 14 percent of total revenue. We amended table 67 and the text of section 3.3.10.2, *Net Fiscal Effects*, to put the project-related deficit in the context of the General Fund as well as the total County budget. However, this did not alter our analysis or conclusions.

Comment 219: Drs. Jon Ebeling and Frederica Shockley of Regional and Economic Sciences comment that the calculation of O&M-related sales taxes estimated by the IMPLAN model overstate the tax revenue to the County, and they provide the mathematical backup for a corrected calculation.

Response: We adjusted the O&M sales tax revenue estimate given in table 67 of the draft EIS downward, from \$32,900 to \$1,000 annually. This adjustment is reflected in our conclusion that the project likely has a net negative fiscal effect on the county.

Comment 220: Drs. Jon S. Ebeling and Frederica Shockley of Regional and Economic Sciences provide several comments regarding the socioeconomic models used in the draft EIS. They point out that the visitor spending data compiled by DWR was collected using a “convenience sample,” not a probability sample and that this data collection method does not provide a representative sample. Furthermore, they comment that the 37.5 percent return rate is low compared to the 60 percent response rate from professional surveys using mail response. In addition, Drs. Ebeling and Shockley observe that no mention is made of how the visitor spending data were “cleaned” and that DWR has indicated that they made up responses in some cases where responses were missing or garbled. While the draft EIS acknowledges it is important to understand how the data were “cleaned,” it does not include this information. The Harvey M. Rose Accountancy Groups offer similar comments on the socioeconomic model data and assumptions.

Response: In their comments, Drs. Ebeling and Shockley are raising the same points that Dr. Ebeling has raised previously in this proceeding, some of which the staff addressed in appendix A of the draft EIS. With respect to DWR’s use of a convenience sample, we note that the same sampling method is commonly used by licensees and their consultants in relicensing proceedings, and we consider the method acceptable. DWR collected expenditure data via a mail-in survey where potential respondents were intercepted at the site(s) over a period of months, interviewed about the recreational facilities and subsequently asked if they would be willing to participate in a follow-up expenditure survey to be mailed to them at a later date. There is no indication that the interviewers chose respondents based on anything other than good practice.

The 37.5 percent response rate, while not ideal, does not appear to the staff to be abnormally low. In any case, the response rate of a survey is not the only means by which to judge the adequacy of the sample. If the number of responses (n) is sufficient to satisfy some standard measure of statistical confidence, and the sample is demographically representative of the population, then one can conclude that the survey results are valid. In the case of the expenditure data, 480 residents of the County and 484 non-residents responded, which results in a margin of error of 4.5 percent for both the resident and non-resident populations. We consider that sufficient for this purpose.

Regarding the data cleaning method, as was stated in the draft EIS, cleaning the data is not an unusual process. Staff finds that the explanation of the data cleaning methods on pages B-2 and B-3 of the R-18 report (DWR, 2004p) is consistent with good practice.

Comment 221: Drs. Ebeling and Shockley remark that the draft EIS states that the DWR survey data are unavailable but that the draft EIS does not indicate why the data were not obtained. In addition, the draft EIS concludes that there is no evidence that the study data are biased. Drs. Ebeling and Shockley point out that the opposite conclusion could just as easily be made.

Response: The survey data were not part of the record submitted to the Commission, although we note that the data were made available to members of the Recreation and Socioeconomic Work Group in 2003 (DWR, 2003g). With regard to bias, the staff finds the work group’s selection of a reputable consultant, acceptance of the study plan, and acceptance of the final study report R-18 (DWR, 2004p) to be acceptable demonstrations of good practice.

Comment 222: Drs. Ebeling and Shockley comment that the artificial analysis using the Monte Carlo data is irrelevant and that the draft EIS should include real survey data from real visitors.

Response: Staff performed the Monte Carlo simulations to address Dr. Ebeling's original objection to the use of point estimates of visitor expenditures calculated from the mail-in survey data to derive IMPLAN model outputs. We continue to find the simulations useful.

