

# Chapter 18

## Recreation and Public Access

### 18.1 Affected Environment

This section describes recreational facilities and opportunities and public access in the primary and extended study areas.

#### 18.1.1 Recreation

##### ***Shasta Lake and Vicinity***

Shasta Lake is the centerpiece of the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA). The Shasta Unit has a total area of approximately 125,500 acres, of which 29,500 acres are currently inundated by Shasta Lake at full pool, leaving approximately 96,000 acres of land area (USFS 1996). Figure 18-1 shows the recreation facilities in the Shasta Unit of the NRA.

**Recreation Setting and Activities** The USFS, headquartered in Redding, manages the Shasta Unit of the NRA to be a showcase recreational area. Environmental factors such as a hot summer season, steep terrain, and sparse forest cover in some areas favor water-oriented recreation as the main attraction. The focal point of recreation in the Shasta Unit is Shasta Lake itself, with its large surface area and 370 miles of shoreline (USFS 1996). The lake has four major arms; three of the arms are more than 12 miles long at full pool, and all are a mile or more wide at their downstream ends. The main basin of the lake near the dam is about 2 miles across.

Because boating is the predominant recreation activity at Shasta Lake, the lake attracts all types and sizes of powerboats, including personal watercraft (jet skis); runabouts, ski boats, and fishing boats; and larger cabin cruisers, pontoon boats, deck boats, and houseboats (Graefe et al. 2005).

Most fishing at Shasta Lake is done by boat rather than from the shoreline. The summer stratification of the lake into an upper warm layer above a deep cold-water pool provides opportunities for anglers to catch both warm-water and cold-water fish species year-round (USFS 1996).

Because of the steep terrain around the lake, there are no suitable sites for developed beach facilities (USFS 1996), and most swimming is associated with boating. Shasta Lake is also a very popular camping destination.

1 The primary recreation season at Shasta Lake is the period of approximately  
2 100 days from Memorial Day weekend to Labor Day weekend, although  
3 recreation uses occur year-round. Daytime high temperatures during the  
4 summer average in the mid to high 90s and in midwinter average in the mid-  
5 50s. Nearly all of the 30 to 70 inches of precipitation received by the lake area,  
6 mostly in the form of rain but occasionally as snowfall, occurs during late fall,  
7 winter, and spring (USFS 1996).

8 The Shasta Unit is bisected by Interstate 5, which provides easy access in 4  
9 hours or less for more than five million residents of southern Oregon and  
10 Northern California (USFS 1996). The population of Shasta County was  
11 estimated to be about 181,000 in 2009 (U.S. Census Bureau 2011).

12 This combination of large size and plentiful water-based recreation  
13 opportunities, favorable climate, and easy access make Shasta Lake one of the  
14 most visited recreation destinations in the state and region. The Shasta Unit of  
15 the Whiskeytown-Shasta-Trinity NRA received approximately 2.4 million  
16 recreation visitor days of use in 1994 (USFS 1996). Use levels are reduced  
17 during low-water years. Boating use levels as high as 1,400 boats have been  
18 recorded on summer weekends in recent years. Houseboats have been found to  
19 compose 30 percent to 40 percent of boat traffic on summer weekends (Graefe  
20 et al. 2005).

21 **Recreation Facilities** The boating, fishing, camping, and other recreation  
22 activities enjoyed at Shasta Lake are supported by a diverse range of public,  
23 commercial, and private facilities. Table 18-1 summarizes the major types of  
24 recreation facilities present.

25 Recreational boating on Shasta Lake is dependent on access to the water via  
26 shoreline facilities such as boat ramps and marinas. Six USFS public boat ramps  
27 are dispersed around the lake (USFS 2010a). Total parking capacity at the six  
28 ramps is about 600 vehicles (USFS 2007). The three largest ramps also offer  
29 accessible boat loading platforms for use by disabled persons (USFS 2010a).

30 A two-lane low-water ramp is used only when the reservoir is at least 75 feet  
31 below full pool, making the other public ramp in that area unusable (USFS  
32 2010a). Parking is on the lake bed, and vault toilets are provided when the ramp  
33 is in use.



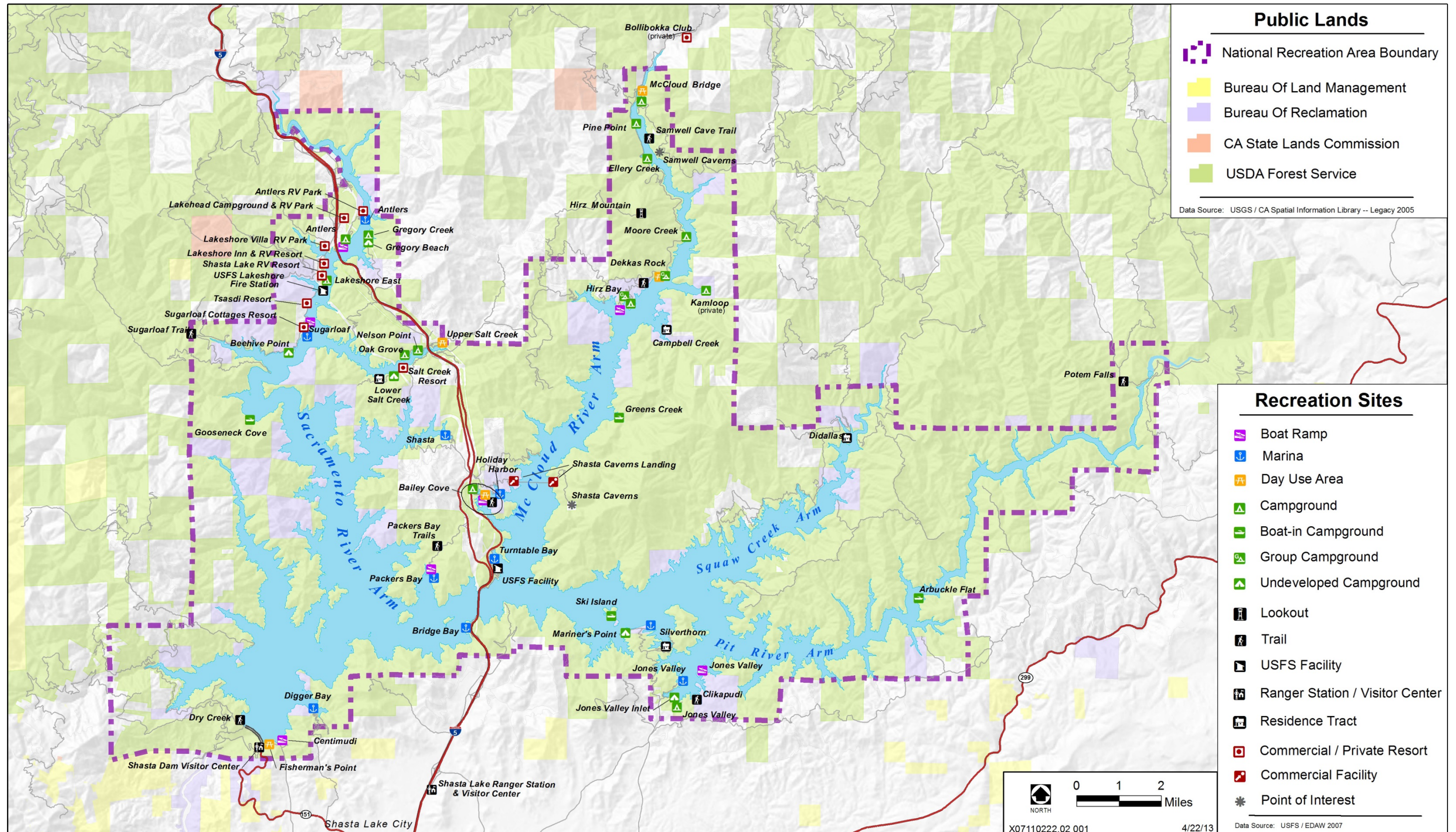


Figure 18-1. Recreation Facilities in the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area



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**Table 18-1. Summary of Public, Commercial, and Private Recreation Facilities on Shasta Lake**

Type of Facility	Number	Description
<b>Public Facilities</b>		
Boat ramp	6	Each provides parking, restrooms, and two to four paved launch lanes at full pool; there is also a two-lane low-water ramp with parking on the lake bed.
Day-use area	4	Each provides parking, picnic sites with tables and grills, and restrooms.
Family or group campground	15	Twelve family campgrounds with eight to 59 sites per campground; all have flush and/or vault toilets, most have piped water. Three group campgrounds have water and vault toilets.
Shoreline camping area	5	No designated campsites; all are provided with vault toilets, some with piped water.
Boat access campground	4	Eight to 23 sites per campground, accessible only by boat; vault toilets are provided.
Trail/trailhead	12	Twelve trails from one-third mile to 8 miles in length; several trailheads are incorporated into boat ramp or day-use parking areas, while others are stand-alone facilities.
<b>Commercial Facilities</b>		
Marina/marina resort	9	Wide range of sizes and services; most provide boat rentals, moorage, gas, groceries, etc.; some provide campsites and/or cabins.
Nonmarina resort/ RV park	7	Most provide cabins and/or RV and tent sites, moorage, and groceries/sundries. (Note: Five of these have shoreline infrastructure other than floating docks, two do not; additional resorts are nearby but not on the lake shoreline.)
Organization campground	1	Operated for members and the general public by California Kamloops, Inc.; tent camping, accessible only by boat, and boat dock/moorage provided for campers.
Other commercial facility	2	Shasta Lake Cavern tour; provides ferry and bus transport to caverns, moorage for private boats, and a gift shop.
		Bollibokka Club; offers lodging, meals, and guided trout fishing trips on the McCloud River upstream from the lake. (Note: This facility is not within the Whiskeytown-Shasta-Trinity National Recreation Area, but is accessed via a USFS road.)
<b>Private Facilities</b>		
Private cabin	~160	Located in four tracts, managed by USFS for individual recreation use with restrictions on improvements.

Source: USFS 1996

Key:

RV = recreational vehicle

USFS = U.S. Forest Service

1 Nine commercial marinas and marina resorts, all of which operate under USFS  
2 special-use permits, are distributed around Shasta Lake. All of the marinas offer  
3 houseboats for rent, providing a combined rental fleet of several hundred  
4 houseboats. Some marinas also rent other types of powerboats, personal  
5 watercraft, and nonpowered boats. The other primary service offered by most of  
6 the marinas is short- and long-term moorage for private boats. In addition to the  
7 rental fleets, several hundred private houseboats are moored at these marinas,  
8 along with many other powerboats. Additional commercial services are offered  
9 at most marinas/marina resorts, such as boat launching, gas sales, stores, and  
10 restaurants. Some have tent and recreational vehicle (RV) campsites and cabin  
11 or motel accommodations (ShastaLake.com 2011).

12 Sixteen nonmarina resorts and RV parks are located on or near Shasta Lake.  
13 These typically provide some combination of tent and/or RV campsites and  
14 cabins with other ancillary amenities such as stores, game rooms, restaurants,  
15 and swimming pools (ShastaLake.com 2011). Some of the resorts have  
16 special-use permits from USFS for use of a segment of shoreline land and/or  
17 installation of a boat dock. Other resorts are situated a short distance from the  
18 shoreline but do not provide direct access to the lake.

19 Thirteen USFS-constructed and concessionaire-operated and maintained family  
20 and group campgrounds are located on the lake. These range in size from 8 to  
21 59 sites and generally provide flush and/or vault restrooms and drinking water.  
22 Several of the campgrounds are adjacent to a public boat ramp or are served by  
23 a nearby ramp. Also available to campers are five shoreline camping areas with  
24 vault toilets but no designated sites; boaters may use one of four boat-access  
25 campgrounds ranging in size from 8 to 23 sites, each with fire rings, picnic  
26 tables, and vault toilets (USFS 2010b). Four USFS day-use sites with views of  
27 the lake provide five to nine picnic sites each, along with restrooms and  
28 drinking water (USFS 2011). An additional day-use and swim area is at the  
29 upstream end of the Salt Creek inlet, but is not currently operational.

30 Twelve USFS hiking and mountain biking trails, totaling about 25 miles in  
31 length, are located on or near the shoreline of Shasta Lake. Several of these  
32 trails are accessed via trailheads located at boat ramp and day-use parking areas,  
33 while others are served by stand-alone trailheads (USFS 2010c).

34 A unique commercial recreation service offered at Shasta Lake is the Shasta  
35 Caverns Tour. The tour operator uses a parking area, gift shop, and ferry  
36 boarding facility on the west shore of the McCloud Arm, and a similar staging  
37 area on the opposite shore, where visitors board buses for the short drive to the  
38 caverns.

39 Four USFS-managed “recreation residence” tracts are located on Shasta Lake,  
40 with numerous private cabins near the shoreline. USFS policy is to manage  
41 these facilities for the individual recreation use of the owners and to keep the  
42 areas in a primarily natural state (USFS 1996).

1           **Reservoir Operations and Effects on Recreation** Reclamation manages  
2 Shasta Lake primarily to provide water supply, which results in an annual cycle  
3 of major water level fluctuations at the lake. Such fluctuations affect access to  
4 water-based recreation facilities and services. In the typical annual cycle, the  
5 reservoir will reach its highest elevation for the year during late spring, then will  
6 be gradually drawn down through the summer peak recreation season and into  
7 fall. Refilling begins with the arrival of substantial winter rains in the watershed  
8 and continues through spring with additional rain and snowmelt. The highest  
9 annual reservoir pool level usually occurs between mid-April and mid-May. As  
10 the reservoir is drawn down during summer and fall, the lowest elevations are  
11 typically reached in November or December (DWR 2011a).

12 Boating facilities on the lake are generally designed to accommodate these  
13 expected and normal fluctuations in reservoir pool levels. All but one of the six  
14 primary public boat ramps extend to at least 75 feet below full pool; four extend  
15 from 95 feet to more than 200 feet below full pool (USFS 2010a).

16 Certain boating safety issues are related to pool level fluctuations. Reservoir  
17 drawdown places rocks, shoals, and islands just below the water surface where  
18 they may be struck by boats. Conversely, rising water levels may put obstacles  
19 that were easily seen and avoided one day just beneath the surface the next.  
20 Because the lake level varies considerably on a seasonal basis, the pattern of  
21 submerged obstacles varies as well.

22 Rising water levels may also increase the amount of floating debris in the lake,  
23 primarily woody debris that may include large tree limbs and logs. The larger  
24 debris can present a hazard to boating; even smaller debris can damage props or  
25 clog water intake ports in boat-engine cooling systems.

26 Campers are affected to some degree by falling pool levels because the distance  
27 from the campsites to the shoreline increases as the pool level decreases. The  
28 sites nearest the shoreline at most public campgrounds will be within a few  
29 hundred feet of the water through most summers when the pool level is  
30 generally high, but they may be considerably farther from the water during the  
31 off-peak seasons or during the latter portion of the peak season in dry years.  
32 Because the shoreline terrain is steep in most areas, the drawdown zone is  
33 difficult for visitors to use. Drawdown of the reservoir also has aesthetic effects  
34 for lake users, with an expanding band of mostly bare earth and rock exposed as  
35 the pool level declines.

### 36 ***Upper Sacramento River (Shasta Dam to Red Bluff)***

37 The Sacramento River corridor is an important recreation resource for the  
38 northern California region. Access and facilities are found on both public and  
39 private land. This section describes existing recreation and public access  
40 resources in the primary study area, beginning at and including the downstream  
41 side of Shasta Dam and extending to Lake Red Bluff/Red Bluff Pumping Plant

1 that could be affected by the project. Figure 18-2 shows the recreation facilities  
2 in the upper Sacramento River portion of the primary study area.

3 **Shasta Dam** Reclamation controls public access at Shasta Dam. For several  
4 years, access was available only by permit for security reasons; since 2010,  
5 visitors have been allowed to drive across the dam between 6 a.m. and 10 p.m.  
6 after producing a valid driver's license and vehicle registration and subjecting  
7 their vehicle and any trailer to inspection (Reclamation 2010).

8 The area immediately below the dam, where the Shasta Powerplant and  
9 associated infrastructure is located and where water is released from Shasta  
10 Dam and the powerplant, is closed to public use for safety and security reasons.

11 **Shasta Dam to Keswick Dam** Recreation facilities provided along this  
12 portion of the Sacramento River include the Chappie-Shasta Off Highway  
13 Vehicle (OHV) Area, Sacramento River Rail Trail and other trails, Shasta  
14 Campground, and Keswick Reservoir Boat Ramp.

15 Keswick Reservoir occupies nearly the full length of the narrow river gorge that  
16 stretches 9 miles from Shasta Dam to Keswick Dam. The reservoir has a healthy  
17 population of wild trout, including German browns and rainbows, and fish are  
18 occasionally planted by CDFW.

19 The Chappie-Shasta OHV Area, managed by the U.S. Department of the  
20 Interior, Bureau of Land Management (BLM), Redding Field Office, provides  
21 opportunities for OHV use on 200 miles of roads throughout 52,000 acres of  
22 land. Two staging areas provide access to OHV roads and trails that are rated  
23 difficult and moderate. Those roads and trails are open to two-wheeled  
24 motorcycles, all-terrain vehicles, and four-wheel-drive high-clearance vehicles  
25 (BLM 2006). The Shasta staging area and campground are situated close to the  
26 river about 1 mile below Shasta Dam. The campground has 30 campsites for  
27 tents and RVs. No water or electricity hook-ups are available (USFS 2010b).

28 The Sacramento River Rail Trail, a nonmotorized-use National Recreation  
29 Trail, extends more than 10 miles along an old railroad line and closely follows  
30 the west side of the river and of the shoreline of Keswick Reservoir. The wide  
31 and generally flat gravel-surface trail is open year-round to equestrians, hikers,  
32 and bicyclists. Trailheads are located at the Chappie-Shasta OHV Area, at  
33 Keswick Boat Ramp and Rock Creek, at the southern terminus of the trail, and  
34 at a location near the midpoint of the trail. The BLM lands above the east side  
35 of Keswick Reservoir have more than 20 miles of trails, primarily single-track  
36 nonmotorized trails with a dirt surface, connecting at the north end to Shasta  
37 Dam (Healthy Shasta 2009).



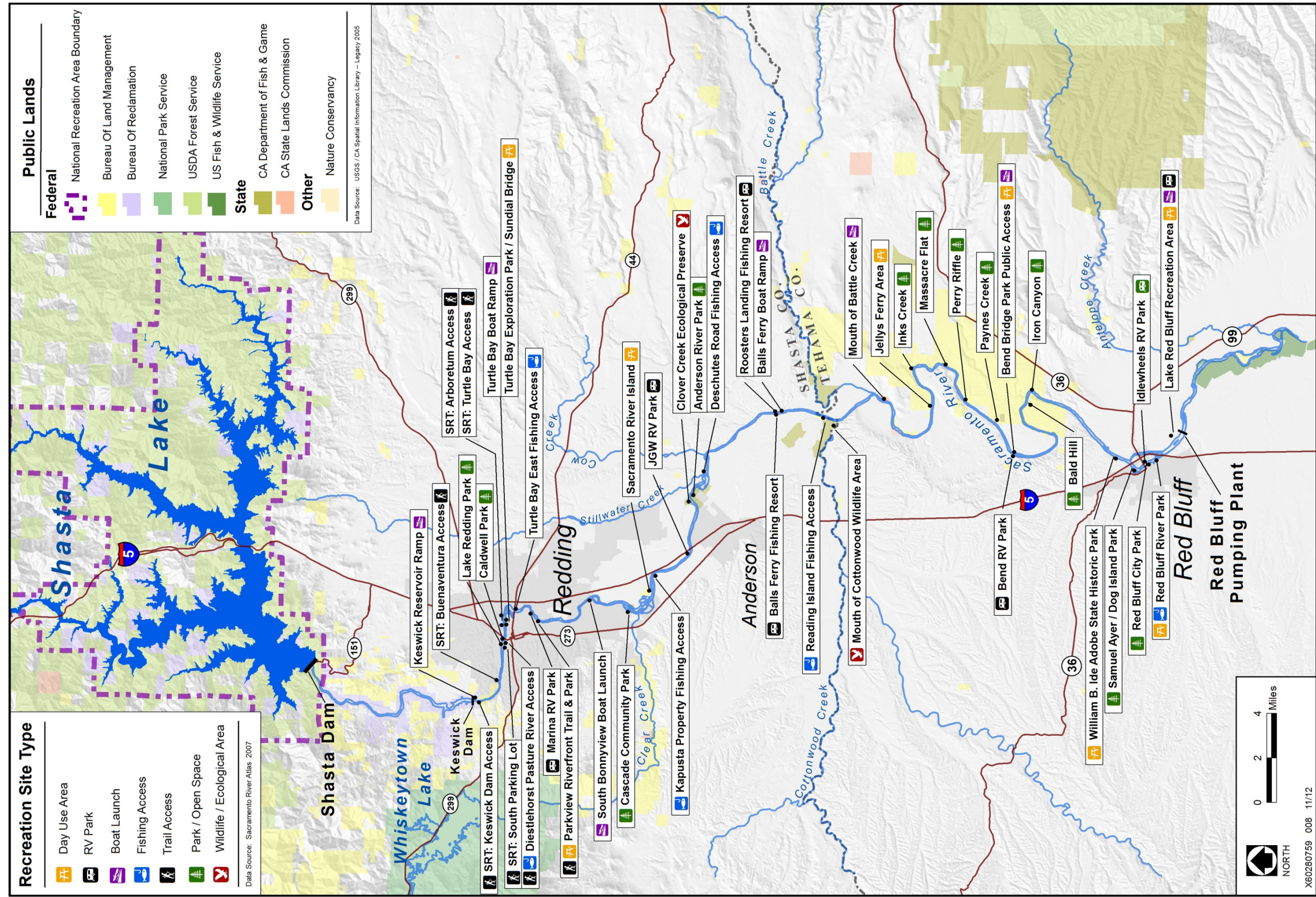


Figure 18-2. Recreation Facilities in the Upper Sacramento River Portion of the Primary Study Area



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1           **Keswick Dam to the Red Bluff Pumping Plant** This area encompasses about  
2 60 miles of the Sacramento River and contains the majority of recreation  
3 resources and public access sites within the primary study area. Recreational  
4 activities are numerous within this area and include fishing, boating, hiking,  
5 horseback riding, biking, hunting, camping, picnicking, wildlife viewing/nature  
6 observation, viewing historic sites, and enjoying developed urban recreational  
7 activities such as soccer and baseball. The discussion below provides a brief  
8 overview of the activities supported by the Sacramento River and riverside  
9 recreation facilities, followed by additional details about recreation facilities.

10           *Recreational Setting and Activities* Between Keswick Dam and the Red Bluff  
11 Pumping Plant, the Sacramento River flows past cities and towns and both private  
12 and public lands. The riparian forests along the river, the oak woodlands and  
13 grasslands on higher ground, and riverside bluffs provide a scenic setting for river  
14 users at riverside recreation facilities and for boaters and anglers on the river. The  
15 riparian landscape between Redding and Red Bluff is described as the most  
16 unspoiled of the entire 375-mile river (DBW 2011a). BLM owns and manages  
17 much of the riverside lands between Balls Ferry and Red Bluff (approximately  
18 River Mile (RM) 250 to RM 276).

19           The climate of the northern Sacramento Valley is hot and dry during the summer,  
20 with daily high temperatures averaging in the upper 90s Fahrenheit and little or no  
21 precipitation. Winter climate can be described as moderate but wet, with average  
22 daily high temperatures in the mid-50s during December and January and an  
23 average of 4-8 inches of rain per month between November and March.

24           River use and recreation opportunities available vary throughout the year with the  
25 highly variable flow of the river. During the winter and spring, the river may have  
26 short-term peak flows of 80,000 to 90,000 cubic feet per second (cfs) and is  
27 usually flowing above 20,000 to 30,000 cfs. Flows are less variable during the  
28 summer and fall, with typical summer flows of 10,000 to 15,000 cfs and typical  
29 fall flows of 5,000 to 10,000 cfs (DWR 2011b). BLM identifies flows of 6,000 to  
30 12,000 cfs as optimal for boating (BLM no date). River temperature is cold year-  
31 round because of the release of water from the deep cold-water layers of Keswick  
32 Reservoir, and Shasta Lake upstream. Winter water temperatures are in the 40s  
33 Fahrenheit and summer water temperatures do not rise above the mid-50s.

34           The Sacramento River is known for good fishing opportunities. Species such as  
35 salmon, steelhead, rainbow trout, sunfish, largemouth bass, and striped bass can  
36 be found within the river. Fly fishing is popular, especially when flows are 5,000  
37 to 8,000 cfs, which typically occurs during fall and early winter (Fly Fishing  
38 Connection 2003).

39           Boating opportunities are abundant along the Sacramento River from Keswick  
40 Dam to the Red Bluff Pumping Plant. Eight sites along the river provide public  
41 boat ramps and two additional sites permit car-top launch and retrieval.

1 Although the Sacramento River is not generally considered a whitewater river,  
2 there are two easy whitewater runs on this section of the river. The first is from  
3 Keswick Dam to the Anderson-Cottonwood Irrigation District Diversion Dam in  
4 Redding. The second run is from Anderson River Park to William B. Ide Adobe  
5 State Historic Park. This run is 22 miles long and rated Class I to Class II. The  
6 Class II China Rapid is a few miles upstream from Red Bluff (Tuthill 2005).

7 Opportunities for trail activities such as walking, jogging, bicycling, and  
8 horseback riding are available throughout this stretch of the river. There are 21  
9 sites with trails or access to trails. The most notable trails along this section of  
10 river are the Sacramento River Trail and the trails that connect BLM lands below  
11 Balls Ferry.

12 Hunting opportunities are located primarily on BLM land along the Sacramento  
13 River. The main hunting areas along the river are Inks Creek, Massacre Flat,  
14 Perry Riffle, Paynes Creek, Bald Hill, and Iron Canyon. Hunting is permitted on  
15 BLM land unless posted as closed (e.g., along hiking trails and at developed  
16 recreation areas). Game species found on BLM lands include quail, dove,  
17 waterfowl, deer, pig, bear, and turkey (BLM 1992).

18 Opportunities for developed camping along or near the river are located mainly at  
19 privately operated RV parks and fishing resorts, and are also provided at the  
20 public Lake Red Bluff Recreation Area. Most camping opportunities are for RVs,  
21 but a few tent and group camping sites are available. Primitive camping is  
22 available at five sites within the BLM Sacramento River Area, between about  
23 Battle Creek and Payne's Creek, about 10 miles upstream from the Red Bluff  
24 Pumping Plant. River visitors may also camp on undeveloped BLM land in the  
25 area. The mouth of Inks Creek and 0.75 mile above and below the mouth is closed  
26 to camping (BLM 1992).

27 The Sacramento River corridor provides a beautiful setting for picnickers. A total  
28 of 21 sites along this river reach provide picnicking facilities; these sites include  
29 municipal parks, RV parks and fishing resorts (private facilities), William B. Ide  
30 Adobe State Historic Park, boat ramps, and fishing access sites. Generally,  
31 facilities include picnic tables, shade structures (or trees), and barbeque pits.

32 Another recreation opportunity available along the Sacramento River is viewing  
33 historic sites. Historic sites or historical markers exist at a handful of sites.

34 The Sacramento River meanders through the small cities of Redding, Anderson,  
35 and Red Bluff. The municipal parks along this section of the river provide  
36 developed urban recreation opportunities such as horseshoes, soccer, and  
37 baseball, as well as playgrounds and a swimming pool.

38 *Recreational Facilities* More than 40 recreation/public access sites are available  
39 along the Sacramento River between Keswick Dam and the Red Bluff Pumping  
40 Plant. For this analysis, these sites have been categorized by primary use as

1 municipal parks, fishing access/day-use areas, boat launches, trail accesses, RV  
 2 parks, wildlife areas, and undeveloped open space areas. Table 18-2 describes  
 3 these facilities by type.

4 **Table 18-2. Summary of Recreation Sites along the Sacramento River Between Keswick**  
 5 **Dam and the Red Bluff Pumping Plant**

Type of Facility	Number	Description
<b>Public Facilities</b>		
Municipal park	6	Managed by the Cities of Redding, Anderson, and Red Bluff. All sites provide parking and picnic sites. Most have restrooms and trails. Several also have boat ramps and two sites have hand launching. Other amenities include horseshoe pits, sports fields, swimming pools, playgrounds, a skateboard park, a fish viewing area, and a bike riding area.
Boat launch	7	Managed by the City of Redding, Shasta County, Tehama County, the State Lands Commission, and the City of Red Bluff. All provide parking and most provide restrooms. One site is a Point of Historical Interest and one site provides raft rentals.
Trail access	6	Managed by Reclamation and the City of Redding. Primarily provide access to Sacramento River Trail. All provide parking, two provide picnic sites, and one provides restrooms. One site has a historical marker and one has a historic powerhouse.
Fishing access/ day-use area	7	Managed by the City of Redding, BLM, and Shasta County. Most provide parking and access to trails. Other amenities include ponds, boat ramps, day-use facilities, group camping, and a community garden.
Wildlife area/ ecological reserve	2	Both managed by CDFW. Mouth of Cottonwood Creek Wildlife Area has parking facilities. Clover Creek Ecological Preserve has no facilities.
Open space area	6	All are managed by BLM. Most have trails, three have parking, and two have restrooms. Other amenities include hand launching, picnic sites, walk-in camping, fishing pond, and beaches. Three are trail or boat access only.
Other public park	2	Lake Red Bluff Recreation Area, administered by USFS, provides river access, day-use, and camping facilities; also includes the Sacramento River Discovery Center. William B. Ide Adobe State Historic Park is a small State Parks unit focused on a historic adobe and related structures.
<i>Subtotal</i>	35	
<b>Private/Commercial Facilities</b>		
Educational/nature Park	1	Turtle Bay Exploration Park; includes a museum, butterfly house, live animals, and parking, with access to a scenic pedestrian bridge over the river and the Sacramento River Trail.
RV park	7	The largest facility provides 174 RV sites, four other facilities provide from 44 to 85 RV sites; two "fishing resorts" provide 12 and 20 RV sites. Most provide a boat ramp and showers; other amenities include tent sites, restaurants, swimming pools, a store, a bar, and a group campground.
<i>Subtotal</i>	8	
<b>Total – All Facilities</b>	<b>43</b>	

Key:  
 BLM = U.S. Bureau of Land Management  
 CDFW = California Department of Fish and Wildlife  
 Reclamation = U.S. Department of the Interior, Bureau of Reclamation  
 RV = recreational vehicle  
 State Parks = California Department of Parks and Recreation  
 USFS = U.S. Forest Service

6 *Municipal Parks* Municipal parks in this river section consist of Lake Redding  
 7 Park, Caldwell Park, and Cascade Community Park (City of Redding); Anderson  
 8 River Park (City of Anderson); and Samuel Ayer/Dog Island Park and Red Bluff



1 City Park (City of Red Bluff) (CSUC 2006, City of Redding 2004, City of  
2 Anderson 2007). Most of the municipal parks provide facilities such as trails or trail  
3 access, restrooms, playgrounds, ball fields, swimming pools, horseshoe pits, and  
4 picnic sites. Lake Redding Park (Lake Redding is created by the Anderson-  
5 Cottonwood Irrigation District Diversion Dam) provides boating facilities, trails,  
6 picnic facilities, horseshoe pits, and restrooms. Anderson River Park provides a  
7 similar range of amenities, including a boat ramp.

8 *Fishing Access and Day-Use Sites* There are four public fishing accesses in this  
9 reach of the Sacramento River: the Turtle Bay East, Kapusta Property, Deschutes  
10 Road, and Reading Island fishing accesses. All of the fishing accesses provide  
11 parking and most provide trails as well. The sites are managed by the City of  
12 Redding, Shasta County, and BLM (CSUC 2006). Reading Island provides a  
13 cement boat ramp along a slough leading to the river, but sedimentation and dense  
14 aquatic vegetation limit use to small car-top boats. Primitive group camping is  
15 also available at Reading Island, under a special-use permit issued by BLM (BLM  
16 no date).

17 Three day-use sites are available on this stretch of the Sacramento River. These  
18 sites may provide both fishing and trail access, like that found at Diestlehorst  
19 Pasture River Access, managed by the City of Redding. Two BLM-managed day-  
20 use sites, Jellys Ferry and Sacramento River Island, are also available (CSUC  
21 2006).

22 *Boat Launch Facilities* There are seven sites on this river reach that are primarily  
23 for boat launching: Turtle Bay Boat Ramp, Caldwell Park Boat Ramp, and South  
24 Bonnyview Boat Launch, operated by the City of Redding; Balls Ferry Boat  
25 Ramp, operated by Shasta County; Mouth of Battle Creek Boat Launch, owned  
26 by the State Lands Commission; Bend Bridge Park Public Access, operated by  
27 Tehama County; and Red Bluff River Park, operated by the City of Red Bluff.

28 *Trails and Trail Access Facilities* The Sacramento River Trail is a 13-mile paved  
29 urban trail system along the riparian corridor on both sides of the river from  
30 Keswick Dam to Turtle Bay Park in Redding. Two pedestrian bridges cross the  
31 river to create a loop of about 5 miles. At least six sites provide primary access to  
32 the trail and a few other sites provide connections to the trail (Healthy Shasta  
33 2008).

34 Unlike the boating and day-use facilities that occur throughout this river reach,  
35 the trail access sites are primarily on the portion of the river that flows through  
36 Redding. Six specific Sacramento River Trail access sites and five other sites, all  
37 provided by the City of Redding, also provide access to the Sacramento River  
38 Trail.

39 *RV Parks* There are seven privately operated RV parks along this reach: one in  
40 Redding (Marina RV Park), three in the Anderson area (JGW RV Park, Balls  
41 Ferry Fishing Resort, and Roosters Landing Fishing Resort), one near the

1 community of Bend (Bend RV Park), and two in Red Bluff (Idlewheels RV Park  
2 and Durango RV Resort). The two largest parks offer 85 and 174 RV sites. Two  
3 of the parks also offer tent camping, and two parks offer group camping. All of  
4 the RV parks offer picnic facilities and most offer showers. Three of the parks  
5 offer boat launches. Two of the parks offer a restaurant and one offers a bar,  
6 swimming pool, and store. The largest park, a new facility in Red Bluff, offers a  
7 lap pool and spa, a lodge, two clubhouses for meetings, and 45 acres of  
8 surrounding land with walking trails (CSUC 2006).

9 *Wildlife Areas* There is one CDFW-owned and managed area along this river  
10 reach, the Mouth of Cottonwood Creek Wildlife Area. A parking area is the only  
11 improvement at the site. The area is excellent habitat for Swainson’s hawk, bald  
12 eagle, ringtail, and river otter and provides good wildlife viewing, birding, and  
13 photography opportunities (CDFG 2011).

14 *Undeveloped Public Lands* There are six areas between Inks Creek and Iron  
15 Canyon that, for this analysis, are considered undeveloped open space areas: Inks  
16 Creek, Massacre Flat, Perry Riffle, Paynes Creek, Bald Hill, and Iron Canyon. All  
17 six areas are managed by the BLM Redding Field Office. Other than parking  
18 areas, few facilities are available at most of these areas; they are mainly large  
19 open areas available for general public use and enjoyment (CSUC 2006).

20 *Other Public and Private Parks* Turtle Bay Exploration Park in Redding is a  
21 privately operated facility that contains a museum, butterfly house, forest camp  
22 replica, arboretum, and gardens. The park provides access to the scenic Sundial  
23 pedestrian bridge over the river, and access to the Sacramento River Trail (Turtle  
24 Bay Exploration Park 2011). The 3-acre William B. Ide Adobe State Historic  
25 Park in Red Bluff focuses on several historical elements and provides parking,  
26 trails, picnic facilities, and restrooms (State Parks 1990).

### 27 ***Lower Sacramento River and Delta***

28 Recreation opportunities on the Sacramento River downstream from Red Bluff  
29 Pumping Plant include hunting, fishing, boating, RV/tent/group camping, birding,  
30 wildlife viewing, picnicking, hiking, and sports activities (softball, soccer, tennis,  
31 basketball, and horseshoes). The 100-mile stretch of river down to Colusa  
32 includes many parcels of public conservation and recreation lands, as well as a  
33 few privately owned commercial recreation sites. There are two primary  
34 landowners on the river: the U.S. Fish and Wildlife Service, with more than two  
35 dozen units of the Sacramento River National Wildlife Refuge totaling more than  
36 10,300 acres (many of which are closed to the public) (USFWS 2005); and  
37 CDFW, with more than 15 units of the Sacramento River Wildlife Area totaling  
38 more than 3,700 acres (most open to the public but accessible only by boat)  
39 (CDFG 2004). The California Department of Parks and Recreation (State Parks)  
40 operates three park units (one State park and two State recreation areas) on the  
41 river between Red Bluff and Colusa—one each near Corning (RM 218), Hamilton  
42 City (RM 193 to RM 200), and Colusa (RM 145) (CSUC 2006). An additional  
43 State recreation area is located on the Sacramento River in the Delta.

1 Recreation facilities are located primarily between Red Bluff and the Bidwell–  
2 Sacramento River State Park near Hamilton City, about 50 river miles  
3 downstream, because of the availability of the State park facilities and privately  
4 owned RV parks and resorts. Downstream from Bidwell–Sacramento River State  
5 Park, the variety and density of facilities are reduced. Facilities vary from boat  
6 ramps and marinas to campgrounds, picnic sites, and trails (CSUC 2006). Beyond  
7 the Red Bluff Pumping Plant, recreation and public access would not likely be  
8 affected with implementation of the project; therefore, an in-depth review of  
9 recreation activities and facilities south of the Red Bluff Pumping Plant is not  
10 presented in this analysis.

### 11 **CVP/SWP Service Areas**

12 CVP and SWP facilities and service areas are widespread throughout much of  
13 California. Facilities include multiple dams, reservoirs, and canals that provide  
14 substantial water-based recreational activities. Releases from dams on major  
15 tributaries to the Sacramento River provide numerous recreational opportunities,  
16 especially boating and fishing. Reservoirs such as Folsom, Oroville, and New  
17 Melones provide boating, fishing, camping, and other recreational activities.

## 18 **18.2 Regulatory Framework**

### 19 **18.2.1 Federal**

#### 20 **U.S. Forest Service**

21 Shasta Lake and the surrounding Federal lands compose the Shasta Unit of the  
22 Whiskeytown-Shasta-Trinity NRA, established by Congress in November 1965 to  
23 provide for public outdoor recreation use and enjoyment, among other purposes.  
24 Both the Shasta and Trinity units of the NRA are within the Shasta-Trinity  
25 National Forest and are administered by USFS. The act establishing the NRA  
26 specified that it was to be administered in a manner coordinated with other  
27 purposes of the CVP. Reclamation retained management of lands and waters  
28 needed for operating the CVP, and controls operation of Shasta Dam and  
29 reservoir pool levels. The lake surface and surrounding lands are administered by  
30 USFS (an exception is the area in the immediate vicinity of the dam, which is  
31 administered by Reclamation).

32 USFS manages recreation within the Shasta Unit under the authority of the 1987  
33 Master Interagency Agreement between Reclamation and USFS. Administration  
34 of the Shasta Unit of the NRA is coordinated with the administration and  
35 purposes of the CVP through a memorandum of agreement between Reclamation  
36 and USFS established December 31, 1986. The management of Shasta Lake is  
37 guided by the 1995 *Shasta-Trinity National Forest Land and Resource*  
38 *Management Plan* (STNF LRMP) and the *Management Guide: Shasta and*  
39 *Trinity Units of the Whiskeytown-Shasta-Trinity NRA* (USFS 1996). The NRA  
40 Management Guide is currently being updated.

1                   **Shasta-Trinity National Forest Land and Resource Management Plan (1995)**

2                   The STNF LRMP (USFS 1995a) guides management of both the Shasta and  
3                   Trinity national forests with the goals of integrating a mixture of management  
4                   activities that protect forest resources and allow use, fulfill guiding legislation,  
5                   and address local, regional, and national issues. The project is located within two  
6                   management units—the Shasta Unit of the Whiskeytown-Shasta-Trinity NRA,  
7                   which includes Shasta Lake and surrounding lands, and the Front Unit, which  
8                   includes USFS lands south of the lake. As stated in the STNF LRMP, the Shasta  
9                   Unit is managed according to the current NRA Management Guide. The portion  
10                  of the Front Unit located within the primary study area (south of the lake) is  
11                  managed under Matrix Prescription III, Roaded Recreation. This prescription  
12                  “emphasizes recreational opportunities associated with developed road systems  
13                  and dispersed and developed campsites” (USFS 1995a). The STNF LRMP states  
14                  that this prescription is also the primary prescription for the Shasta Unit of the  
15                  NRA. The plan provides relevant recreation-related standards and guidelines to  
16                  ensure road, trail, and facility development and management activities consistent  
17                  with a Roaded Natural setting.

18                  **Shasta-Trinity National Recreation Area Management Guide (1996)** The

19                  *Shasta-Trinity National Recreation Area Management Guide* (USFS 1996)  
20                  integrates management of the NRA with and implements the direction in the  
21                  STNF LRMP. The guide addresses key management concerns related to  
22                  recreation and other resource management, such as the types and amounts of  
23                  commercial and USFS recreation facilities to be provided. Desired future  
24                  conditions for Shasta Lake are described, and management recommendations  
25                  aimed at implementing the STNF LRMP and achieving desired future conditions  
26                  are detailed for both lake and land-based recreation and for commercial recreation  
27                  operations within the NRA.

28                  **Mendocino National Forest Land and Resource Management Plan (1995)**

29                  The *Mendocino National Forest Land and Resource Management Plan*  
30                  (Mendocino National Forest LRMP) (USFS 1995b) guides management of the  
31                  Mendocino National Forest with the goals of integrating a mixture of  
32                  management activities that protect forest resources and allow use, fulfill guiding  
33                  legislation, and address local, regional, and national issues. Management Area  
34                  #38, Lake Red Bluff Recreation Area, is at the extreme downstream end of the  
35                  primary study area. (The Lake Red Bluff Recreation Area was transferred from  
36                  Reclamation ownership in the late 1980s and is isolated from the rest of the  
37                  National Forest; all other lands are well to the west of the study area.)