Comment 223: Drs. Ebeling and Shockley point out that on page 333 of the draft EIS staff says that the net impact is about 0.3 percent of Butte County's fiscal year 2002-2003 budget. On page A-10 of the draft EIS staff states that in all cases, the level of project-related fiscal deficit is in the range of 2 to 3 percent of the County's total budget. They request clarification. In addition, Drs. Ebeling and Shockley comment that DWR uses one year of budget data to forecast county spending for the next 50 years. They suggest that this is inadequate and that DWR should use data from over a 10 to 15 year time period.

Response: The staff estimate in the draft EIS was of a fiscal deficit of, -\$732,900 representing 0.266 percent of the County's budget of \$275 million. The reference to 2 to 3 percent was a typographical error; in preparing the final EIS, we removed that entire paragraph from appendix A. With respect to the use of one year of budget data, DWR used Butte County's FY 2001-2002 and FY 2002-2003 budgets to derive its cost and revenue translators for the IMPLAN model. DWR reviewed budget data over time but found inconsistencies that precluded the development of a representative time series. DWR explains its rationale on page 4-4 of study report R-19 (DWR, 2004x). Further, beginning on page 4-5 of R-19, DWR explains its assumptions for forecasted visitor fiscal impacts on the County in the year 2020. Staff finds these assumptions reasonable.

Comment 224: Drs. Ebeling and Shockley comment that the draft EIS concludes that the project provides a net fiscal benefit overall because the net benefits to Oroville and other communities exceed Butte County's overall deficit. They suggest that this conclusion does not make sense. The cities reap the benefits of sales tax revenues because most of the businesses are located in the cities; however, the County provides most of the services in the project area. Drs. Ebeling and Shockley also comment that the draft EIS claims (as an assumption of the IMPLAN model) that the population due to the impact of the dam imposes no net cost on the county because that group pays enough taxes to offset their demand for services. Harvey M. Rose Accountancy Corporation states that, although many of the economic benefits of the project occur within the unincorporated areas of Butte County, it does not follow that these benefits translate into net fiscal gains for the Butte County government entity. They note that the construction jobs associated with new environmental measures would not necessarily go to county residents, and that the draft EIS does not account for the fact that many higher-paying jobs were lost when the Big Bend hydro project had to cease operations.

Response: We find that the text referred to by Dr. Ebeling and Dr. Shockley is self-explanatory; the communities' gains exceed the county's loss, which yields a net benefit overall. This statement does not contradict Dr. Ebeling and Dr. Shockley's point that the cities receive the benefits of sales tax revenues because most of the businesses are located in the cities, while the County provides most of the services in the project area. However, to remove any ambiguity associated with the statement, we removed it from final EIS section 3.3.10.2, *Butte County Recommendations*.

DWR does not dispute that Butte County will experience a net fiscal deficit associated with the project, and indeed this is clearly stated in the draft EIS in section 3.3.10.2, *Butte County Recommendations*, in the first paragraph. Dr. Ebeling and Dr. Shockley are incorrect in commenting that the draft EIS characterizes the IMPLAN model as being based on an assumption that the population due to the impact of the dam imposes no net cost on the County because that group pays enough taxes to offset their demand for services. The draft EIS does not make such a statement and appendix A clearly states that the

opposite is true (see page A-14, which states “... the model predicts that Butte County’s costs of serving the additional population would be greater than the revenue associated with those people...”). Additionally, one of the study reports on which the draft EIS is based (R-19 [DWR, 2004x]) indicates that the cost to the County of serving both the recreational population and the population indirectly attributable to the project exceeds the expected revenue associated with those populations (for example, see R-19, tables 5.1-1 and 5.1-2). However, we revised the text of appendix A, *IMPLAN Model Output and Model Estimation of Indirect Impacts*, as well as section 3.3.10.2, *Butte County Recommendations*, to make this point more prominently.

With respect to jobs associated with new environmental measures, we agree that not all jobs would be filled by County residents; however, some undoubtedly would, which is what is stated in the EIS. Because the loss of jobs from the Big Bend Project was associated with project construction, it is considered part of the baseline and is not subject to further evaluation in this relicensing.