38                  The Mendocino National Forest LRMP states that management and development  
39                  should conform to the record of decision for the Final EIS for the Lake Red Bluff  
40                  Recreational Development. Relevant recreation-related major aspects of this  
41                  decision include a management direction emphasizing supplying quality water-  
42                  oriented recreation experiences for the public, maintaining a safe setting for  
43                  recreational users, and providing educational and interpretive opportunities. The  
44                  management area is also managed under the Recreation Area prescription, which

1 “provides direction for maintaining attractive landscapes and recreation quality  
2 around major lakes and within other areas of concentrated recreation use” (USFS  
3 1995b). The area is to be managed to maintain a Recreation Opportunity  
4 Spectrum (ROS) class of “Roaded Natural.”

5 ***U.S. Bureau of Land Management***

6 **Overview** BLM administers most of the public lands along the Sacramento  
7 River between Shasta Dam and Keswick Dam, and additional lands between  
8 Keswick Dam and the city of Redding, as part of the 23,000-acre Interlakes  
9 Special Recreation Management Area. BLM administers the Chappie-Shasta Off-  
10 Highway Vehicle Area, which encompasses 52,000 acres and 250 miles of roads and  
11 trails between the Sacramento River and Clear Creek. BLM also administers more  
12 than 17,000 acres of public lands on both sides of the river within the Sacramento  
13 River Management Area, which extends from just downstream from Redding  
14 downstream to the Tehama County/Glenn County boundary, about 25 miles south  
15 of Red Bluff. Most of the BLM lands are concentrated above Red Bluff, between  
16 Jellys Ferry and Iron Canyon. A few hundred additional acres of BLM lands are  
17 at two island parcels downstream from Red Bluff.

18 **Proposed Redding Resource Management Plan and Final EIS (1992)** The  
19 proposed resource management plan (RMP) and Final EIS (BLM 1992) for the  
20 Redding Resource Area (BLM 1992) identifies proposed management direction  
21 for BLM-administered public lands within the Redding Resource Area, totaling  
22 approximately 250,000 acres of land in north-central California. The RMP  
23 focuses on resolving four main issues: land tenure adjustment, recreation  
24 management, access, and forest management. BLM selected a preferred  
25 alternative for each of the seven management areas; collectively these preferred  
26 alternatives compose the proposed action of the RMP. The project is located  
27 within the Shasta and Sacramento River management areas. The Shasta  
28 Management Area includes the lands southwest of Shasta Lake within the  
29 Interlakes Special Recreation Management Area. General recreation management  
30 direction for the entire Redding Resource Area is also provided within the RMP  
31 and focuses on ROS designations and guidelines, camping limits, OHV  
32 designations, and wild and scenic rivers.

33 Recreation-related management direction for the Interlakes Special Recreation  
34 Management Area includes objectives to provide a regional opportunity for  
35 motorized recreation with a focus within the Gene Chappie/Shasta OHV Area and  
36 to enhance nonmotorized recreation opportunities within the area via a greenway  
37 connecting Redding to Shasta Dam along the Sacramento River. Motorized  
38 vehicle use is limited to designated roads and trails that may be closed between  
39 November 15 and April 15 to protect the wintering deer herd. The area is  
40 managed as Semi-Primitive, Non-Motorized, Semi-Urban, Semi-Primitive  
41 Motorized, and Roaded Natural (ROS classes).

42 The Sacramento River Management Area includes the Sacramento Island area,  
43 between Redding and Anderson, a large block of contiguous parcels along the



1 river between Balls Ferry (RM 276) and Iron Canyon (RM 250), and two islands  
2 downstream from Red Bluff. Recreation-related management direction for these  
3 areas includes management within the Semi-Primitive Motorized ROS class,  
4 closure to motorized vehicles, and an emphasis on boat-in access and use.  
5 Because of the special value of the Valley oak riparian forest at Sacramento  
6 Island, the area has been designated as a Research Natural Area/Area of Critical  
7 Environmental Concern, with special management plans to protect and improve  
8 the plant communities and habitat there.

9 The 25 miles of the Sacramento River between Balls Ferry and Iron Canyon have  
10 been determined to be eligible for inclusion in the National Wild and Scenic  
11 Rivers System, with recreational, scenic, and wild classifications for various  
12 segments. All public lands within one-quarter mile of normal high water will be  
13 managed to protect the outstandingly remarkable values and free-flowing  
14 character that led to their determination of eligibility.

## 15 18.2.2 State

### 16 ***California Department of Fish and Wildlife***

17 CDFW manages the ecological reserve and the wildlife areas within the study  
18 area under Title 14 of the California Code of Regulations and the California Fish  
19 and Game Code. The regulations provide for various types of public uses in the  
20 wildlife areas. However, fish and wildlife protection and enhancement are the  
21 primary management purposes of the wildlife areas; recreation and public use is  
22 secondary to habitat preservation. Ecological reserves are established to provide  
23 rare, threatened, or endangered plants and wildlife and special habitat types;  
24 public entry may be restricted to protect wildlife or habitat.

25 The CDFW-administered wildlife areas on the Sacramento River within the  
26 primary and extended study areas are designated by the California Fish and Game  
27 Code as “Type C” areas, which generally have no or minimal developed facilities.  
28 A “Type C” area designation does not require hunters to have a permit or pass  
29 (other than a valid California hunting license and any required stamps) for most  
30 areas. General “Type C” area regulations apply to all of the wildlife areas within  
31 the study area; special regulations for each area prohibit camping and establish  
32 other restrictions on hunting and other uses (see Title 14 of the California Code of  
33 Regulations).

34 CDFW interacts with other management agencies in the study area to ensure that  
35 hunting and fishing regulations are enforced on public and private lands and  
36 maintains authority over all activities that have the potential to affect wildlife or  
37 wildlife habitat. CDFW administers the waterfowl hunting program on a number  
38 of Federal wildlife refuges, including the Sacramento River National Wildlife  
39 Refuge.

1                   **California Department of Parks and Recreation**

2                   State Parks manages the State park and recreation areas within the study area  
3                   under Title 14 of the California Code of Regulations and the California Public  
4                   Resources Code. Specific management direction and guidance is provided by  
5                   general plans for individual parks. A preliminary draft general plan was  
6                   completed for the Bidwell–Sacramento River State Recreation Area in 2003 (a  
7                   final plan was approved by the California Park and Recreation Commission in  
8                   2006 but has not been published). The plan provides specific goals and guidelines  
9                   for a range of issues related to environmental resources, visitor use and  
10                  opportunities, and park administration and operations. Additional direction for  
11                  facility development at each of the park’s four subunits is also provided. The  
12                  management recommendations in the 1990 general plan for William B. Ide Adobe  
13                  State Historic Park focus on protecting the historic integrity that is the primary  
14                  value of the 3-acre site, and on protecting the riparian forest in the riverbank area  
15                  (State Parks 1990). No current park management plans were available for the two  
16                  other small State Parks units on the river.

17   **18.2.3 Regional and Local**

18                   **Shasta County**

19                  The Open Space and Recreation Element of the *Shasta County General Plan*  
20                  (Shasta County 2004) is intended to preserve open space for the economy,  
21                  enjoyment of scenic beauty, recreation, and use of natural resources. The Open  
22                  Space and Recreation Element addresses recreation as it relates to the tourist  
23                  industry and recreation at the countywide level. Recreation is considered the  
24                  active use of open space land. “Recreational areas are essentially open space lands  
25                  which are designed to accommodate recreational activities such as hiking,  
26                  picnicking, or camping” (Shasta County 2004). Several sites that fall under the  
27                  recreation analysis herein are included under Shasta County’s Open Space  
28                  Inventory: the Shasta-Trinity National Forest, BLM holdings, Balls Ferry Fishing  
29                  Access, Anderson River Park and Fishing Access, Lake Redding–Caldwell  
30                  Memorial Park, Turtle Bay Regional Park, Turtle Bay East, privately owned and  
31                  operated recreational facilities such as resorts and RV parks, and historic  
32                  landmarks and points of interest (Shasta County 2004).

33                  The Open Space and Recreation Element describes goals and objectives for  
34                  protection of open space and recreation resources including the following (Shasta  
35                  County 2004):

- 36                      • Protection of open space through certain land-use classifications
- 37                      • Coordination of parks and recreation systems planning, acquisition,  
38                      development, and operation among Federal, State, county, and city  
39                      governments

- 1                   • Using the National Resource Protection–Recreation Resources land use  
2 designation to protect the quality of recreation resource values of national  
3 parks and recreation areas, wilderness areas, and State parks
  
- 4                   • Permitting commercial recreation uses
  
- 5                   • Requirement of public access and easements provided by the Subdivision  
6 Map Act along the Sacramento River (Keswick Dam to the county line)  
7 and Battle Creek (downstream from Coleman Powerhouse)
  
- 8                   • Provision of public access and easements for recreation if riparian habitat  
9 is not significantly affected, public access is not available within a  
10 reasonable distance, or the corridor is located near urban, town, and rural  
11 community centers

12                   The Public Facilities Element contains a discussion of recreation at the  
13 community level. The element states that the “community recreation needs of  
14 Shasta County residents and the degree to which these needs are met by County  
15 government vary with the type of community in which they live” (Shasta County  
16 2004). Recreation needs in urban areas are primarily for publicly owned  
17 parklands. The element identifies that “recreation officials in the unincorporated  
18 urban areas of the County indicate that a substantial portion of the recreation  
19 needs of the residents of these communities is not being met” (Shasta County  
20 2004).

21                   An increase in recreational demand is expected as a result of the growth of urban  
22 areas over the 20-year planning period. County policy “will rely upon interagency  
23 planning efforts and providing long-term protection of resource and open space  
24 lands and features that exhibit future recreation potential” (Shasta County 2004).

25                   The objective in the Public Facilities Element related to recreation describes  
26 developing a land use pattern that adequately serves for community recreation.  
27 The policy that supports this objective relates to designation of the locations of  
28 existing and proposed large-scale community recreation facilities as Natural  
29 Resources Protection Parklands (Shasta County 2004).

### 30                   ***Tehama County***

31                   The Open Space and Conservation Element of the *Tehama County General Plan*  
32 *Update 2009 – 2029* (March 2009) (Tehama County 2009) addresses several  
33 resource areas, including Natural Resource Land and Recreation. The element  
34 includes a brief description of national forests located within the county, Lassen  
35 Volcanic National Park, BLM lands, State parks, Black Butte Lake (USACE), and  
36 county parks. The element states one overarching Natural Resource Land and  
37 Recreation goal (Goal OS-9): “To protect and enhance resource lands in the  
38 County for the continued benefit of agriculture, timber, grazing, recreation,  
39 wildlife habitat, and quality of life” (Tehama County 2009). Supporting policies  
40 aim to do all of the following:

- 1                   • Protect and enhance resource lands
- 2                   • Protect reasonable access to resource lands and not unreasonably deprive
- 3                   users of enjoyment of previously accessible areas through closure
- 4                   • Coordinate natural resource practices and recreation plans of different
- 5                   jurisdictions and assure cooperation
- 6                   • Promote recreation opportunities including agritourism, nature tourism,
- 7                   and environmental learning tourism

8                   The Public Services Element of the general plan includes goals and policies  
9                   related to recreation facilities. The goals and policies aim to develop local  
10                  services that meet local needs in a cost-effective manner, including supporting  
11                  enhanced recreation services for existing and future residents, and obtaining  
12                  dedicated lands for new schools, libraries, and recreational facilities when  
13                  existing facilities are not adequate.

14                  ***City of Redding***

15                  The Recreation Element of the City of Redding’s general plan (City of Redding  
16                  2000) contains goals, objectives, and policies addressing natural and scenic open  
17                  areas, development of a regional river parkway, archaeological and historic  
18                  resources related to park and recreation sites, park planning and development,  
19                  compatibility with adjacent land uses, facility funding and management,  
20                  recreation programs, a citywide trail system, and vandalism and user safety. The  
21                  plan specifically recognizes the Sacramento River as “the backbone of the City’s  
22                  park system.” Policies are established in the plan for a regional river parkway and  
23                  for trails along the river, including continued development of the Sacramento  
24                  River Trail.

25                  The *City of Redding Parks, Trails, and Open Space Master Plan* (City of Redding  
26                  2004) includes as part of its parks strategy Goal PK4, “The Sacramento River and  
27                  its major tributary streams will continue to be the focus and the organizing  
28                  principle of the park, trail, and open space system.” In addition, the plan  
29                  establishes Goal TB1 within the Trails and Bikeway Strategy, “Promote and  
30                  facilitate the development of a Citywide Trail System.” A subgoal is to “continue  
31                  development of the Sacramento River Trail to establish a common and continuous  
32                  thread along the river corridor.”

33                  ***City of Anderson***

34                  The Recreation Element of the City of Anderson’s general plan “addresses parks  
35                  and recreation facilities throughout the Anderson Planning Area, including both  
36                  those owned and maintained by the City of Anderson and those under the purview  
37                  of other agencies or, selectively, private entities” (City of Anderson 2007). The  
38                  element describes the city’s parks, park classifications and standards, park issues,  
39                  and the recreation trails network. One of the identified additional park needs is to  
40                  extend, enlarge, and protect Anderson River Park, which is located within the

1 primary study area. Relevant recreation-related policies contained with the  
2 element aim to do all of the following:

- 3 • Allow for expanded and diverse recreational programs, areas, and  
4 opportunities
- 5 • Facilitate community and cultural opportunities
- 6 • Formalize and enhance walking trails in existing city parks
- 7 • Provide nonmotorized linkages between parks and open spaces
- 8 • Develop and promote community trails to provide health benefits for all  
9 residents
- 10 • Update the Parks and Recreation System Master Plan, incorporating  
11 appropriate provisions of the general plan (including the Trails-Sidewalks  
12 Network Concept Plan) into the master plan, and establish clear priorities  
13 and phasing plans as part of the master plan process

## 14 **18.3 Environmental Consequences and Mitigation Measures**

### 15 **18.3.1 Methods and Assumptions**

16 The project could affect recreation and public access resources through a variety  
17 of impact mechanisms. Primary effects on recreation facilities and recreation  
18 activities at Shasta Lake would be tied directly to the increased full pool  
19 elevation. Additional impacts could result from changes in reservoir operations  
20 that alter the magnitude, rate, or timing of reservoir drawdown; and from  
21 construction-related disruption of recreation access and activities at and near  
22 Shasta Dam. Primary conflicts with the use of recreation facilities and recreation-  
23 related activities on the Sacramento River and tributaries would be tied directly to  
24 the changes in flow regime of the rivers and the seasonal timing of those changes.

25 More specifically, this chapter evaluates the potential impacts on recreation and  
26 public access facilities and recreation activities resulting from the following  
27 mechanisms:

- 28 • Construction-related disruption of recreation access and activities at and  
29 near Shasta Dam
- 30 • Seasonal inundation of reservoir recreation facilities and shoreline access  
31 sites
- 32 • Changes in the magnitude, rate, or timing of reservoir drawdown
- 33 • Seasonal inundation of river recreation facilities or access sites



- 1                   • Increased or decreased river flows during particular recreation use  
2                   periods
- 3                   • Disruption of recreation access and boating, or changes in river  
4                   characteristics related to boating, caused by gravel deposition activities

5                   The evaluation of impacts on Shasta Lake recreation facilities was based on  
6                   several existing information sources. During previous phases of the project, a  
7                   detailed inventory was prepared and mapping based on high-resolution aerial  
8                   photographs was completed for all recreation facilities on or near the shoreline of  
9                   Shasta Lake. The inventory data included descriptions and elevations for the  
10                  features of each facility—buildings, paved and unpaved roads, paved and unpaved  
11                  areas, and miscellaneous objects—up to an elevation 30 feet above the current full  
12                  pool elevation of 1,067 feet above mean sea level. The inventory data included  
13                  the lowest and highest elevations at which each feature would be affected  
14                  (buildings excepted; only the lowest elevation was recorded for buildings). The  
15                  inventory did not include buried infrastructure such as electric and water lines and  
16                  septic systems. However, nearly all developed facilities on the lake are known to  
17                  include these types of improvements, and these would also be among the features  
18                  affected at most locations.

19                 The CalSim-II computer model, SLWRI 2012 Benchmark Version, was used to  
20                 aid in the evaluation of potential impacts of the project on water-related resources,  
21                 including recreation resources. This computer modeling used historical California  
22                 hydrology data to represent the variety of weather and hydrologic patterns,  
23                 including wet periods and droughts, under which the project would be operated.  
24                 Each model run represented a constant level of development (2005 for the  
25                 existing case and 2030 for the future case), so that the performance of the No-  
26                 Action Alternative and other alternatives could be evaluated under both existing  
27                 and future conditions.

28                 For statements based on CalSim-II modeling results (e.g., statements regarding  
29                 project impacts on mean monthly flow), “existing conditions” refers to modeling  
30                 runs with 2005 facilities and demands; “future conditions” refers to modeling runs  
31                 with forecasted 2030 demands and reasonably foreseeable future projects and  
32                 facilities. The existing and future base cases are the without-project conditions in  
33                 2005 and 2030, respectively. The No-Action Alternative represents future  
34                 conditions in 2030, including other reasonably foreseeable future projects and  
35                 facilities.

36                 The results of the CalSim-II modeling provide information about the seasonal  
37                 changes in Shasta Lake pool elevation associated with each dam-raise height.  
38                 This information was used in combination with the inventory data described  
39                 above to determine impacts of the alternatives on recreation facilities and  
40                 activities.

1 The CalSim-II results also describe flow characteristics for the Sacramento River  
2 downstream from Shasta Dam, and for other rivers downstream from reservoirs  
3 within the CVP and SWP service areas whose operations may be affected by the  
4 project. These data were used to determine potential impacts on recreation and  
5 public access on the Sacramento River downstream from Shasta Dam and on  
6 tributary rivers and reservoirs within the CVP and SWP service areas. Both  
7 average increases and decreases in monthly pool elevation and mean monthly  
8 flows were considered with respect to impacts evaluated in this section.  
9 Preliminary assessments of impacts on public and commercial recreation facilities  
10 at Shasta Lake were reviewed by USFS and revised based on comments received.

11 A detailed description of the CalSim-II model, the modeling methodology used to  
12 evaluate this project, and key assumptions are provided in the Modeling  
13 Appendix. Summaries of the analysis and modeling results are provided in  
14 Chapter 6, “Hydraulics, Hydrology, and Water Management.”

### 15 **18.3.2 Criteria for Determining Significance of Effects**

16 An environmental document prepared to comply with NEPA must consider the  
17 context and intensity of the environmental effects that would be caused by, or  
18 result from, the proposed action. Under NEPA, the significance of an effect is  
19 used solely to determine whether an EIS must be prepared. An environmental  
20 document prepared to comply with CEQA must identify the potentially  
21 significant environmental effects of a proposed project. A “[s]ignificant effect on  
22 the environment” means a substantial, or potentially substantial, adverse change  
23 in any of the physical conditions within the area affected by the project” (State  
24 CEQA Guidelines, Section 15382). CEQA also requires that the environmental  
25 document propose feasible measures to avoid or substantially reduce significant  
26 environmental effects (State CEQA Guidelines, Section 15126.4(a)).

27 The following significance criteria were developed based on guidance provided  
28 by the State CEQA Guidelines, and consider the context and intensity of the  
29 environmental effects as required under NEPA. Impacts of an alternative on  
30 recreation and public access would be significant if project implementation would  
31 do any of the following:

- 32 • Substantially affect the operability or seasonal use of or otherwise affect  
33 reservoir and river recreation facilities and access sites as a result of  
34 water level changes or flow regime modifications
- 35 • Substantially increase recreation use such that existing facilities would be  
36 used beyond their capacity and degraded
- 37 • Substantially reduce recreational opportunities or substantially degrade  
38 recreational experiences
- 39 • Create hazardous or unusual conditions for boaters, swimmers, waders,  
40 or other water-contact activities as a result of increased or decreased

1 water levels related to flow regime modifications associated with the  
2 action alternatives

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

### 5 **18.3.3 Topics Eliminated from Further Consideration**

6 No topics related to recreation and public access that are included in the  
7 significance criteria listed above were eliminated from further consideration.  
8 All relevant topics are analyzed below.

### 9 **18.3.4 Direct and Indirect Effects**

#### 10 ***No-Action Alternative***

11 Under the No-Action Alternative, the existing Shasta Dam would be operated  
12 in the same manner as under current operations. Changes to the reservoir flow  
13 regime caused by changes in demand and other factors would be small, with a  
14 reduction in Shasta Lake storage of 2 percent to 4 percent during the fall of some  
15 years. Relative to existing conditions, the change in Shasta Lake storage under the  
16 No-Action Alternative would be minimal, ranging between -2 percent and 1  
17 percent at most times. Also, no new project-related recreation facilities would be  
18 constructed and no existing facilities would be altered, expanded, or demolished.