Comment 225: Drs. Ebeling and Shockley comment that DWR reports to the Commission indicate that visitation to the project in 2003 and 2004 (the last two years in which visitation survey data were reported) was more than double the project visitation in 2002. They state that the draft EIS cites DWR claims that the rate of visitation to the project is declining which is contrary to these survey results.

Response: Following its review of DWR’s fifth biennial recreation report (2005) to the Commission, the Oroville Recreational Advisory Committee noted the vast difference in use figures from the fourth biennial report (2003) and asked DWR to explain the reason for the difference. DWR responded that the differences were due to the fifth biennial report’s relying almost entirely on traffic counter data and using persons-per-vehicle multipliers that are site specific and higher than the multipliers used in previous years. DWR considers the 2005 figures to more closely represent the actual number of visitors to the project than the numbers presented for earlier years. Thus, the 2005 figures represent an improved method of reporting as well as, likely, an increase in actual visitors.

We note that the draft EIS makes no claim that the rate of visitation to the project is declining. Instead, it reported the results of an econometric investigation of project visitation to the project showing that *holding all other variables in the model constant*, the trend in long-term visitation to the project is in decline. The results were presented on pages B16 and B17 of appendix B of DWR’s final study report on Projected Recreation Use (R-12). To illustrate, consider the Lake Oroville model on page B-16. Visitation to Lake Oroville was hypothesized to be a function of water elevation at the lake and a time trend. If, from one year to the next, there is no change in water elevation, the model predicts that visitation during that period will decrease. Drs. Ebeling and Shockley point to data that indicates a doubling of recreation use at the project in the years 2003 and 2004 compared to 2002 and suggest that such an increase invalidates the econometric model. However, Dr. Ebeling and Dr. Shockley are describing a short-term, positive fluctuation in visitation that is not inconsistent with a long-term downward sloping trend. In other words, had the estimated impact of trend on visitation been positive, the positive fluctuation described by Dr. Ebeling and Dr. Shockley would have been even higher than what the 2003 and 2004 data reveal.

Comment 226: Drs. Ebeling and Shockley comment that DWR’s data indicate that average income per job of indirect population added because of the dam is \$19,000. Drs. Ebeling and Shockley observe that people at that income level pay little taxes to the county, but do require welfare services from the county. Hence, they are likely to impose a net cost to the county.

Response: Based on a work week of 40 hours, an average wage of \$19,000 annually amounts to approximately \$9.13 per hour, which is above the national minimum wage (\$5.15/hour) and also above the state of California minimum wage (\$7.50/hour). Even if these workers do not own property and pay

property taxes to the County, it is likely that they contribute to Butte County sales tax revenue by spending some of their earnings in unincorporated Butte County. It is not clear that workers necessarily require public assistance. Further, it is not clear that workers who fill jobs created by recreational spending at the project would not be receiving social assistance but for the project. Although the IMPLAN model is based on a simplifying assumption of full employment, so that any new jobs require new workers from outside the area, we know that is not actually the case in most economies. Drs. Ebeling and Shockley imply that the jobs created by recreational spending at the project draw workers exclusively from outside labor markets who subsequently require social assistance from Butte County to augment the wages paid by project-related employment. In reality, it is at least as likely that some workers would be sourced from within the County, and some of these workers would require less public assistance than they received when they were unemployed.

Comment 227: The socioeconomic analysis summarized in table 67 of the draft EIS is based on estimates contained in DWR's report R-19, Fiscal Impacts. The R-19 analysis includes the estimated fiscal impacts on Butte County attributable to the resident population indirectly supported by visitor spending and project O&M activities. Of the net \$732,900 deficit to Butte County estimated by staff and summarized in table 67, \$354,300 is attributable to these indirect effects. DWR comments that estimates of population-driven, indirect effects of recreation and O&M activity associated with the project could not be reliably derived in report R-19, since that model held intergovernmental revenues constant in the analysis of current and project indirect (growth-related) fiscal effects of the project, which had the effect of understating population driven revenues and overstating the population-driven, indirect net fiscal effect. DWR comments that because of the fiscal model's inability to capture all indirect fiscal effects, the \$354,300 deficit related to indirect population growth is deemed to be unreliable by the R-19 model's developers and that conclusions concerning the severity of fiscal impacts on Butte County should be based only on the Commission's estimated direct visitor-driven deficit of \$378,600 rather than on the estimated total deficit of \$732,900 that includes indirect effects.

Response: We presume that the commentor is referring to the following statement found on page RS-3 in DWR's Fiscal Impacts Final R-19 report: "This estimated deficit, however, likely overstates the actual deficit for the County because intergovernmental revenues associated with the population supported by visitor spending and O&M of the Oroville Facilities are underestimated in the analysis." In contrast to DWR's comment, Butte County, in earlier filings, has stated that the IMPLAN model tends to understate the actual deficit, and that the study does not describe the supposed "intergovernmental revenues" that would offset the estimated deficit.

Were the indirect fiscal effects to be dismissed as suggested by DWR, the fiscal deficit attributable to the Oroville Facilities would be cut by nearly half. Such a drastic change in the outcome of the IMPLAN model would require substantially more evidence to support it. Given that DWR does not provide any quantitative or qualitative analysis in support of its comment, and given that the R-19 study was reviewed and accepted by the Recreation and Socioeconomics Work Group, we find no compelling reason to reject the indirect fiscal deficit calculation included in the R-19 report, and made no change to the draft EIS text.

Comment 228: DWR comments that in section 3.3.10.2, *Payments in Lieu of Taxes*, the Commission should conclude that the development of the project has resulted in negligible net impacts on Butte County's annual property tax revenues. DWR comments that a large portion of project lands would have been developed in residential uses if the project had not been constructed and that ongoing public services costs generated by this development would have likely outweighed public revenues. DWR states that since Butte County has not attempted to quantify public services costs potentially generated by development of project lands, it cannot support the assertion that private development of lands would have created less of a fiscal burden on the County than project uses do.

Response: The preponderance of evidence, based on DWR's studies and the County's filings, indicate that overall, the project has a negative impact on the County's fiscal position. This is reflected in the draft EIS and final EIS.

Comment 229: FMY Associates comment that the TCW report cited in the draft EIS with respect to the increased value of rice production does not account for inflation. FMY Associates states that adjusting for inflation would account for most of the increase in value from 1964-68 to 1996-2000, and that a growth in productivity could easily account for the remainder.

Response: We note FMY Associates' points concerning inflation and potential increases in productivity. Because we did not use TCW's estimates of the increased value of rice production in the draft EIS, we did not change the text in response to this comment.

Comment 230: FMY Associates comment that the draft EIS references the CH2M HILL report concerning the availability of low cost power and the fact that on average, electricity costs account for 0.64 percent to 2.64 percent of total cost for various industries, not significant enough to provide an impact on the local economy. FMY Associates states that there are many industries for which electricity accounts for 10 to 50 percent of production costs, and such industries would have had a compelling reason to locate in Butte County if low cost power had been available from the project.

Response: While it is true that some industries use much more power than the average cited in the draft EIS, it is entirely speculative that any of those industries would have located in Butte County if lower cost power had been available. Additionally, as noted in the draft EIS, the allocation of project power is a matter beyond the scope of the EIS.

Comment 231: FMY Associates comments that the draft EIS perpetuates an error in the TCW Report by indicating that the County's growth rate was 3.2 percent between 1980 and 2000. FMY Associates states that the actual growth rate was 2.2 percent annually, which was lower than the growth rate in neighboring counties and the state.

Response: In contrast to FMY Associates' comment, draft EIS section 3.3.10.1, *Affected Environment, Population*, clearly states that the growth rate in the county from 1980 to 2000 was "about 2.1 percent annually", the same as the rate shown in figure 20 of the draft EIS. The draft EIS does not attribute the County's growth, or lack of growth, to the project, and we did not change the text of the final EIS in this regard.