19 If the project alternatives were not implemented, CVP and SWP operations would  
20 likely continue under existing regulatory requirements. Analysis of flow modeling  
21 indicates that there would be no significant changes in flows with the potential to  
22 affect recreation between existing conditions and future No-Action Alternative  
23 conditions.

24 Under the No-Action Alternative, changes to the flow regime of the upper  
25 Sacramento River caused by changes in demand and other factors would be small;  
26 mean monthly flows in the Sacramento River would be within  $\pm 5$  percent of flows  
27 under existing conditions at most times. (Flows could increase by a greater  
28 amount during late summer and early fall of below-normal, dry, and critical water  
29 years<sup>1</sup>.) Also, no new recreation facilities would be constructed and no existing  
30 facilities would be altered, expanded, or demolished.

31 Under the No-Action Alternative, the flow regime in the lower Sacramento River  
32 and Delta and in the CVP/SWP service areas would not change as a result of  
33 Shasta Lake operations.

#### 34 **Shasta Lake and Vicinity**

35 *Impact Rec-1 (No-Action): Increased Use of Shasta Lake Recreation Facilities*  
36 *and Demand for Recreation Opportunities on Shasta Lake and in the Vicinity*  
37 Demand for recreation facilities at Shasta Lake and in the vicinity is expected to

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

1 increase, but recreation opportunities would still be extensive and varied. This  
2 impact would be less than significant.

3 Recreational use at Shasta Lake and in the vicinity is expected to increase in the  
4 future simply based on population growth in Northern California and southern  
5 Oregon from now until 2030. The resulting increase in demands on all  
6 recreational facilities and opportunities could affect the quality of the recreational  
7 activity. Recreational opportunities would still be extensive and varied in the area,  
8 however, and USFS management of the Shasta Unit of the Whiskeytown-Shasta-  
9 Trinity NRA would continue to respond to changing recreation needs. Because no  
10 substantial hydrologic changes are anticipated under the No-Action Alternative,  
11 this impact would be less than significant. Mitigation is not required for the No-  
12 Action Alternative.

13 **Upper Sacramento River (Shasta Dam to Red Bluff)**

14 *Impact Rec-2 (No-Action): Increased Use and Demand for Recreation*

15 *Opportunities on the Upper Sacramento River* Demand for recreation facilities  
16 along the upper Sacramento River is expected to increase, but recreation  
17 opportunities would still be extensive and varied. This impact would be less than  
18 significant.

19 Recreational use in the upper Sacramento River portion of the primary study area  
20 is expected to increase in the future simply based on population growth in  
21 Northern California from now until 2030. The resulting increase in demands on  
22 all recreational facilities and opportunities could affect the quality of the  
23 recreational activity. Recreational opportunities would still be extensive and  
24 varied in the area, however. Because no substantial hydrologic changes are  
25 anticipated under the No-Action Alternative, this impact would be less than  
26 significant. Mitigation is not required for the No-Action Alternative.

27 **Lower Sacramento River and Delta**

28 *Impact Rec-3 (No-Action): Increased Use and Demand for Recreation*

29 *Opportunities on the Lower Sacramento River and in the Delta* Demand for  
30 recreation facilities along the lower Sacramento River and in the Delta is expected  
31 to increase, but recreation opportunities would still be extensive and varied. This  
32 impact would be less than significant.

33 Recreational use in the lower Sacramento River and Delta portions of the  
34 extended study area is expected to increase in the future simply based on  
35 population growth in Northern and Central California from now until 2030. The  
36 resulting increase in demands on all recreational facilities and opportunities could  
37 affect the quality of the recreational activity. Recreational opportunities would  
38 still be extensive and varied in the area, however. Because no substantial  
39 hydrologic changes are anticipated under the No-Action Alternative, this impact  
40 would be less than significant. Mitigation is not required for the No-Action  
41 Alternative.

1                   **CVP/SWP Service Areas**

2                   *Impact Rec-4 (No-Action): Increased Use and Demand for Recreation*  
3                   *Opportunities in the CVP and SWP Service Areas* Demand for recreation  
4                   facilities in the CVP/SWP service areas is expected to increase, but recreation  
5                   opportunities in the CVP/SWP service areas would still be extensive and varied.  
6                   This impact would be less than significant.

7                   Recreational use in the CVP/SWP service areas within the extended study area is  
8                   expected to increase in the future simply based on population growth in California  
9                   from now until 2030. The resulting increase in demands on all recreational  
10                  facilities and opportunities could affect the quality of the recreational activity.  
11                  Recreational opportunities would still be extensive and varied in the area,  
12                  however. Because no substantial hydrologic changes are anticipated under the  
13                  No-Action Alternative, this impact would be less than significant. Mitigation is  
14                  not required for the No-Action Alternative.

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

17                  By increasing storage at Shasta Lake, this alternative would change the full pool  
18                  elevation and seasonal pool elevations at Shasta Lake, and the flow regime  
19                  downstream in the Sacramento River and potentially several other reservoirs and  
20                  downstream waterways. In turn, these alterations to reservoir pool elevations and  
21                  river flows could affect the usability of several types of recreation facilities on  
22                  Shasta Lake and the downstream reservoirs and waterways, particularly marinas,  
23                  boat ramps, and nearshore campgrounds and day-use areas. These alterations  
24                  could also affect the ability of recreationists to use the reservoirs and waterways  
25                  for boating, camping, fishing, and similar activities.

26                  The full pool elevation of Shasta Lake would increase by 8.5 feet and the pool  
27                  elevation would average as much as 6 to 10 feet higher than under existing (2005)  
28                  and No-Action Alternative (2030) conditions at various times of the year. The  
29                  greatest change would occur during the wettest years. The surface area of the  
30                  reservoir at full pool would increase by about 1,100 acres (4 percent) with a 6.5-  
31                  foot dam raise. The width of the water body would not increase substantially in  
32                  most areas, and much of the increase would occur during spring rather than  
33                  during the high-traffic summer boating period.

34                  At most times, flows in the upper Sacramento River within the primary study area  
35                  (between Shasta Dam and the Red Bluff Pumping Plant) under CP1 would be  
36                  within about  $\pm 5$  percent of flows under existing (2005) and No-Action Alternative  
37                  (2030) conditions.

38                  Reservoir- and river-based recreation facilities and activities are similar in the  
39                  primary and extended study areas downstream from Shasta Lake; thus, potential  
40                  effects on reservoir and river recreation would be similar. However, changes to  
41                  the flow regime affecting reservoirs and rivers in the extended study area would  
42                  be increasingly attenuated by flows from tributary waterways and other water

sources and diversions that are unaffected by the project, reducing the level of effects downstream.

**Shasta Lake and Vicinity**

*Impact Rec-1 (CP1): Seasonal Inundation of Shasta Lake Recreation Facilities or Portions of Recreation Facilities and Public Access at Pool Elevations Above the Current Full Pool Elevation* The 8.5-foot increase in full pool elevation associated with a 6.5-foot dam raise would cause seasonal inundation of recreation facilities or portions of facilities surrounding Shasta Lake. In many years, the reservoir would fill to an elevation greater than the current full pool elevation of 1,067 feet; in some years, it would fill to the new full pool elevation of 1,075.5 feet. In each case, portions of existing recreation facilities on the shoreline would be inundated, resulting in substantial effects. However, the affected recreation facilities would be relocated during construction and before inundation. As described in Chapter 2, Alternatives, the replacement facilities would be of equivalent overall capacity and quality to the affected facilities; would provide comparable shoreline access, where applicable; and would comply with Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) guidelines. Therefore, this impact would be less than significant.

Within each of the three arms of Shasta Lake with recreation development, effects of implementing CP1 on individual recreation facilities would vary. These effects would range from no effect to effects on several of the facilities’ inventoried and mapped features (e.g., roads, parking, and restrooms or other buildings) and on features not specifically inventoried (e.g., campsites and picnic sites). Table 18-3 shows the anticipated effects of CP1 on inventoried and mapped (developed) recreation facilities.

**Table 18-3. Effects of CP1 on Developed Recreation Facilities at Shasta Lake**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Sacramento Arm</b>	
<b>Boat Ramps</b>	
1. Antlers Public Boat Ramp	Boat ramp length reduced but ramp usable; parking lot and restroom unaffected
2. Centimudi Public Boat Ramp	Boat ramp entirely affected, most of lower parking lot affected, access road to ramp and parking partly affected
<b>Campgrounds</b>	
1. Antlers Campground	No effect—all features are above full pool elevation
2. Gregory Creek Campground	One restroom affected and shoreline campsites affected
3. Lakeshore East Campground	One restroom, lower portion of access road, and some campsites affected; access substantially affected
4. Nelson Point Campground	Campground access road and possibly some campsites affected
5. Oak Grove Campground	No effect—all features are above full pool elevation

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**Table 18-3. Effects of CP1 on Developed Recreation Facilities at Shasta Lake (contd.)**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Boat-in Campgrounds</b>	
1. Gooseneck Cove Boat-in Campground	Some shoreline campsites likely affected
<b>Day-Use Areas</b>	
1. Fisherman's Point Day Use Area	Access road, parking, and restroom unaffected, but part of use area affected
2. Salt Creek Swim Area (nonoperational)	Restroom and portion of paved pathway affected
<b>Marinas</b>	
1. Antlers Resort and Marina	One building affected, boat ramp partially affected
2. Digger Bay Marina	Bottom portion of marina road/ramp affected, but effects appear minor
3. Shasta Marina Resort	Office and equipment shed affected, parking and access roads partially affected
4. Sugarloaf Resort and Marina	Electrical service building and associated structures affected, boat ramp and unpaved parking areas partially affected
<b>Resorts (Nonmarina)</b>	
1. Lakeshore Inn and RV Park	Shoreline campsites and walkway may be affected; access substantially affected
2. Lakeshore Villa RV Park	No effect—entire facility is above full pool elevation
3. Salt Creek Resort and RV Park	Resort unaffected; lower part of old road bed used as boat ramp affected, but usable
4. Shasta Lake RV Resort	No effect—entire facility is above full pool elevation; access substantially affected
5. Sugarloaf Cottages Resort	Unpaved shoreline access roads affected but usable
6. Tsasdi Resort	Entrance and exit roads connecting to Lakeshore Drive affected; resort cabins appear to be unaffected
<b>Trails<sup>1</sup></b>	
1. Dry Fork Creek Trail	Trailhead and portion of trail along shoreline affected
2. Fisherman's Point Trail	Portion of trail along shoreline affected
<b>Other Facilities</b>	
USFS Lakeshore Fire Station	Five buildings affected, entrance road partially affected; access substantially affected
Salt Creek Recreation Residence Track Cabins	No effect—all cabins are above full pool elevation
<b>McCloud Arm</b>	
<b>Boat Ramps</b>	
1. Bailey Cove Boat Ramp and Day Use Area	Boat ramp entirely affected, parking area, day-use area, and access road partially affected
2. Hirz Bay Public Boat Ramp	Boat ramp entirely affected; some of lower parking area likely to be affected

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**Table 18-3. Effects of CP1 on Developed Recreation Facilities at Shasta Lake (contd.)**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Campgrounds</b>	
1. Bailey Cove Campground	Campsites appear unaffected; access road may be affected
2. Dekkas Rock Campground	Lower part of loop road affected; possibly a portion of group camp affected
3. Ellery Creek Campground	Lower portion of loop road and shoreline campsites affected
4. Hirz Bay Campgrounds	No effect—entire facility is above full pool elevation
5. Kamloop Camp (private organization)	No effect—entire facility is above full pool elevation
6. McCloud Bridge Campground	Portion of access road affected; some campsites likely affected
7. Moore Creek Campground	Lower portion of loop road and shoreline campsites affected
8. Pine Point Campground	No effect—entire facility is above full pool elevation
<b>Boat-in Campgrounds</b>	
1. Greens Creek Boat-in Campground	Some shoreline campsites likely affected
<b>Day-Use Areas</b>	
1. Dekkas Rock Day Use Area	Lower portion of loop road and some parking affected
2. McCloud Bridge Day Use Area	Part of use area affected (no permanent infrastructure present)
<b>Marinas</b>	
Holiday Harbor Marina	Two marina buildings and boat ramp affected, overflow parking partially affected; RV park/campground likely to be partially affected
<b>Trails<sup>1</sup></b>	
1. Bailey Cove Trail	Portion of trail along shoreline affected
2. Hirz Bay Trail	Portion of trail along shoreline affected
3. Samwel Cave Nature Trail	Portion of trail along shoreline affected
<b>Other Facilities</b>	
1. Bollibokka Club	No effect—entire facility is above full pool elevation
2. Campbell Creek Residence Track cabins	At least four cabins affected, possibly others also affected
3. Shasta Caverns ferry landing	Access roads serving east and west shore landings partially affected; parking and building unaffected
4. USFS Station (Turntable Bay)	Four buildings affected and access road affected
<b>Squaw Arm</b>	
<b>Other Facilities</b>	
1. Didallas Recreation Residence Track cabins	At least one cabin affected; possibly others also affected

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**Table 18-3. Effects of CP1 on Developed Recreation Facilities at Shasta Lake (contd.)**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Pit Arm</b>	
<b>Boat Ramps</b>	
1. Jones Valley Public Boat Ramp	Boat ramp entirely affected, access road from parking area partially affected
2. Packers Bay Public Boat Ramp	Boat ramp and information shelter affected, parking partially affected
<b>Campgrounds</b>	
1. Lower Jones Valley Campground	Footbridge associated with trail affected; culverts and creek may back up into campground during high-water periods
2. Upper Jones Valley Campground	No effect—entire facility is above full pool elevation
<b>Boat-in Campgrounds</b>	
1. Ski Island Boat-in Campground	Some shoreline campsites likely affected
2. Arbuckle Flat Boat-in Campground	Some shoreline campsites likely affected
<b>Marinas</b>	
1. Bridge Bay Resort and Marina	Seven buildings, boat ramp, parking lots, and roads affected
2. Jones Valley Resort	Three buildings and access road affected, parking area and resort roads partially affected
3. Packers Bay Marina	Boat ramp partially affected but usable
4. Silverthorn Resort	Parking and ramp mostly affected, shoreline road partially affected
<b>Trails<sup>1</sup></b>	
1. Klikapudi Trail	Portion of trail along shoreline affected
2. Packers Bay Trails	Portion of trails (3 out of 4 trails) along shoreline affected
<b>Other Facilities</b>	
1. Silverthorn Recreation Residence Track cabins	No effect—all cabins are above full pool elevation

Source: Reclamation 2003

Note:

<sup>1</sup> For some trails, trailheads are integrated into other recreation facilities. Alternative effects identified for standalone trailheads only.

Key:

RV = recreational vehicle

USFS = U.S. Forest Service

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On the Sacramento Arm, one of the two boat ramps, two of the five campgrounds, and one of the four marinas would be subjected to effects on several features or a substantial portion of the facility's use area. Access to three resorts in the Lakeshore area would be substantially affected due to accessibility despite minor direct impacts to facilities. Other facilities that would be subject to major effects are the USFS Lakeshore Fire Station, Dry Fork Creek trail and trailhead, and

1 Fisherman’s Point trail. The only operational day-use area, one campground, and  
2 one boat-in campground would be subject to a somewhat lesser but still  
3 substantial effect, while several additional facilities would be subject to relatively  
4 minor effects.

5 On the McCloud Arm, the one marina and both boat ramps would be subject to  
6 major effects, as would the USFS station at Turntable Cove, and Bailey Cove  
7 trail. At least four of the cabins in the recreation residence tract at Campbell  
8 Creek would be affected. Effects would be less, but still substantial at four of the  
9 seven public campgrounds and one of the two day-use areas. The other day-use  
10 area, boat-in campground, and other two trails would have less-than-substantial  
11 effects.

12 On the Squaw Creek Arm, one private cabin in the Didallas recreation residence  
13 tract would be affected. On the Pit Arm, both of the boat ramps, three of the four  
14 marinas, and Klikapudi and Packers Bay trails would be subject to major effects,  
15 whereas one campground and two boat-in campgrounds would experience a lesser  
16 effect.

17 Although they are not included in the table because of a lack of permanent  
18 infrastructure, shoreline camping areas at Beehive Point (Sacramento Arm),  
19 Gregory Beach (Sacramento Arm), Lower Salt Creek (Sacramento Arm), Jones  
20 Valley Inlet (Pit Arm), and Mariner’s Point (Pit Arm) would also be subject to  
21 substantial effects with the inundation of access roads and use areas.

22 It is important to note that effects on roads and bridges that are outside of the  
23 recreation facilities themselves but are used to access the facilities would also  
24 affect recreation at Shasta Lake. (Effects on roads and bridges are discussed in  
25 more detail in Chapter 20, “Transportation and Traffic.”) A prominent example is  
26 the effect on a long stretch of Lakeshore Drive, the primary route on the west side  
27 of the Sacramento Arm providing visitors access to several commercial recreation  
28 facilities (marinas and nonmarina resorts) and a campground. Effects on the road  
29 would begin at a small segment near the north end of the Doney Creek Bridge and  
30 extend about 2 miles south to the Sugarloaf area. Two major bridges over inlets of  
31 the lake would be affected as well. (These roads and bridges are also used to  
32 access private homes and nonrecreation businesses.) Numerous segments of  
33 Shasta County and USFS roads that provide access to facilities or the shoreline on  
34 each of the lake’s arms would also be affected.

35 In summary, the most prominent direct effects on recreation facilities and public  
36 access at Shasta Lake and in the vicinity from the 6.5-foot dam raise would be the  
37 major effects on five of six boat ramps, six of 15 family and group campgrounds,  
38 five of nine commercial marinas, three of six resorts, two of four recreation  
39 residence tracks, and USFS stations on both the Sacramento and McCloud arms.  
40 A lesser effect would occur at several day-use areas, campgrounds, and boat-in  
41 campgrounds, and minor effects would occur at several additional facilities. Table

1 18-4 summarizes the number of recreation facilities of specific types substantially  
 2 affected.

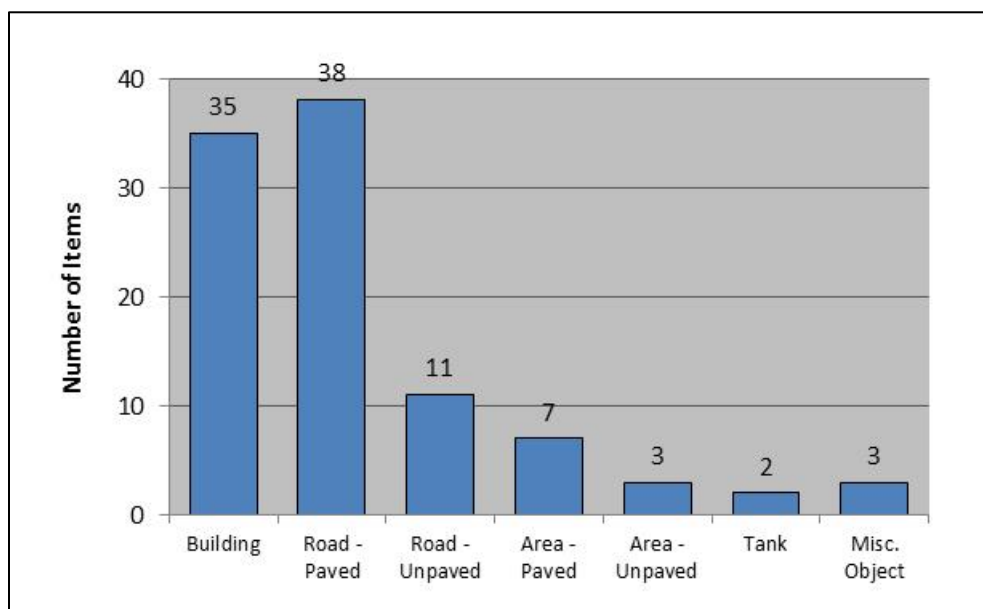
3 **Table 18-4. Summary of Shasta Lake Recreation Facilities Substantially**  
 4 **Affected by CP1**

Type of Facility	Number of Facilities Affected
Boat ramp	5
Marina	5
Resorts	3
Campground (family and group)	6
Day-use area	1
USFS operations	2
Trailhead/Trails	1/5
Recreation residence tract	2

Source: Reclamation 2003

Key:  
 USFS = U.S. Forest Service

5 Figure 18-3 depicts the total number of inventoried Shasta Lake recreation facility  
 6 items, at all recreation facilities combined, that would be affected by inundation  
 7 under CP1. A total of 99 facility and infrastructure elements would be affected,  
 8 with nearly three-fourths of those being buildings and segments of paved roads. A  
 9 lesser number of unpaved road segments, paved and unpaved areas (usually  
 10 parking areas), tanks, and miscellaneous objects would also be affected.



Source: Reclamation 2003

11 **Figure 18-3. Number of Recreation Facility Infrastructure Items Affected by**  
 12 **a 6.5-Foot Dam Raise Under CP1**  
 13  
 14

1 As described in Section 2.3.8 in Chapter 2, “Alternatives,” affected recreation  
2 facilities would be relocated as part of the construction activities for all action  
3 alternatives. This could include relocation of affected portions of facilities within  
4 existing use areas, in adjacent undeveloped areas, or at new sites in the general  
5 vicinity of the lake. Because of the possible consolidation of facilities, the total  
6 number of facilities of specific types may be reduced. However, all affected  
7 recreation capacity would be replaced. Replacement facilities would be of  
8 equivalent overall capacity and quality to affected facilities and would provide  
9 comparable shoreline access, where applicable. With the relocation of affected  
10 facilities, this impact would be less than significant. Mitigation for this impact is  
11 not needed, and thus not proposed.

12 *Impact Rec-2 (CPI): Temporary Construction-Related Disruption of Recreation*  
13 *Access and Activities at and near Shasta Dam* Construction activity that would  
14 be necessary to raise Shasta Dam and complete related modifications would  
15 prevent recreation visitors from crossing the dam, and thus could affect other  
16 recreation activities in the area. These effects are expected only during the  
17 construction period. However, this impact would be potentially significant.

18 One of the primary routes used by recreation visitors to the Chappie-Shasta OHV  
19 Area, situated below Shasta Dam on the west side of Keswick Reservoir, crosses  
20 Shasta Dam. It is assumed that public access to the road crossing the dam would  
21 be temporarily suspended during the construction phase of the project. An  
22 alternative route to the Chappie-Shasta OHV Area from the south exists;  
23 however, that route requires several more miles of travel on unpaved roads than  
24 the route across the dam, and it may not be suitable for some visitors to the OHV  
25 area who bring OHVs to the area on trailers.

26 The road across the dam is also the primary access route to the Dry Fork Creek  
27 trailhead near the west end of Shasta Dam, used by hikers and anglers to access  
28 the Dry Fork Creek Trail, which follows the shoreline of Shasta Lake. Access to  
29 this trailhead and trail would be disrupted during the project construction period.  
30 (As noted under Impact Rec-1 (CPI) above, the trailhead itself would be  
31 destroyed by modifications to the dam and portions of the trail would be affected  
32 by the increased reservoir elevation.)

33 Construction at Shasta Dam would also result in a temporary cessation of  
34 Reclamation’s public tours of the dam and powerhouse. In addition, noise, dust,  
35 and aesthetic changes would disturb recreation visits to the Shasta Dam Visitor  
36 Center (situated just below the east end of the dam).

37 For the reasons described above, this impact would be potentially significant.  
38 Mitigation for this impact is proposed in Section 18.3.5.

39 *Impact Rec-3 (CPI): Effects on Boating and Other Recreation Use and*  
40 *Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the*  
41 *Reservoir* An increase in the magnitude or rate or changes in the timing of the

1 annual summer and fall drawdown of Shasta Lake could adversely affect boating  
 2 enjoyment and safety on the reservoir. Conversely, a reduced or slower drawdown  
 3 could have beneficial effects. However, under CP1, reservoir operations would be  
 4 similar to existing operations, except during dry and critical water years. Little  
 5 change would occur in the annual magnitude, rate, or timing of reservoir  
 6 drawdown associated with any water year type. Therefore, this impact would be  
 7 less than significant.

8 Over the past decade, Shasta Lake has had an average drawdown of about 67 feet  
 9 from the annual high pool. (The annual high pool is typically reached in April or  
 10 May; the reservoir is drawn down during summer and fall, before the winter rains  
 11 arrive.) During most of those years, the drawdown has been in the range of 50 to  
 12 85 feet, but it has been as much as 108 feet and as little as 38 feet. Total  
 13 drawdown, as compared to the full pool elevation of 1,067 feet (which the  
 14 reservoir does not reach every year), has averaged about 77 feet and has been as  
 15 great as 130 feet.

16 Both public launch ramps and commercial recreation facilities such as marinas  
 17 and shoreline resorts on the lake are designed and operated to remain functional at  
 18 a wide range of pool elevations, although some facilities are closed or have  
 19 restricted use below certain pool elevations. Table 18-5 shows simulated  
 20 exceedences for public boat ramp availability for selected months. Boaters  
 21 familiar with the lake generally know to expect a substantial annual drawdown  
 22 and are aware of the effects of drawdown on facilities and navigation on the lake.  
 23 Signs at boat ramps and marinas warn boaters of the potential for rapidly  
 24 changing conditions on the lake as a result of regular seasonal drawdowns.

25 **Table 18-5. Simulated Percent Exceedence of Shasta Lake Public Boat**  
 26 **Ramp Availability for Future Conditions**

		May					
Public Boat Ramp	Minimum Ramp Elevation (feet)	No-Action	CP1	CP2	CP3	CP4	CP5
Antlers	991	90%	90%	90%	90%	93%	90%
Bailey Cove	1013	86%	87%	87%	88%	90%	87%
Centimudi	844	100%	100%	100%	100%	100%	100%
Hirz Bay	920	99%	99%	99%	99%	99%	99%
Jones Valley	852	100%	100%	100%	100%	100%	100%
Packers Bay	947	96%	98%	98%	98%	99%	98%
Sugarloaf	914	99%	99%	99%	99%	99%	99%

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**Table 18-5. Simulated Percent Exceedence of Shasta Lake Public Boat Ramp Availability for Future Conditions (contd.)**

July							
Public Boat Ramp	Minimum Ramp Elevation (feet)	No-Action	CP1	CP2	CP3	CP4	CP5
Antlers	991	81%	81%	82%	82%	88%	83%
Bailey Cove	1013	63%	66%	68%	73%	79%	73%
Centimudi	844	99%	99%	100%	99%	100%	100%
Hirz Bay	920	94%	94%	94%	94%	96%	94%
Jones Valley	852	98%	99%	99%	99%	100%	99%
Packers Bay	947	91%	90%	90%	91%	93%	90%
Sugarloaf	914	95%	95%	94%	95%	97%	94%
September							
Public Boat Ramp	Minimum Ramp Elevation (feet)	No-Action	CP1	CP2	CP3	CP4	CP5
Antlers	991	63%	70%	71%	73%	80%	74%
Bailey Cove	1013	32%	46%	55%	60%	64%	60%
Centimudi	844	96%	96%	97%	97%	100%	97%
Hirz Bay	920	91%	91%	91%	91%	92%	90%
Jones Valley	852	96%	96%	95%	96%	100%	95%
Packers Bay	947	86%	87%	88%	88%	91%	88%
Sugarloaf	914	91%	91%	91%	91%	93%	91%

Potential adverse effects of an increase in the magnitude or rate of drawdown include an increase in seasonally exposed shoals and other boating hazards, and increased navigation challenges compared to what boaters have typically experienced in past years. Other potential adverse effects of such changes in drawdown include a need to more frequently adjust docks and moorings at boat launches and marinas and other locations, and an increase in the distance between developed shoreline campsites and day-use areas and the water's edge. Facilities that operate only above a certain pool level would be usable for a shorter period of time each year. Aesthetically, an increased drawdown would result in a less appealing recreation setting characterized by a wider unvegetated inundation zone.

Conversely, a reduced drawdown or slower drawdown during the primary summer boating season could have beneficial effects by reducing the adverse effects described above, which normally occur to some degree each year under existing conditions and would continue under the No-Action Alternative.

Under CP1, storage would increase but reservoir operations would be similar to existing operations, except during dry and critical water years; therefore, the



1 character of the annual reservoir drawdown would not be expected to change  
2 greatly in most years. This conclusion is confirmed by CalSim-II modeling  
3 results, which indicate that the reservoir elevation would be as much as 10 feet  
4 higher at various points in the year, but that the magnitude, rate, and timing of the  
5 annual drawdown would be essentially unchanged relative to the existing (2005)  
6 and No-Action Alternative (2030) conditions. As a result, no effects related to  
7 drawdown changes are expected under CP1. This impact would be less than  
8 significant. Mitigation for this impact is not needed, and thus not proposed.

9 *Impact Rec-4 (CP1): Increased Hazards to Boaters and Other Recreationists at*  
10 *Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of*  
11 *the Inundation Zone* At full pool, the increased pool elevation would result in  
12 approximately 730 acres of newly inundated area where the existing trees and  
13 other vegetation would not be removed. Anglers would generally benefit from the  
14 associated enhancement of fish habitat; however, the standing trees and stumps  
15 remaining in these areas would increase the number of areas and total acreage  
16 where this type of hazard to boaters and other recreation visitors would exist.  
17 Therefore, this impact would be significant.

18 Approximately 730 acres (66 percent) of the 1,100 acres of newly inundated area  
19 that would result from the 6.5-foot dam raise at full pool would receive no  
20 vegetation treatment (no vegetation removed), to maximize the habitat benefits of  
21 inundated and residual vegetation. The remaining 370 acres would be subject to  
22 either complete vegetation removal or overstory removal. In areas of overstory  
23 removal, all trees greater than 10 inches in diameter at breast height would be  
24 removed, with stumps cut to within 24 inches of the ground surface. The intent of  
25 these treatments would be to minimize the risk to boaters and other visitors from  
26 snags and water hazards. These treatments would be targeted for areas adjacent to  
27 developed recreation sites and houseboat mooring areas, and other areas where  
28 snags pose the greatest risk to boaters.

29 Because no vegetation would be removed from portions of the newly inundated  
30 area, the area at Shasta Lake where boaters would be exposed to potential hazards  
31 from standing timber and stumps would increase. The hazards may increase as the  
32 trees die and decay, leaving stumps that may be at or just below the water surface.  
33 The hazard represented by the standing timber and stumps would exist only when  
34 the reservoir surface elevation is above the current full pool elevation, which  
35 would occur only during the highest pool elevation period (generally late spring  
36 and early summer) of wetter-than-normal years.

37 Although the number and acreage of areas where this hazard would be present  
38 would expand, the hazard already exists on portions of the Pit and Squaw Creek  
39 arms of the lake, where vegetation was not cleared when the reservoir was  
40 constructed and where numerous inundated trees still exist. The Shasta Lake  
41 Boating Safety brochure provided to Shasta Lake boaters by USFS warns that  
42 numerous underwater obstacles (as well as floating debris and shallows) are  
43 present and not marked, and that responsibility for boating safety rests with each

1 individual vessel operator. Also, the Shasta County ordinance that limits boat  
2 speeds on Shasta Lake to 5 miles per hour within 100 feet of the shoreline would  
3 serve to reduce the hazard. Finally, the standing timber and other remaining  
4 vegetation would provide structural diversity that is attractive to fish; therefore,  
5 these areas are likely to be attractive to anglers, who could benefit from the  
6 increase in uncleared areas and may consider them a recreation enhancement  
7 rather than a hindrance.

8 Despite these factors, the untreated areas of the new inundation zone would  
9 represent an increased hazard to boaters and potentially other types of  
10 recreationists. For this reason, this impact would be significant. Mitigation for this  
11 impact is proposed in Section 18.3.5.

12 **Upper Sacramento River (Shasta Dam to Red Bluff)**

13 *Impact Rec-5 (CPI): Seasonal Inundation of Portions of Recreation Facilities or*  
14 *Informal River Access Sites as a Result of Increased River Flows* Within the  
15 upper Sacramento River portion of the primary study area, increased mean  
16 monthly river flows associated with project implementation and operation could  
17 inundate recreation facilities or portions of recreation facilities, such as boat  
18 launch ramps and unimproved riverbank sites used for boat launching and other  
19 activities. In general, the flow increases that would occur in some years would be  
20 expected to be small (6 percent or less); likewise, only a small additional area  
21 would be inundated relative to the area inundated under existing conditions or the  
22 No-Action Alternative. As a result, the adverse effects are unlikely to be  
23 substantial. This impact would be less than significant.

24 Increased river flows associated with project implementation could temporarily  
25 inundate portions of developed recreation facilities used by boaters, anglers, and  
26 other recreationists to access the upper Sacramento River between Shasta Dam  
27 and Red Bluff. Any of the more than 15 boat ramps at public and privately  
28 operated parks on the river would be affected if increased river flows were to  
29 cause overtopping of the ramps, which are generally designed to be used at a  
30 range of river elevations. These facilities are often associated with picnic areas,  
31 shoreline fishing access areas, and similar day-use facilities, as well as  
32 campgrounds. The portions of these areas nearest to the riverbank could also be  
33 affected. Many of these facilities are used year-round, but the peak period for  
34 boating on the river is late spring through fall (May to November), when river  
35 flows are most likely to be in the optimum range of 6,000 to 12,000 cfs. Although  
36 existing average monthly flows are within this range year-round, in most winter  
37 and spring seasons the river experiences much higher peak flows of 30,000 to  
38 50,000 cfs or more that may last several weeks.

39 Many of the locations that recreationists use to access the river and to  
40 hand-launch watercraft are informal sites, where conditions such as gradually  
41 sloping and sandy riverbanks create beaches that are conducive to recreation use.  
42 Like developed sites, these undeveloped and informal use areas could be affected

1 by increased river flows if increased flows were to result in temporary inundation  
2 of the area.

3 CalSim-II model simulations indicate that at nearly all times, Sacramento River  
4 flows below Keswick Dam under CP1 would be within about  $\pm 5$  percent of flows  
5 under existing (2005) and No-Action Alternative (2030) conditions. Regarding  
6 increases to river stage, the CalSim-II model simulations indicate that mean  
7 monthly river stage below Keswick Dam would increase by 0.1 to 0.3 foot during  
8 fall months (September through November) relative to existing (2005) and No-  
9 Action Alternative (2030) conditions. (River stage during the summer below  
10 Keswick Dam is typically 10 to 11 feet under existing conditions.) The modeling  
11 results also indicate the potential for lower river levels during winter and spring in  
12 some years. Effects of decreased river flows are addressed below under Impact  
13 Rec-7 (CP1).

14 River stage information was not assessed for points within the primary study area  
15 downstream from Keswick Dam. However, the effects of the project on river  
16 stage at those locations would be expected to be moderated by inflows from  
17 tributaries, and would therefore be less than the potential changes below Keswick  
18 Dam. As a result, potential effects of the project on recreation facilities would be  
19 progressively less as one moves downstream from Keswick Dam.

20 Because most recreation facilities are designed to be used well above the highest  
21 annual river stage elevations that commonly occur during late summer and spring,  
22 the stage increases cited above would not affect the functionality of those  
23 facilities. Likewise, the small fall increases in river stage would be unlikely to  
24 have noticeable adverse effects on informal use sites, because those sites exist at a  
25 range of elevations and at many river locations. During periods of very high flows  
26 that may occur during winter and spring, boat ramps and other recreation facilities  
27 on the river may close, and safety warnings may be issued to boaters to stay off  
28 the river until the flow subsides.

29 It is important to note that for this assessment of environmental consequences,  
30 specific information was not available regarding how specific river stages affect  
31 specific recreation facilities. The assessment has also not considered the riverbank  
32 slope in specific river reaches, which would determine how much increased  
33 inundation would result from river stage increases at undeveloped recreation sites.  
34 Additional analysis would be required to provide accurate projections of effects at  
35 specific recreation sites or specific stretches of riverbank. Overall, however, the  
36 hydrologic changes in the Sacramento River's high flows that would result from  
37 CP1 would be relatively small and within the variability of flows that already  
38 occur in the river.

39 For the reasons described above, this impact would be less than significant.  
40 Mitigation for this impact is not needed, and thus not proposed.

1                    *Impact Rec-6 (CP1): Increased Difficulty for Boaters in Using the Sacramento*  
2                    *River as a Result of Increased River Flows* Increased mean monthly flows  
3                    within the primary study area, particularly during summer and fall when boating  
4                    activity is most likely, could result in more difficult conditions for boat launching  
5                    and boating on the Sacramento River. Depending on the time of year and base  
6                    river flows, increased flow may also have beneficial effects. Because the  
7                    magnitude of flow increases associated with CP1 would be small (averaging less  
8                    than 8 percent for any month or water year type), adverse effects on boaters  
9                    within the primary study area are unlikely. This impact would be less than  
10                    significant.

11                    Increased river flows associated with project implementation could affect boating  
12                    conditions on the upper Sacramento River between Shasta Dam and Red Bluff.  
13                    Increased flows can make boating on the river more difficult, particularly for  
14                    nonmotorized boats such as canoes and dories or “drift boats.” Drift boats are  
15                    controlled by oars; these boats are commonly used by anglers and commercial  
16                    angling guide services, primarily during summer, before lower flows during fall  
17                    make their use more difficult. Canoeing, kayaking, and similar forms of  
18                    nonmotorized boating are also most common on the river during summer, but are  
19                    less affected by low flows than drift boating. Boating activity occurs on the river  
20                    year-round, but the peak period for boating is late spring through fall (May to  
21                    November), when river flows are most likely to be in the optimum range.

22                    As described above under Impact Rec-5 (CP1), CalSim-II model simulations  
23                    indicate that at nearly all times, Sacramento River flow below Keswick Dam  
24                    under CP1 would be within about  $\pm 5$  percent of flows under existing (2005) and  
25                    No-Action Alternative (2030) conditions. The CalSim-II model simulations  
26                    indicate that mean monthly river stage below Keswick Dam could increase by as  
27                    much as 0.3 foot relative to existing (2005) and No-Action Alternative (2030)  
28                    conditions during fall months (September through November) of some years.  
29                    Changes in flows farther downstream within the primary study area would be  
30                    expected to be progressively smaller as the influence of tributary streams  
31                    increases.

32                    The generally small flow increases that would occur as a result of the project in  
33                    some years would be unlikely to adversely affect boating, which occurs primarily  
34                    during summer and fall. These flow increases may have small beneficial effects  
35                    during dry years by reducing exposure of sand bars and shallows and thus  
36                    increasing navigability on the river. Although boating activity is lower during  
37                    winter, particularly during peak-flow periods when facilities may be closed and  
38                    conditions are hazardous, increased flows during dry years and decreased flows  
39                    during wet years could have similarly minor beneficial effects during those  
40                    months.

41                    For the reasons described above, this impact would be less than significant.  
42                    Mitigation for this impact is not needed, and thus not proposed.

1                    *Impact Rec-7 (CP1): Increased Difficulty for Swimmers and Waders in Using the*  
2                    *Sacramento River as a Result of Increased River Flows* Increased mean monthly  
3                    flows within the upper Sacramento River, particularly during summer when  
4                    swimming activity is most likely, and during fall and winter nonpeak-flow  
5                    periods when wade angling activity is most likely, could result in more difficult  
6                    swimming and wading conditions. Increased flows can make swimming and  
7                    wading more challenging and potentially more hazardous. The magnitude of flow  
8                    increases associated with CP1 would be small (averaging less than 8 percent for  
9                    any month or water year type), and the timing of the increases would be such that  
10                    adverse effects on angling waders within the primary study area are unlikely.  
11                    Swimming is not a common activity on the main channel of the river because of  
12                    cold-water temperatures. As a result, this impact would be less than significant.

13                    Increased river flows associated with project implementation could affect  
14                    swimming and wading conditions on the upper Sacramento River between Shasta  
15                    Dam and Red Bluff. Increased flows can make swimming and wading more  
16                    difficult. Because of cold-water temperatures (a maximum of less than 60 degrees  
17                    during summer), swimming is not a major activity on the Sacramento River;  
18                    however, it does occur, particularly in association with other activities like tubing  
19                    and nonmotorized boating. Anglers commonly wade in the river; their use is  
20                    particularly focused on the months of September and October, when flows  
21                    typically decrease substantially from summer levels and the opportunities for  
22                    wading correspondingly increase.

23                    As described above under Impact Rec-5 (CP1), CalSim-II model simulations  
24                    indicate that at nearly all times, Sacramento River flow below Keswick Dam  
25                    under CP1 would be within about  $\pm 5$  percent of flows under existing (2005) and  
26                    No-Action Alternative (2030) conditions. However, CalSim-II model simulations  
27                    indicate that mean monthly river stage below Keswick Dam could increase by as  
28                    much as 0.3 foot relative to existing (2005) and No-Action Alternative (2030)  
29                    conditions during fall months (September through November). Changes in flows  
30                    farther downstream within the primary study area would be expected to be  
31                    progressively smaller as the influence of tributary streams increases.

32                    The small magnitude of river stage increases during the fall peak period for  
33                    wading by anglers indicates that adverse effects of the project on wading anglers  
34                    are unlikely. Likewise, the generally small increases in summer flows throughout  
35                    the primary study area that would occur as a result of the project in some years  
36                    (generally smaller than the increases in fall flows described above) would be  
37                    unlikely to adversely affect the limited amount of swimming that occurs during  
38                    those months.

39                    For the reasons described above, this impact would be less than significant.  
40                    Mitigation for this impact is not needed, and thus not proposed.

41                    *Impact Rec-8 (CP1): Increased Usability of the Sacramento River for Boating*  
42                    *and Water-Contact Recreation as a Result of Decreased River Flows* Decreased

1 mean monthly flows within the primary study area, particularly during summer  
2 when boating and swimming activity is most likely and during fall and winter  
3 low-flow periods when wade angling activity is most likely, could result in  
4 enhanced boating, swimming, and wading conditions. Decreased flows during  
5 normally high-flow periods can make boating less challenging and potentially less  
6 hazardous. The magnitude of flow decreases associated with the project would be  
7 small (averaging less than 7 percent for any month or water year type), and the  
8 timing of the decreases (fall and winter months) would be such that effects on  
9 boaters, swimmers, and waders within the primary study area are unlikely. As a  
10 result, this impact would be less than significant.