Comment 232: Harvey M. Rose Accountancy Corporation, consultants to Butte County, comment that the County's use of peak rather than average recreation days is a reasonable basis for estimating the costs of the project for the County, because although visitor numbers drop during non-peak periods, the County must respond to a higher percentage of the total number of calls for assistance and emergencies at the project during that time.

Response: On page 32 of its detailed comments on the draft EIS, Butte County provides emergency call statistics that demonstrate at least a 2:1 ratio of peak emergency response calls to off-peak calls to Lake Oroville from 2004 to October of 2006. The data indicate that calls per month during the peak period (May 15 to September 15 each year) equaled 8.8 to 13.5 calls per month, compared to 0.6 to 2.0 calls per month in the off-peak period. This supports the County's position that peak visitation periods at the project generate a higher number of emergency calls than off-peak visitation periods. We revised appendix A of the EIS to reflect this new information. However, it is still not clear to the staff that the additional labor resources required for peak-season visitation could not be augmented on a seasonal basis to handle the small number of calls in question.

Comment 233: Harvey M. Rose Accountancy Corporation states that the draft EIS “argues that the County inappropriately uses recreation days rather than visitor days to calculate visitor population,” and offers reasons why the use of recreation days is appropriate.

Response: The commentor misinterpreted the draft EIS text, which does not argue that the County’s use of recreation days is inappropriate. Instead, the draft EIS merely cites the fact that the CH2M HILL report (2006) argues that point.

Comment 234: Based on the statement in section 5.1.2.8 regarding other economic benefits to Butte County that the project provides, but are not quantified in the fiscal analysis in the draft EIS, DWR provides a list of some of these benefits, including (1) funding under Measure B111, Oroville Wildlife Area Funding; (2) the Project Supplemental Benefit Fund to be established and maintained under the Settlement Agreement; and (3) direct and indirect assistance with law enforcement funding.

Response: The draft EIS in section 3.3.10.3, *Cumulative Effects on Socioeconomics*, acknowledges the potential benefit of Measure B111 in terms of reducing Butte County’s costs of providing law enforcement services at the project, and the benefits associated with the Project Supplemental Benefits Fund. We revised table 67 and the text of section 3.3.10.2, *Net Fiscal Effects*, to include DWR’s annual payments to Butte County for patrolling Thermalito afterbay. We also revised section 5.1.2.8, *Socioeconomics*, to include these items.

DEVELOPMENTAL ANALYSIS

Comment 235: DWR makes several comments on the developmental analysis in the draft EIS. DWR comments that the analysis presented in table 68 appears to have been calculated using 500 MW for dependable project capacity. DWR notes that a lower value for MW would more appropriately reflect power the project could make regularly available to CALISO. In addition, this analysis overstates the net project benefits because the ancillary service benefit is also counted in the Commission levelized benefit analysis. DWR also questions the value of dependable capacity in MW and dollar value of ancillary benefits we used based upon the limitations of how the project can operate and the criteria they used to meet system load. SWC and Metropolitan make a similar comment. Specifically they note that the ancillary services value may be overstated in table 71 and that the Commission should rely on the historic value of ancillary services supplied by DWR in estimating future value. DWR also comments that Table 70 shows only \$11,830,000 for Annualized Cost of PM&Es for the Settlement Agreement Alternative. DWR notes that this is above the amount stated for the No-action Alternative, which was \$10,016,000, so the total PM&E's under the Settlement Agreement Alternative would presumably be \$11,380,000 + \$10,016,000 = \$21,846,000). By comparison, DWR notes that it cited a total of \$25,327k in its June 28, 2006, cost table submittal to the Commission.

Response: We revised our analysis to use 300 MW. We will maintain the \$5,218,000 in ancillary benefits as they do not appear to be redundant. The difference between the \$25,237,000 cost of the proposed measures in the Settlement Agreement and the \$21,846k for the PM&Es in the cost table in the draft EIS is based on our assumptions given in appendix B on cashflow associated with various individual measures. DWR assumed that all cash flow would occur upfront, but measures like the low flow channel facility modifications are not operational until year 10. We did make some corrections to our annualized costs based on other DWR comments.