11 Decreased river flows associated with project implementation could benefit  
12 boating conditions on the Sacramento River in the primary study area, between  
13 Shasta Dam and Red Bluff. Decreased flows can make boating on the river easier,  
14 particularly for nonmotorized boats such as canoes and dories or “drift boats.”  
15 BLM has identified an optimum range of 6,000 to 12,000 cfs for boating on the  
16 Sacramento River in the primary study area. Boating may benefit if the decrease  
17 in river flows lowers the flows below the high end of the optimum range. Under  
18 existing conditions, average monthly flows below Keswick Dam and below  
19 Cottonwood Creek are above the optimum level during midsummer most years  
20 and during much of the winter and early spring of wet years.

21 Decreased river flows associated with project implementation could also benefit  
22 conditions for swimming and wading, although boating conditions could be  
23 adversely affected if flows were to fall below the low end of the optimum range  
24 of 6,000 cfs. Decreased flow could make swimming and wading easier and may  
25 lengthen the period when these activities are best pursued. For example, wading  
26 anglers typically concentrate their activity in the fall months, when flows are  
27 lowest, whereas fishing from a boat is more common in summer, when flows are  
28 higher. Reduced flows in late summer or early fall may extend the wading season.

29 As described above under Impact Rec-5 (CP1), CalSim-II model simulations  
30 indicate that at nearly all times, Sacramento River flows below Keswick Dam  
31 under CP1 would be within about  $\pm 5$  percent of flows under existing (2005) and  
32 No-Action Alternative (2030) conditions. The CalSim-II model simulations  
33 indicate that mean monthly river stage below Keswick Dam could decrease by as  
34 much as 0.5 foot relative to existing (2005) and No-Action Alternative (2030)  
35 conditions during winter (December through February) of wetter-than-normal  
36 years. Again, changes in flows farther downstream within the primary study area  
37 would be expected to be progressively smaller as the influence of tributary  
38 streams increases.

39 The reduction in mean monthly flows during winter months of wetter-than-  
40 normal years would have minimal effects on boating because the existing mean  
41 flows during those months are usually within the optimum range. However, the  
42 decreased flow could have a beneficial effect on boating during the winter months  
43 of some wet years, when the existing mean flows are above the optimum range.

1 The small reduction in flows and corresponding decrease in river stage during  
2 some spring months during both wetter-than-normal and drier-than-normal years  
3 could have a beneficial effect on wading. Flows could be reduced to a level that is  
4 similar to existing fall conditions, when wading by anglers is most popular.  
5 However, because the spring months are not the period when most wading anglers  
6 are present, and because swimming activity is low in the spring months, the  
7 effects are likely to be minimal.

8 For the reasons described above, this impact would be less than significant.  
9 Mitigation for this impact is not needed, and thus not proposed.

10 *Impact Rec-9 (CPI): Enhanced Angling Opportunities in the Upper Sacramento*  
11 *River as a Result of Improved Flows and Reduced Water Temperatures* Project  
12 operation would result in improved flow and water temperature conditions in the  
13 upper Sacramento River, which would benefit Chinook salmon populations. This  
14 would result in enhanced populations of these game fish in the river, which would  
15 provide enhanced sport angling opportunities. This impact would be beneficial.

16 Chinook salmon contribute to the popular sport fishery in the upper Sacramento  
17 River. (The salmon season has been closed on the upper Sacramento River in  
18 recent years, but may be reopened if the health of the runs improves.) With  
19 increased flows and cooler water temperatures resulting from project operation,  
20 salmon populations would benefit from reduced mortality. These beneficial  
21 effects on Chinook salmon could result in enhanced angling opportunities on the  
22 upper Sacramento River, which would have a beneficial effect on recreation.  
23 Mitigation for this impact is not needed, and thus not proposed.

24 *Impact Rec-10 (CPI): Disruption of Sacramento River Boating and Access*  
25 *Resulting from the Gravel Augmentation Program* The proposed gravel  
26 augmentation program would not be implemented under CP1. Therefore, no  
27 impact would occur. Mitigation for this impact is not needed, and thus not  
28 proposed.

29 *Impact Rec-11 (CPI): Changes in Usability of Reading Island Fishing Access*  
30 *Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration*  
31 *Sites* The proposed restoration of flow through various sites along the upper  
32 Sacramento River, rehabilitation of the Reading Island boat ramp for use by  
33 motorized boats, and construction of a handicap fishing access area would not be  
34 implemented under CP1. Therefore, no impact would occur. Mitigation for this  
35 impact is not needed, and thus not proposed.

### 36 **Lower Sacramento River and Delta and CVP/SWP Service Areas**

37 *Impact Rec-12 (CPI): Seasonal Inundation of Portions of River Recreation*  
38 *Facilities or Informal River Access Sites on the Lower Sacramento River and*  
39 *Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows*  
40 Within the extended study area, if increased mean monthly river flows were to  
41 occur in some months of some years as a result of project implementation and



1 operation under CP1, the increased flows could inundate recreation facilities or  
2 portions of recreation facilities, such as boat launch ramps and unimproved  
3 riverbank sites used for boat launching and other activities. However, even with  
4 the increases, flows on the Sacramento, American, and Feather rivers would  
5 remain moderate and well below normal winter and spring high flows. As a result,  
6 adverse effects on river facilities or informal use areas within the extended study  
7 area are unlikely. This impact would be less than significant.

8 Increases in Sacramento River stage (elevation) within the extended study area  
9 associated with increased flows under CP1 would be small (averaging less than  
10 0.3 foot). Likewise, only a small additional area would be inundated relative to the  
11 area inundated under existing conditions and the No-Action Alternative. On the  
12 Feather River below Thermalito Afterbay and on the lower American River (at the  
13 H Street Bridge), the increase in flows would be larger during some months of  
14 some years, with some increases exceeding 25 percent. However, the largest  
15 increases on the lower American River would occur during late summer of critical  
16 water years, when flows are generally low, and the largest increases on the Feather  
17 River would occur during early fall of dry years, when flows are generally  
18 moderate. On both rivers, flows would remain well below winter and spring high  
19 flows experienced in most years. Therefore, adverse effects on river recreation  
20 facilities and informal use areas appear unlikely.

21 For the reasons described above, this impact would be less than significant.  
22 Mitigation for this impact is not needed, and thus not proposed.

23 *Impact Rec-13 (CP1): Increased Difficulty for Boaters in Using the Lower*  
24 *Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
25 *Increased River Flows* Increased mean monthly flows within the extended study  
26 area, particularly during summer and fall when boating activity is most likely,  
27 could result in more difficult conditions for boat launching and boating on the  
28 Sacramento River and other rivers affected by the project. Depending on the time  
29 of year and base river flows, increased flow may also have beneficial effects on  
30 boating by reducing shallow bars and riffles, thus improving navigability.  
31 However, the timing and flow conditions under which the flow increases are  
32 likely to occur on the Sacramento, Feather, and American rivers under CP1, and  
33 the continuation of moderate flows even with the increase, suggest that adverse  
34 effects on boaters within the extended study area are unlikely. This impact would  
35 be less than significant.

36 CalSim-II modeling results indicate that the magnitude of flow increases in the  
37 lower Sacramento River associated with CP1 would be generally small, averaging  
38 less than 6 percent in any month in all water year types. Also, the largest changes  
39 would occur primarily during fall months (September through November) of dry  
40 and critical water years, when flows are normally relatively low. Thus, even with  
41 the flow increases, flows would remain moderate (7,500 to 11,000 cfs at Verona  
42 and 7,500 to 13,000 cfs below Freeport, on average) during those periods.

1 CalSim-II modeling results indicate that the magnitude of flow increases in the  
2 Feather River below Thermalito Afterbay associated with CP1 may occasionally  
3 exceed 100 percent. More typically, however, the largest increases would be in  
4 the range of 20 percent to 30 percent and would occur during mid- and late  
5 summer and fall and primarily during drier-than-normal years, when flows are  
6 often lower than average. Flows would remain moderate (1,500 to 4,500 cfs) with  
7 the increases. CalSim-II modeling results also indicate that flows in the American  
8 River at the H Street Bridge (below Folsom Lake) would also substantially  
9 increase during some months of some years, but would remain moderate.  
10 Although some of the potential flow increases in the Sacramento, Feather, and  
11 American rivers would be substantial, adverse effects on boating appear to be  
12 unlikely.

13 Hydrologic changes in more distant areas of the CVP and SWP service areas  
14 resulting from CP1 cannot be accurately predicted but would be small. Such slight  
15 changes occur on a dynamic and daily basis under existing conditions as water is  
16 moved throughout California. Other CVP and SWP reservoir elevations, canal  
17 flows, and flows below the reservoirs could be slightly modified, but any  
18 resulting effects on recreation would be negligible and speculative.

19 For the reasons described above, this impact would be less than significant.  
20 Mitigation for this impact is not needed, and thus not proposed.

21 *Impact Rec-14 (CP1): Increased Difficulty for Swimmers and Waders in Using*  
22 *the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
23 *Increased River Flows* Increased mean monthly river flows within the extended  
24 study area during some months of some years, particularly during summer when  
25 swimming activity is most likely and nonpeak-flow periods when wade angling  
26 activity is most likely, could result in more difficult swimming and wading  
27 conditions. These activities could become more hazardous, and thus less attractive  
28 to river users. However, given the timing of the likely flow increases under CP1,  
29 the conditions under which such increases would occur, and the continuation of  
30 moderate flows even with the increase, adverse effects on swimmers and waders  
31 in the extended study area are unlikely. This impact would be less than  
32 significant.

33 Even during the lowest flow months of late summer and early fall, average flow  
34 in the more downstream portions of the Sacramento River is around 10,000 cfs;  
35 average flow is much higher at other times of the year. As a result, swimming and  
36 wading are not common activities on the river in much of the extended study area,  
37 where the most common uses are boating and bank angling.

38 CalSim-II modeling results indicate that the magnitude of flow increases in the  
39 lower Sacramento River associated with CP1 would be generally small, averaging  
40 less than 6 percent for any month in all water year types. Also, the largest changes  
41 would occur primarily during fall months (September through November) of dry  
42 and critical water years, when flows are normally relatively low. Thus, even with

1 the flow increases, flows would remain moderate (7,500 to 11,000 cfs at Verona  
2 and 7.500 to 13,000 cfs below Freeport, on average) during those periods.

3 CalSim-II modeling results indicate that the magnitude of flow increases in the  
4 Feather River below Thermalito Afterbay associated with CP1 exceeds 100  
5 percent in two Septembers during the simulation period of 1922 to 2003. Flow  
6 increases occur sporadically, typically during mid- and late-summer and fall, are  
7 usually in the range of 0 to 20 percent, and primarily occur during drier-than-  
8 normal years when flows are typically lower than average. Flows would remain  
9 moderate (1,500 to 4,500 cfs) with the increases. CalSim-II modeling results also  
10 indicate that flows in the American River at the H Street Bridge (below Folsom  
11 Lake) would increase by more than 100 percent once during the simulation  
12 period, with flow increases more typically in the range of 0 to 30 percent. Even  
13 with these increases, flows would remain moderate. While a few of the simulated  
14 flow increases in the Sacramento, Feather, and American rivers would be  
15 substantial, adverse effects on swimming and wading appear to be unlikely.  
16 Therefore, this impact would be less than significant. Mitigation for this impact is  
17 not needed, and thus not proposed.

18 *Impact Rec-15 (CPI): Increased Difficulty for Boaters and Anglers in Using the*  
19 *Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
20 *Decreased River Flows* Decreased mean monthly flows below CVP and SWP  
21 reservoirs during fall and winter low-flow periods when wade angling activity is  
22 most common, and during summer and fall when boating and river floating is  
23 popular in some areas, could have adverse effects if reduced flows were to reduce  
24 fishing success or boating navigability. Given the modest flow decreases in the  
25 Sacramento River associated with CP1 and the timing of the changes, effects on  
26 these recreation uses of the Sacramento River in the extended study area are  
27 unlikely. However, given the magnitude and timing of the largest flow decreases  
28 during some years on the Feather and American rivers below CVP and SWP  
29 reservoirs in the extended study area, adverse effects may occur. This impact  
30 would be potentially significant.

31 CalSim-II results indicate that the magnitude of mean monthly flow decreases that  
32 would occur in some years in the Sacramento River below Wilkins Slough, at  
33 Verona, and below Freeport associated with CP1 would be small (averaging less  
34 than 2 percent for any month in all water year types) and would equate to  
35 elevation (stage) decreases of no more than about 6 inches. The occasional larger  
36 decreases would occur during mid- and late fall and early winter (October through  
37 December) rather than in the summer months, when boating activity is highest.  
38 Wade angling is not common on most of the river in the extended study area  
39 because of the depth and volume of the river, among other factors. As a result of  
40 these factors, adverse effects on boating or angling from the flow decreases  
41 appear to be unlikely.

42 CalSim-II results indicate that mean monthly flows in the Feather River below  
43 Thermalito Afterbay would be reduced in some years by as much as 32 percent

1 during mid-summer through mid-fall (June through October), particularly during  
2 drier-than-normal years. However, the reduction in flow would average 6 percent  
3 or less in all months of those years, with the exception of the month of June in dry  
4 years, when the reduction would average 10 percent. The boating and angling  
5 activity that occurs on the Feather River during summer and fall months could be  
6 adversely affected if navigability or angling success were to be hampered by  
7 reduced flow and shallower water.

8 CalSim-II results indicate that mean monthly flows in the American River at the  
9 H Street Bridge (below Folsom Lake) would also be reduced by as much as 20  
10 percent to 50 percent in some months of some years, primarily during mid-  
11 summer to mid-fall (June through October). Many of these reductions would  
12 occur during wetter-than-average years, when flows would typically be high, and  
13 the average reduction in flow would be 10 percent or less for any months in all  
14 water year types. However, in drier-than-average years, the effect would be to  
15 reduce flows during periods when the flows are already below average. This may  
16 adversely affect boating and angling on the river if navigability or angling success  
17 is hampered by reduced flow and shallower water.

18 For the reasons described above, this impact would be potentially significant.  
19 Mitigation for this impact is proposed in Section 18.3.5.

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

22 Like CP1, CP2 would increase storage at Shasta Lake, thus changing the full pool  
23 elevation at Shasta Lake, and the seasonal pool elevations and the flow regime in  
24 the Sacramento River and potentially several other reservoirs and downstream  
25 waterways. In turn, these alterations to reservoir pool elevations and river flows  
26 could affect the usability of some types of recreation facilities on the lake and  
27 downstream waterways, particularly marinas, boat ramps, and nearshore  
28 campgrounds and day-use areas. These alterations could also affect the ability of  
29 recreationists to use the reservoirs and waterways for boating, camping, fishing,  
30 and similar activities.

31 The full pool elevation of Shasta Lake would increase by 14.5 feet and the pool  
32 elevation would average as much as 12 to 17 feet higher than under existing  
33 (2005) and No-Action Alternative (2030) conditions at various times of the year.  
34 The greatest change would occur during the wettest years.

35 Raising the dam by 12.5 feet would increase the surface area of the reservoir at  
36 full pool by about 1,750 acres (6 percent). The width of the water body would not  
37 increase substantially in most areas, and much of the increase would occur during  
38 spring rather than during the high-traffic summer boating period.

39 In general, the proposed changes in flow and river stage on the upper Sacramento  
40 River associated with CP2 are similar to but slightly greater than the changes  
41 associated with CP1, as outlined above.

1 Reservoir- and river-based recreation facilities and activities in the primary and  
 2 extended study areas downstream from Shasta Lake are similar; thus, potential  
 3 reservoir and river recreation impacts would be similar. However, changes to the  
 4 flow regime affecting reservoirs and rivers in the extended study area would be  
 5 increasingly attenuated by flows from tributary waterways and other water sources  
 6 and diversions that are unaffected by the project, reducing the level of impacts.

7 **Shasta Lake and Vicinity**

8 *Impact Rec-1 (CP2): Seasonal Inundation of Shasta Lake Recreation Facilities or*  
 9 *Portions of Recreation Facilities and Public Access at Pool Elevations Above the*  
 10 *Current Full Pool Elevation* The 14.5-foot increase in full pool elevation  
 11 associated with a 12.5-foot dam raise would cause seasonal inundation of  
 12 recreation facilities or portions of facilities at Shasta Lake. In many years, the  
 13 reservoir would fill to an elevation greater than the current full pool elevation of  
 14 1,067 feet; in some years, it would fill to the new full pool elevation of 1,081.5  
 15 feet. In each case, portions of existing recreation facilities on the shoreline would  
 16 be inundated, resulting in substantial effects. However, the affected recreation  
 17 facilities would be relocated during construction and before inundation. The  
 18 replacement facilities would be of equivalent overall capacity and quality to the  
 19 affected facilities; would provide comparable shoreline access, where applicable;  
 20 and would comply with ADA and ABA guidelines. Therefore, this impact would  
 21 be less than significant.

22 Within each of the three arms of Shasta Lake with recreation development, effects  
 23 of implementing CP2 on individual recreation facilities would vary. These effects  
 24 would range from no effect to effects on several of the facilities' inventoried and  
 25 mapped features (e.g., roads, parking, and restrooms or other buildings) and on  
 26 features not specifically inventoried (e.g., campsites and picnic sites). Table 18-6  
 27 shows the anticipated effects of CP2 on inventoried and mapped (developed)  
 28 recreation facilities.

29 **Table 18-6. Effects of CP2 on Developed Recreation Facilities at Shasta**  
 30 **Lake**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Sacramento Arm</b>	
<b>Boat Ramps</b>	
1. Antlers Public Boat Ramp	Boat ramp length shortened but usable; courtesy dock and rail would also be affected
2. Centimudi Public Boat Ramp	Boat ramp and lower parking entirely affected, part of access road to ramp and lower parking affected

1  
2

**Table 18-6. Effects of CP2 on Developed Recreation Facilities at Shasta Lake (contd.)**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Campgrounds</b>	
1. Antlers Campground	All features are above full pool elevation; shoreline erosion may threaten portions of site
2. Gregory Creek Campground	One restroom, part of campground road, and shoreline campsites affected
3. Lakeshore East Campground	One restroom, lower half of campground road, and several campsites affected; access substantially affected
4. Nelson Point Campground	Campground road and some campsites affected
5. Oak Grove Campground	All features are above full pool elevation; access road affected
<b>Boat-in Campgrounds</b>	
1. Gooseneck Cove Boat-in Campground	Some shoreline campsites likely affected
<b>Day-Use Areas</b>	
1. Fisherman's Point Day Use Area	Parking and restroom unaffected but most picnic sites affected; also loss of access to shoreline trail
2. Salt Creek Swim Area (nonoperational)	Restroom and portion of paved pathway affected
<b>Marinas</b>	
1. Antlers Resort and Marina	Generator/pumphouse building and boat ramp/dock access road affected
2. Digger Bay Marina	Bottom portion of marina access road/ramp affected, but appears to remain usable
3. Shasta Marina Resort	Two buildings (office and equipment shed) affected, most of parking and access roads affected
4. Sugarloaf Resort and Marina	Electrical service building and associated structures affected, boat ramp and unpaved parking areas partially affected
<b>Resorts (Nonmarina)</b>	
1. Lakeshore Inn and RV Park	Shoreline campsites and walkway, and underground septic system may be affected; access substantially affected
2. Lakeshore Villa RV Park	No effect—entire facility is above full pool elevation
3. Salt Creek Resort and RV Park	Resort unaffected; old road bed used as boat ramp (outside resort) affected
4. Shasta Lake RV Resort	Entire facility appears to be unaffected; access substantially affected
5. Sugarloaf Cottages Resort	Four cottages and large portion of unpaved shoreline access roads affected
6. Tsasdi Resort	Three cabins and entrance and exit roads connecting to Lakeshore Drive affected

3

1  
2

**Table 18-6. Effects of CP2 on Developed Recreation Facilities at Shasta Lake (contd.)**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Trails<sup>1</sup></b>	
1. Dry Fork Creek Trail	Trailhead and portion of trail along shoreline affected
2. Fisherman's Point Trail	Portion of trail along shoreline affected
<b>Other Facilities</b>	
1. USFS Lakeshore Fire Station	Five buildings and entrance road affected (entire facility)
2. Salt Creek Recreation Residence Track cabins	At least one cabin affected; possibly others also affected
<b>McCloud Arm</b>	
<b>Boat Ramps</b>	
1. Bailey Cove Boat Ramp and Day Use Area	Boat ramp entirely affected, parking area, day-use area, and access road partially affected
2. Hirz Bay Public Boat Ramp	Boat ramp and lower parking area, restroom, entirely affected
<b>Campgrounds</b>	
1. Bailey Cove Campground	No effect—entire facility is above full pool elevation
2. Dekkas Rock Campground	Lower part of loop road and portion of group camp affected
3. Ellery Creek Campground	Lower portion of loop road and shoreline campsites affected
4. Hirz Bay Campgrounds	No effect—entire facility is above full pool elevation
5. Kamloop Camp (private organization)	No effect—entire facility is above full pool elevation
6. McCloud Bridge Campground	One restroom, lower part of camp loop and shoreline campsites affected
7. Moore Creek Campground	Lower portion of loop road, shoreline campsites likely affected
8. Pine Point Campground	Possible that some shoreline campsites affected
<b>Boat-in Campgrounds</b>	
1. Greens Creek Boat-in Campground	Some shoreline campsites likely affected
<b>Day-Use Areas</b>	
1. Dekkas Rock Day Use Area	Lower portion of loop road and parking affected
2. McCloud Bridge Day Use Area	Most of picnic sites affected
<b>Marinas</b>	
1. Holiday Harbor Marina	Three buildings, boat ramp, and tank affected, some overflow parking affected; RV park and road to RV park affected
<b>Trails<sup>1</sup></b>	
Bailey Cove Trail	Portion of trail along shoreline affected
Hirz Bay Trail	Portion of trail along shoreline affected
Samwel Cave Nature Trail	Portion of trail along shoreline affected

3

1  
2

**Table 18-6. Effects of CP2 on Developed Recreation Facilities at Shasta Lake (contd.)**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Other Facilities</b>	
1. Bollibokka Club	No effect—entire facility is above the full pool elevation
2. Campbell Creek Residence Track cabins	At least seven cabins affected; possibly others also affected
3. Shasta Caverns ferry landing	Two buildings at east landing affected, access roads serving east and west shore landings partially affected
4. USFS Station (Turntable Bay)	Four buildings and access road affected
<b>Squaw Arm</b>	
<b>Other Facilities</b>	
1. Didallas Recreation Residence Track cabins	At least one cabin affected; possible others also affected
<b>Pit Arm</b>	
<b>Boat Ramps</b>	
1. Jones Valley Public Boat Ramp	Boat ramp and turnaround area at top of ramp entirely affected, access road to parking lot partially affected
2. Packers Bay Public Boat Ramp	Boat ramp and restroom, information shelter, and pump house buildings affected, portion of parking affected
<b>Campgrounds</b>	
1. Lower Jones Valley Campground	One restroom building and trail footbridge affected, camp loop road and campsites partially affected
2. Upper Jones Valley Campground	No effect—entire facility is above full pool elevation
<b>Boat-in Campgrounds</b>	
1. Ski Island Boat-in Campground	Some shoreline campsites likely affected
2. Arbuckle Flat Boat-in Campground	Some shoreline campsites likely affected
<b>Marinas</b>	
1. Bridge Bay Resort and Marina	Most of facility—including eight buildings, boat ramp, parking lots, and roads—affected
2. Jones Valley Resort	Three buildings, parking area, ramp, and shoreline access roads affected
3. Packers Bay Marina	Access road from public ramp affected, boat ramp partially affected
4. Silverthorn Resort	Parking and ramp affected, shoreline access road partially affected

3



**Table 18-6. Effects of CP2 on Developed Recreation Facilities at Shasta Lake (contd.)**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Trails<sup>1</sup></b>	
1. Clikapudi Trail	Trailhead and portion of trail along shoreline affected
2. Packers Bay Trails	Portion of trails (3 out of 4 trails) along shoreline affected
<b>Other Facilities</b>	
1. Silverthorn Recreation Residence Track cabins	No effect—entire facility is above full pool elevation

Source: Reclamation 2003

Note:

<sup>1</sup> For some trails, trailheads are integrated into other recreation facilities. Alternative effects identified for standalone trailheads only.

Key:

RV = recreational vehicle

USFS = U.S. Forest Service

Under CP2, the recreation facilities on the Sacramento Arm that would be subject to effects on several features or a substantial portion of the facility's use area are one of the two boat ramps, three of the five campgrounds, two of the four marinas, four of the six nonmarina resorts, and the only operational day-use area. The USFS Lakeshore Fire Station, Dry Fork Creek trail and trailhead, Fisherman's Point trail, and at least one private cabin in the Salt Creek recreation residence tract would also be subject to major effects. One boat-in campground would be subject to a somewhat lesser but still substantial effect, while several additional facilities would be subject to relatively minor effects.

On the McCloud Arm, many of the major facilities would be subject to effects on several features or on a substantial portion of the facility's use area: both public boat ramps, both day-use areas, the one marina, four of seven public campgrounds, and the one boat-in campground. Other facilities affected to a similar degree are the USFS station at Turntable Cove, the Shasta Caverns Tour facilities on the east and west shores, Bailey Cove trail, and several of the cabins within the recreation residence tract on the east shore at Campbell Creek.

On the Squaw Creek Arm, one private cabin within the Didallas recreation residence tract would be affected. All but one of the public and commercial recreation facilities on the Pit Arm would be subject to major effects under CP2—both boat ramps, all four marinas, one of the two campgrounds, and both boat-in campgrounds.

Although they are not included in the table because of a lack of permanent infrastructure, shoreline camping areas at Beehive Point (Sacramento Arm), Gregory Beach (Sacramento Arm), Lower Salt Creek (Sacramento Arm), Jones

1 Valley Inlet (Pit Arm), and Mariner’s Point (Pit Arm) would also be subject to  
 2 substantial effects with the inundation of access roads and use areas.

3 Thus, the most prominent direct effects on recreation facilities and public access  
 4 at Shasta Lake and in the vicinity under CP2 would be the major effects on five of  
 5 six boat ramps, seven of nine marinas, four of six resorts, eight of 15 family and  
 6 group campgrounds, all four boat-in campgrounds, and three of four day-use  
 7 areas. Other facilities subject to major effects are USFS stations on the  
 8 Sacramento and McCloud arms; trails and trailheads on the Sacramento,  
 9 McCloud, and Pit arms (most located at day-use areas or boat ramps addressed  
 10 above); the Shasta Caverns ferry landing; and several private cabins on the  
 11 Sacramento, McCloud, and Squaw arms. Table 18-7 summarizes the number of  
 12 recreation facilities of specific types substantially affected.

13 **Table 18-7. Summary of Shasta Lake Recreation Facilities Substantially**  
 14 **Affected by CP2**

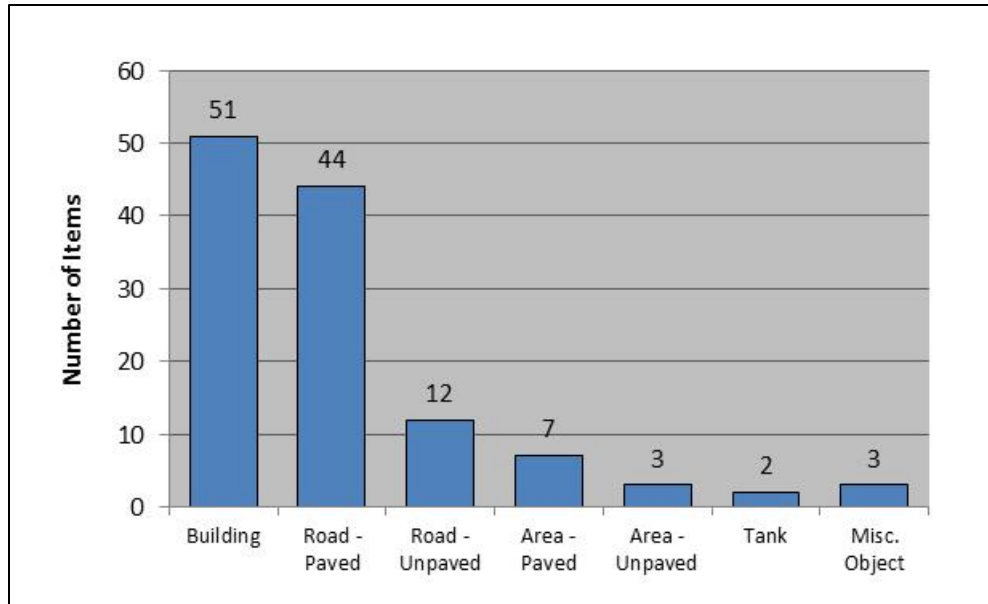
Type of Facility	Number of Facilities Affected
Boat ramp	5
Marina	7
Resort	4
Campground (family and group)	8
Day-use area	3
Boat-in campground	4
USFS operations	2
Trailhead/trail	2/7
Recreation residence tract	3
Commercial tour	1

Source: Reclamation 2003

Key:  
 USFS = U.S. Forest Service

15 Somewhat lesser effects would occur at several campgrounds and one marina.  
 16 Minor effects would occur at additional facilities of several types.

17 Figure 18-4 depicts the total number of inventoried Shasta Lake recreation facility  
 18 items, at all recreation facilities combined, that would be affected by inundation  
 19 under CP2. A total of 122 facility and infrastructure elements would be affected,  
 20 with more than three-fourths of those being buildings and segments of paved  
 21 roads. A lesser number of unpaved road segments, paved and unpaved areas  
 22 (usually parking areas), tanks, and miscellaneous objects would also be affected.



Source: Reclamation 2003

**Figure 18-4. Number of Recreation Facility Infrastructure Items Affected by a 12.5-Foot Dam Raise Under CP2**

As described in Section 2.3.8 in Chapter 2, “Alternatives,” affected recreation facilities would be relocated as part of the construction activities for all action alternatives. This could include relocation of affected portions of facilities within existing use areas, in adjacent undeveloped areas, or at new sites in the general vicinity of the lake. Because of the possible consolidation of facilities, the total number of facilities of specific types may be reduced. However, all affected recreation capacity would be replaced. Replacement facilities would be of equivalent overall capacity and quality to affected facilities and would provide comparable shoreline access, where applicable. With the relocation of affected facilities, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

*Impact Rec-2 (CP2): Temporary Construction-Related Disruption of Recreation Access and Activities at and near Shasta Dam* Construction activity that would be necessary to raise Shasta Dam and complete related modifications would prevent recreation visitors from crossing the dam, and thus could affect other recreation activities in the area. These effects are expected only during the construction period. However, this impact would be potentially significant.

This impact would be similar to Impact Rec-2 (CP1). If the increased dam-raise height relative to CP1 (12.5 feet versus 6.5 feet under CP1) would substantially lengthen the period during which construction would occur or would otherwise increase construction-related disruption in the dam area, the effects described under CP1 could be increased. This impact would be potentially significant. Mitigation for this impact is proposed in Section 18.3.5.

1                    *Impact Rec-3 (CP2): Effects on Boating and Other Recreation Use and*  
2                    *Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the*  
3                    *Reservoir* An increase in the magnitude or rate or changes in the timing of the  
4                    annual summer and fall drawdown of Shasta Lake could adversely affect boating  
5                    enjoyment and safety on the reservoir. Conversely, a reduced or slower drawdown  
6                    could have beneficial effects. However, under CP2, reservoir operations would be  
7                    similar to existing operations, exception during dry and critical water years. Little  
8                    change would occur in the annual magnitude, rate, or timing of reservoir  
9                    drawdown associated with any water year type. Therefore, this impact would be  
10                   less than significant.

11                   This impact would be similar to Impact Rec-3 (CP1) and would be less than  
12                   significant. Mitigation for this impact is not needed, and thus not proposed.

13                   *Impact Rec-4 (CP2): Increased Hazards to Boaters and Other Recreationists at*  
14                   *Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of*  
15                   *the Inundation Zone* At full pool, the increased pool elevation would result in  
16                   approximately 1,167 acres of newly inundated area where the existing trees and  
17                   other vegetation would not be removed. Anglers would generally benefit from the  
18                   associated enhancement of fish habitat; however, the standing trees and stumps  
19                   that would remain in these areas would increase the number of areas and total  
20                   area where this type of hazard to boaters and other recreation visitors would exist.  
21                   Therefore, this impact would be significant.

22                   Approximately 1,167 acres (67 percent) of the 1,750 acres of newly inundated  
23                   area that would result from the 12.5-foot dam raise at full pool would receive no  
24                   vegetation treatment (no vegetation removed), to maximize the habitat benefits of  
25                   inundated and residual vegetation. In general, this impact would be similar to  
26                   Impact Rec-4 (CP1), although the total area of potential hazard from remaining  
27                   trees and stumps would be greater under CP2. Because the untreated areas of the  
28                   new inundation zone would represent an increased hazard to boaters and  
29                   potentially other types of recreationists, this impact would be significant.  
30                   Mitigation for this impact is proposed in Section 18.3.5.

31                   **Upper Sacramento River (Shasta Dam to Red Bluff)**

32                   *Impact Rec-5 (CP2): Seasonal Inundation of Portions of Recreation Facilities or*  
33                   *Informal River Access Sites as a Result of Increased River Flows* Within the  
34                   upper Sacramento River portion of the primary study area, increased mean  
35                   monthly river flows associated with project implementation and operation could  
36                   inundate recreation facilities or portions of recreation facilities, such as boat  
37                   launch ramps and unimproved riverbank sites used for boat launching and other  
38                   activities. In general, the flow increases that would occur in some years would be  
39                   expected to be small (averaging 14 percent or less for any month in all water year  
40                   types); likewise, only a small additional area would be inundated relative to the  
41                   area inundated under existing conditions and the No-Action Alternative. As a  
42                   result, the adverse effects are unlikely to be substantial. This impact would be less  
43                   than significant.

1 This impact would be similar to but slightly greater than Impact Rec-5 (CP1),  
2 because the alteration of the flow regime of the Sacramento River would be more  
3 substantial under CP2 than under CP1. This impact would be less than significant.  
4 Mitigation for this impact is not needed, and thus not proposed.

5 *Impact Rec-6 (CP2): Increased Difficulty for Boaters in Using the Sacramento*  
6 *River as a Result of Increased River Flows* Increased mean monthly flows  
7 within the primary study area, particularly during summer and fall when boating  
8 activity is most likely, could result in more difficult conditions for boat launching  
9 and boating on the Sacramento River. Depending on the time of year and base  
10 river flows, increased flow may also have beneficial effects. Because the  
11 magnitude of flow increases associated with CP2 would be small (averaging less  
12 than 14 percent for any month or water year type), adverse effects on boaters  
13 within the primary study area are unlikely. This impact would be less than  
14 significant.

15 This impact would be similar to but slightly greater than Impact Rec-6 (CP1),  
16 because the alteration of the flow regime of the Sacramento River would be more  
17 substantial under CP2 than under CP1. This impact would be less than significant.  
18 Mitigation for this impact is not needed, and thus not proposed.

19 *Impact Rec-7 (CP2): Increased Difficulty for Swimmers and Waders in Using the*  
20 *Sacramento River as a Result of Increased River Flows* Increased mean monthly  
21 flows within the upper Sacramento River, particularly during summer when  
22 swimming activity is most likely and during fall and winter nonpeak-flow periods  
23 when wade angling activity is most likely, could result in more difficult  
24 swimming and wading conditions. Increased flows can make swimming and  
25 wading more challenging and potentially more hazardous. The magnitude of flow  
26 increases associated with CP2 would be small (averaging less than 14 percent for  
27 any month and water year type), and the timing of the increases would be such  
28 that adverse effects on angling waders within the primary study area are unlikely.  
29 Swimming is not a common activity on the main channel of the river because of  
30 cold-water temperatures. As a result, this impact would be less than significant.

31 This impact would be similar to but slightly greater than Impact Rec-7 (CP1),  
32 because the alteration of the flow regime of the Sacramento River would be more  
33 substantial under CP2 than under CP1. This impact would be less than significant.  
34 Mitigation for this impact is not needed, and thus not proposed.

35 *Impact Rec-8 (CP2): Increased Usability of the Sacramento River for Boating*  
36 *and Water-Contact Recreation as a Result of Decreased River Flows* Decreased  
37 mean monthly flows within the primary study area, particularly during summer  
38 when boating and swimming activity is most likely and during fall and winter  
39 low-flow periods when wade angling activity is most likely, could result in  
40 enhanced boating, swimming, and wading conditions. Decreased flows during  
41 normally high-flow periods can make boating less challenging and potentially less  
42 hazardous. The magnitude of flow decreases associated with CP2 would be small

1 (averaging less than 10 percent for any month or water year type), and the timing  
2 of the decreases (fall and winter months) would be such that effects on boaters,  
3 swimmers, and waders within the primary study area are unlikely. As a result, this  
4 impact would be less than significant.

5 This impact would be similar to but slightly greater than Impact Rec-8 (CP1),  
6 because the alteration of the flow regime of the Sacramento River would be more  
7 substantial under CP2 than under CP1. This impact would be less than significant.  
8 Mitigation for this impact is not needed, and thus not proposed.

9 *Impact Rec-9 (CP2): Enhanced Angling Opportunities in the Upper Sacramento*  
10 *River as a Result of Improved Flows and Reduced Water Temperatures* Project  
11 operation would result in improved flow and water temperature conditions in the  
12 upper Sacramento River, which would benefit Chinook salmon populations. This  
13 would result in enhanced populations of these game fish in the river, which would  
14 provide enhanced sport angling opportunities. This impact would be beneficial.

15 This impact would be similar to Impact Rec-9 (CP1) and would be beneficial.  
16 Mitigation for this impact is not needed, and thus not proposed.

17 *Impact Rec-10 (CP2): Disruption of Sacramento River Boating and Access*  
18 *Resulting from the Gravel Augmentation Program* The proposed gravel  
19 augmentation program would not be implemented under CP2. Therefore, no  
20 impact would occur. Mitigation for this impact is not needed, and thus not  
21 proposed.

22 *Impact Rec-11 (CP2): Changes in Usability of Reading Island Fishing Access*  
23 *Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration*  
24 *Sites* The proposed restoration of flow through various sites along the upper  
25 Sacramento River, rehabilitation of the Reading Island boat ramp for use by  
26 motorized boats, and construction of a handicap fishing access area would not be  
27 implemented under CP2. Therefore, no impact would occur. Mitigation for this  
28 impact is not needed, and thus not proposed.

29 **Lower Sacramento River and Delta and CVP/SWP Service Areas**

30 *Impact Rec-12 (CP2): Seasonal Inundation of Portions of River Recreation*  
31 *Facilities or Informal River Access Sites on the Lower Sacramento River and*  
32 *Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows*  
33 Within the extended study area, if increased mean monthly river flows were to  
34 occur in some months of some years as a result of project implementation and  
35 operation under CP2, the increased flows could inundate recreation facilities or  
36 portions of recreation facilities, such as boat launch ramps and unimproved  
37 riverbank sites used for boat launching and other activities. However, even with  
38 the increases, flows on the Sacramento, Feather, and American rivers would  
39 remain moderate and well below normal winter and spring high flows. As a result,  
40 adverse effects on river facilities or informal use areas within the extended study  
41 area are unlikely. This impact would be less than significant.

1 This impact would be similar to but slightly greater than Impact Rec-12 (CP1),  
2 because the alteration of flow regimes of the lower Sacramento River and rivers  
3 below CVP and SWP reservoirs would be more substantial under CP2 than under  
4 CP1. This impact would be less than significant. Mitigation for this impact is not  
5 needed, and thus not proposed.

6 *Impact Rec-13 (CP2): Increased Difficulty for Boaters in Using the Lower*  
7 *Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
8 *Increased River Flows* Increased mean monthly flows within the extended study  
9 area, particularly during summer and fall when boating activity is most likely,  
10 could result in more difficult conditions for boat launching and boating on the  
11 Sacramento River and other rivers affected by the project. Depending on the time  
12 of year and base river flows, increased flow may also have beneficial effects on  
13 boating by reducing shallow bars and riffles, thus improving navigability.  
14 However, the timing and flow conditions under which the flow increases are  
15 likely to occur on the Sacramento, Feather, and American rivers under CP2, and  
16 the continuation of moderate flows even with the increase, suggest that adverse  
17 effects on boaters within the extended study area are unlikely. This impact would  
18 be less than significant.

19 Hydrologic changes in more distant areas of the CVP/SWP service areas resulting  
20 from CP2 cannot be accurately predicted but would be small. Such slight changes  
21 occur on a dynamic and daily basis under existing conditions as water is moved  
22 throughout California. Other CVP and SWP reservoir elevations, canal flows, and  
23 flows below the reservoirs could be modified slightly, but any resulting impacts  
24 on recreation would be negligible and speculative.

25 This impact would be similar to but slightly greater than Impact Rec-13 (CP1),  
26 because the alteration of flow regimes of the lower Sacramento River and rivers  
27 below CVP and SWP reservoirs would be more substantial under CP2 than under  
28 CP1. This impact would be less than significant. Mitigation for this impact is not  
29 needed, and thus not proposed.

30 *Impact Rec-14 (CP2): Increased Difficulty for Swimmers and Waders in Using*  
31 *the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
32 *Increased River Flows* Increased mean monthly river flows within the extended  
33 study area during some months of some years, particularly during summer when  
34 swimming activity is most likely and nonpeak-flow periods when wade angling  
35 activity is most likely, could result in more difficult swimming and wading  
36 conditions. These activities could become more hazardous and thus less attractive  
37 to river users. However, given the timing of the likely flow increases under CP2,  
38 the flow conditions under which such increases would occur, and the continuation  
39 of moderate flows even with the increase, adverse effects on swimmers and  
40 waders within the extended study area are unlikely. This impact would be less  
41 than significant.

1 This impact would be similar to but slightly greater than Impact Rec-14 (CP1),  
2 because the alteration of flow regimes of the lower Sacramento River and rivers  
3 below CVP and SWP reservoirs would be more substantial under CP2 than under  
4 CP1. This impact would be less than significant. Mitigation for this impact is not  
5 needed, and thus not proposed.

6 *Impact Rec-15 (CP2): Increased Difficulty for Boaters and Anglers in Using the*  
7 *Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
8 *Decreased River Flows* Decreased mean monthly flows below CVP and SWP  
9 reservoirs during fall and winter low-flow periods when wade angling activity is  
10 most common, and during summer and fall when boating and river floating is  
11 popular in some areas, could have adverse effects if reduced flows were to reduce  
12 fishing success or boating navigability. Given the modest flow decreases in the  
13 Sacramento River associated with CP2 and the timing of the changes, effects on  
14 these recreation uses of the Sacramento River within the extended study area are  
15 unlikely. However, given the magnitude and timing of the largest flow decreases  
16 during some years on the Feather and American rivers below CVP and SWP  
17 reservoirs in the extended study area, adverse effects may occur. This impact  
18 would be potentially significant.

19 This impact would be similar to but slightly greater than Impact Rec-15 (CP1),  
20 because the alteration of flow regimes of the lower Sacramento River and rivers  
21 below CVP and SWP reservoirs would be more substantial under CP2 than under  
22 CP1. This impact would be potentially significant. Mitigation for this impact is  
23 proposed in Section 18.3.5.

### 24 **CP3 – 18.5-Foot Dam Raise, Agricultural Water Supply Reliability and** 25 **Anadromous Fish Survival**

26 Like each of the alternatives discussed above, CP3 would alter storage and  
27 operations at Shasta Lake, thus changing the full pool elevation at Shasta Lake,  
28 and the seasonal pool elevations and the flow regime in the Sacramento River and  
29 potentially several other reservoirs and downstream waterways. In turn, these  
30 alterations to reservoir pool elevations and river flows could affect the usability of  
31 some types of recreation facilities on the lake and downstream waterways,  
32 particularly marinas, boat ramps, and nearshore campgrounds and day-use areas.  
33 These alterations could also affect the ability of recreationists to use the reservoirs  
34 and waterways for boating, camping, fishing, and similar activities.

35 The full pool elevation of Shasta Lake would increase by 20.5 feet and the pool  
36 elevation would average as much as 18 to 24 feet higher than under existing  
37 (2005) and No-Action (2030) conditions at various times of the year. The greatest  
38 change would occur during the wettest years. Raising the dam by 18.5 feet would  
39 increase the surface area of the reservoir at full pool by about 2,570 acres (9  
40 percent). The width of the water body would not increase substantially in most  
41 areas, and much of the increase would occur during spring rather than during the  
42 high-traffic summer boating period.



1 In general, the proposed changes in flow and river stage on the upper Sacramento  
2 River associated with CP3 are more substantial than the changes associated with  
3 CP1 and CP2. However, these changes are still within a few percentage points of  
4 the changes associated with CP1 and CP2, as outlined above.

5 Reservoir- and river-based recreation facilities and activities in the primary and  
6 extended study areas downstream from Shasta Lake are similar; thus, potential  
7 reservoir and river recreation impacts would be similar. However, changes to the  
8 flow regime affecting reservoirs and rivers in the extended study area would be  
9 increasingly attenuated by flows from tributary waterways and other water  
10 sources and diversions that are unaffected by the project, reducing the level of  
11 impacts.

12 **Shasta Lake and Vicinity**

13 *Impact Rec-1 (CP3): Seasonal Inundation of Shasta Lake Recreation Facilities or*  
14 *Portions of Recreation Facilities and Public Access at Pool Elevations Above the*  
15 *Current Full Pool Elevation* The 20.5-foot increase in full pool elevation  
16 associated with an 18.5-foot dam raise would cause seasonal inundation of  
17 recreation facilities or portions of facilities at Shasta Lake, such as boat launch  
18 ramps, campgrounds, marinas, and day-use areas. In many years, the reservoir  
19 would fill to an elevation greater than the current full pool elevation of 1,067 feet;  
20 in some years, it would fill to the new full pool elevation of 1,087.5 feet. In each  
21 case, portions of existing recreation facilities on the shoreline would be inundated,  
22 resulting in substantial effects. However, the affected recreation facilities would  
23 be relocated during construction and before inundation. The replacement facilities  
24 would be of equivalent overall capacity and quality to the affected facilities;  
25 would provide comparable shoreline access, where applicable; and would comply  
26 with ADA and ABA guidelines. Therefore, this impact would be less than  
27 significant.

28 Within each of the three arms of Shasta Lake with recreation development, effects  
29 of implementing CP3 on individual recreation facilities would vary. These effects  
30 would range from no effect to effects on several of the facilities' inventoried and  
31 mapped features (e.g., roads, parking, and restrooms or other buildings) and on  
32 features not specifically inventoried (e.g., campsites and picnic sites). Table 18-8  
33 shows the anticipated effects of CP3 on inventoried and mapped (developed)  
34 recreation facilities.

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**Table 18-8. Effects of CP3 on Developed Recreation Facilities at Shasta Lake**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Sacramento Arm</b>	
<b>Boat Ramps</b>	
1. Antlers Public Boat Ramp	Boat ramp entirely affected; courtesy dock and rail would also be affected; restroom may be affected; parking lot is primarily unaffected
2. Centimudi Public Boat Ramp	Boat ramp and lower parking entirely affected, part of access road to ramp and lower parking affected
<b>Campgrounds</b>	
1. Antlers Campground	Amphitheater may be affected; shoreline erosion may threaten portions of site
2. Gregory Creek Campground	Two restrooms, lower half of campground road, and associated campsites affected
3. Lakeshore East Campground	One restroom and majority of campground road and campsites affected; access substantially affected
4. Nelson Point Campground	Most of campground road and several campsites affected
5. Oak Grove Campground	All features are above full pool elevation; access road affected
<b>Boat-in Campgrounds</b>	
1. Gooseneck Cove Boat-in Campground	Most shoreline campsites likely affected
<b>Day-Use Areas</b>	
1. Fisherman's Point Day Use Area	Parking and restroom unaffected but most picnic sites affected; also loss of access to shoreline trail
2. Salt Creek Swim Area (nonoperational)	Two restrooms, bathhouse, and paved pathways affected
<b>Marinas</b>	
1. Antlers Resort and Marina	Generator/pumphouse building and boat ramp/dock access road affected
2. Digger Bay Marina	One building affected; lower portion of marina access road/ramp affected, but appears to remain usable
3. Shasta Marina Resort	Three buildings (office, equipment shed, residence) affected; most parking and access roads affected
4. Sugarloaf Resort and Marina	Electrical service building and associated structures affected, boat ramp and unpaved parking areas partially affected

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**Table 18-8. Effects of CP3 on Developed Recreation Facilities at Shasta Lake (contd.)**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Resorts (Nonmarina)</b>	
1. Lakeshore Inn and RV Park	Shoreline campsites and walkway, storage building, cabin, covered patio area affected; underground septic system may be affected; access substantially affected
2. Lakeshore Villa RV Park	No effect—entire facility is above full pool elevation
3. Salt Creek Resort and RV Park	Resort unaffected; old road bed used as boat ramp (outside resort) affected
4. Shasta Lake RV Resort	Resort office affected; access substantially affected
5. Sugarloaf Cottages Resort	Seven cottages and large portion of unpaved cabin and shoreline access roads affected
6. Tsasdi Resort	Five cabins and entrance and exit roads connecting to Lakeshore Drive affected
<b>Trails<sup>1</sup></b>	
1. Dry Fork Creek Trail	Trailhead and portion of trail along shoreline affected
2. Fisherman's Point Trail	Portion of trail along shoreline affected
<b>Other Facilities</b>	
1. USFS Lakeshore Fire Station	Five buildings and entrance road affected (entire facility)
2. Salt Creek Recreation Residence Track cabins	At least one cabin affected; possibly others also affected
<b>McCloud Arm</b>	
<b>Boat Ramps</b>	
1. Bailey Cove Boat Ramp and Day Use Area	Boat ramp, parking area, day-use area, and access road entirely affected
2. Hirz Bay Public Boat Ramp	Boat ramp and lower parking area, restroom entirely affected
<b>Campgrounds</b>	
1. Bailey Cove Campground	Access road from ramp/day-use area affected
2. Dekkas Rock Campground	Loop road and associated portion of group camp affected
3. Ellery Creek Campground	Most of loop road and associated campsites affected
4. Hirz Bay Campgrounds	No effect entire facility is above full pool elevation
5. Kamloop Camp (private organization)	One building affected
6. McCloud Bridge Campground	Entire facility—two restrooms, camp loop road, and associated campsites—affected

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**Table 18-8. Effects of CP3 on Developed Recreation Facilities at Shasta Lake (contd.)**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
7. Moore Creek Campground	Lower portion of loop road and shoreline campsites appear to be affected
8. Pine Point Campground	Possible that some shoreline campsites affected
<b>Boat-in Campgrounds</b>	
1. Greens Creek Boat-in Campground	Most shoreline campsites likely affected
<b>Day-Use Areas</b>	
1. Dekkas Rock Day Use Area	Loop road and associated picnic sites and parking affected
2. McCloud Bridge Day Use Area	Entire facility, including picnic sites and restroom, affected
<b>Marinas</b>	
1. Holiday Harbor Marina	Entire facility, including three buildings, boat ramp, and tank affected; most parking, RV park, and road to RV park affected
<b>Trails<sup>1</sup></b>	
Bailey Cove Trail	Portion of trail along shoreline affected
Hirz Bay Trail	Portion of trail along shoreline affected
Samwel Cave Nature Trail	Portion of trail along shoreline affected
<b>Other Facilities</b>	
1. Bollibokka Club	Facility appears to be unaffected; McCloud Arm would extend near one building and one miscellaneous object, which may be affected
2. Campbell Creek Recreation Residence Track cabins	At least eight cabins affected; possibly others also affected
3. Shasta Caverns ferry landing	Most of east and west side landings affected; two buildings at east landing, and access roads serving east and west shore landings also affected
4. USFS Station (Turntable Bay)	Entire facility, including four buildings and access road, affected
<b>Squaw Arm</b>	
<b>Other Facilities</b>	
1. Didallas Recreation Residence Track cabins	At least one cabin affected; possibly others also affected

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**Table 18-8. Effects of CP3 on Developed Recreation Facilities at Shasta Lake (contd.)**

Facility Name	Explanation of Effects on Facility at Full Pool Elevation
<b>Pit Arm</b>	
<b>Boat Ramps</b>	
1. Jones Valley Public Boat Ramp	Boat ramp and turnaround area at top of ramp entirely affected, access road to parking lot partially affected
2. Packers Bay Public Boat Ramp	Boat ramp and restroom, information shelter, and pump house buildings affected; large portion of parking affected
<b>Campgrounds</b>	
1. Lower Jones Valley Campground	The restroom building, trail footbridge, and large portion of camp loop road and associated campsites affected
2. Upper Jones Valley Campground	No effect—entire facility is above full pool elevation
<b>Boat-in Campgrounds</b>	
1. Ski Island Boat-in Campground	Most shoreline campsites likely affected
2. Arbuckle Flat Boat-in Campground	Most shoreline campsites likely affected
<b>Marinas</b>	
1. Bridge Bay Resort and Marina	Nearly entire facility—eight buildings, boat ramp, parking lots, and access roads—affected
2. Jones Valley Resort	Most of facility—five buildings, parking area, ramp, and shoreline access roads – affected
3. Packers Bay Marina	Access road from public ramp and marina ramp affected
4. Silverthorn Resort	Most of facility—resort office and restaurant building, parking, ramp, and shoreline access road – affected
<b>Trails<sup>1</sup></b>	
1. Klikapudi Trail	Trailhead and portion of trail along shoreline affected
2. Packers Bay Trails	Portion of trails (3 out of 4 trails) along shoreline affected
<b>Other Facilities</b>	
1. Silverthorn Recreation Residence Track cabins	No effect—entire facility is above full pool elevation

Source: Reclamation 2003

Note:

<sup>1</sup> For some trails, trailheads are integrated into other recreation facilities. Alternative effects identified for standalone trailheads only.

Key:

RV = recreational vehicle

USFS = U.S. Forest Service

1 Under CP3, nearly all of the public and commercial recreation facilities on the  
2 Sacramento Arm would be subject to effects on several features or a substantial  
3 portion of the facility's use area. Both boat ramps, three of the five campgrounds,  
4 two of the four marinas, four of the six nonmarina resorts, one boat-in  
5 campground, and the one operational day-use area would all be subject to these  
6 major effects. The USFS Lakeshore Fire Station and the Dry Fork Creek trail and  
7 trailhead, Fisherman's Point trail, and at least one private cabin in the Salt Creek  
8 recreation residence tract would also be subject to major effects. Salt Creek Swim  
9 Area would also be subject to major effects, which is currently not operational but  
10 is used occasionally for overflow camping and as a base camp for firefighting  
11 crews. One marina would be subject to lesser but still substantial effects and  
12 several of the remaining facilities would be subject to minor effects.

13 On the McCloud Arm, both public boat ramps, both day-use areas, the one  
14 marina, five of eight campgrounds, and the one boat-in campground would be  
15 subject to major effects. Other facilities that would experience major effects are  
16 the USFS station at Turntable Cove, the Shasta Caverns Tour facilities on the east  
17 and west shores, Bailey Cove trail, and at least eight cabins on the east shore  
18 within the Campbell Creek recreation residence tract.

19 On the Squaw Creek Arm, one cabin within the Didallas recreation residence tract  
20 would be affected. Anticipated effects on recreation facilities on the Pit Arm  
21 under CP3 are similar to those that would occur under CP2. All but one of the  
22 public and commercial recreation facilities—both boat ramps, all four marinas, one  
23 of the two campgrounds, and both boat-in campground—would be subject to major  
24 effects.

25 Shoreline camping areas at Beehive Point (Sacramento Arm), Gregory Beach  
26 (Sacramento Arm), Lower Salt Creek (Sacramento Arm), Jones Valley Inlet (Pit  
27 Arm), and Mariner's Point (Pit Arm) would also be subject to substantial effects,  
28 with the unpaved access roads and use areas mostly inundated.

29 The most prominent direct effects on recreation facilities and public access at  
30 Shasta Lake and in the vicinity under CP3 would be the major effects on all six  
31 boat ramps, eight of nine marinas, four of six nonmarina resorts, nine of 15  
32 family and group campgrounds, all four boat-in campgrounds, and all four day-  
33 use areas. Other facilities subject to major effects are USFS stations on the  
34 Sacramento and McCloud arms; trails and trailheads on the Sacramento,  
35 McCloud, and Pit arms (most located at day-use areas or boat ramps addressed  
36 above); the Shasta Caverns ferry landing; and several private cabins on the  
37 Sacramento, McCloud, and Squaw arms. Many of these facilities would be  
38 entirely or nearly inundated at the new full pool elevation associated with CP3.  
39 Table 18-9 summarizes the number of recreation facilities of specific types  
40 affected.

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**Table 18-9. Tally of Shasta Lake Recreation Facilities Substantially Affected by CP3**

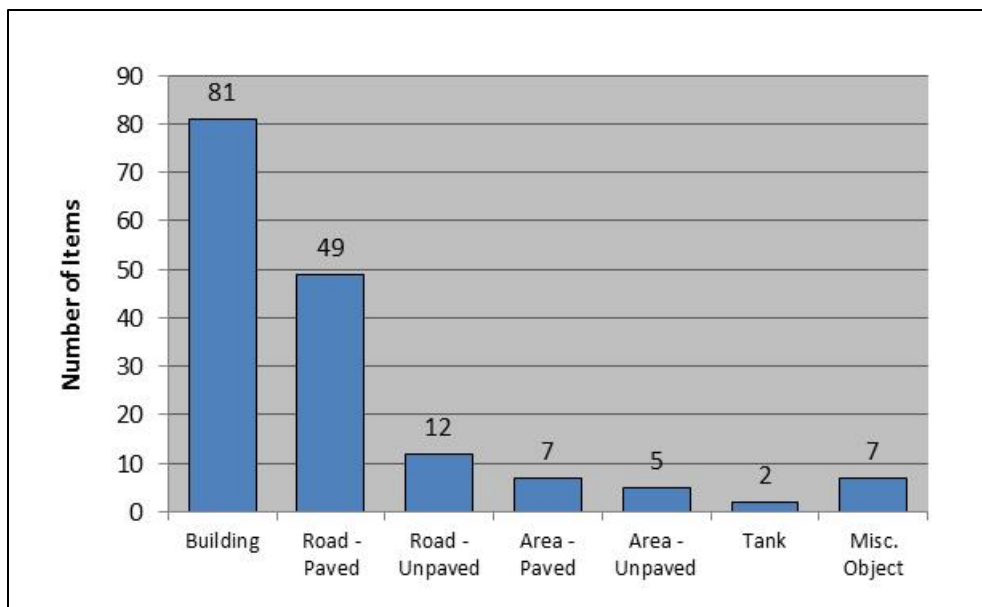
Type of Facility	Number of Facilities Affected
Boat ramp	6
Marina	8
Resort	4
Campground (family and group)	8
Private campground	1
Day-use area	4
Boat-in campground	4
USFS operations	2
Trailhead/trail	2/7
Recreation residence tract	3
Commercial tour	1

Source: Reclamation 2003

Key:  
USFS = U.S. Forest Service

Somewhat lesser but still considerable effects would occur at one campground and one marina, while relatively minor effects would occur at additional facilities of several types.

Figure 18-5 depicts the total number of inventoried Shasta Lake recreation facility items, at all recreation facilities combined, that would be affected by inundation under CP3. A total of 163 facility and infrastructure elements would be affected, with more than three-fourths of those being buildings and segments of paved roads. A lesser number of unpaved road segments, paved and unpaved areas (usually parking areas), tanks, and miscellaneous objects would also be affected.



Source: Reclamation 2003

**Figure 18-5. Number of Recreation Facility Infrastructure Items Affected by an 18.5-Foot Dam Raise Under CP3**

As described in Section 2.3.8 in Chapter 2, “Alternatives,” affected recreation facilities would be relocated as part of the construction activities for all action alternatives. This could include relocation of affected portions of facilities within existing use areas, in adjacent undeveloped areas, or at new sites in the general vicinity of the lake. Because of the possible consolidation of facilities, the total number of facilities of specific types may be reduced. However, all affected recreation capacity would be replaced. Replacement facilities would be of equivalent overall capacity and quality to affected facilities and would provide comparable shoreline access, where applicable. With the relocation of affected facilities, this impact would be less than significant. Mitigation for this impact is not needed, and thus not proposed.

*Impact Rec-2 (CP3): Temporary Construction-Related Disruption of Recreation Access and Activities at and near Shasta Dam* Construction activity that would be necessary to raise Shasta Dam and complete related modifications would prevent recreation visitors from crossing the dam, and thus could affect other recreation activities in the area. These effects are expected only during the construction period. However, this impact would be potentially significant.

This impact would be similar to Impact Rec-2 (CP1). If the increased dam raise height relative to CP1 (18.5 feet versus 6.5 feet under CP1) would substantially lengthen the period during which construction would occur or would otherwise increase construction-related disruption in the dam area, the effects described under CP1 could be increased. This impact would be potentially significant. Mitigation for this impact is proposed in Section 18.3.5.



1                    *Impact Rec-3 (CP3): Effects on Boating and Other Recreation Use and*  
2                    *Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the*  
3                    *Reservoir* An increase in the magnitude or rate or changes in the timing of the  
4                    annual summer and fall drawdown of Shasta Lake could adversely affect boating  
5                    enjoyment and safety on the reservoir. Conversely, a reduced or slower drawdown  
6                    could have beneficial effects. However, under CP3, reservoir operations would be  
7                    similar to existing operations. Little change would occur in the annual magnitude,  
8                    rate, or timing of reservoir drawdown. Therefore, this impact would be less than  
9                    significant.

10                   This impact would be similar to Impact Rec-3 (CP1) and would be less than  
11                   significant. Mitigation for this impact is not needed, and thus not proposed.

12                   *Impact Rec-4 (CP3): Increased Hazards to Boaters and Other Recreationists at*  
13                   *Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of*  
14                   *the Inundation Zone* At full pool, the increased pool elevation would result in  
15                   approximately 1,738 acres of newly inundated area where the existing trees and  
16                   other vegetation would not be removed. Anglers would generally benefit from the  
17                   associated enhancement of fish habitat; however, the standing trees and stumps  
18                   that would remain in these areas would increase the number of areas and total  
19                   area where this type of hazard to boaters and other types of recreation visitors  
20                   would exist. Therefore, this impact would be significant.

21                   Approximately 1,738 acres (68 percent) of the 2,570 acres of newly inundated  
22                   area that would result from the 18.5-foot dam raise at full pool would receive no  
23                   vegetation treatment (no vegetation removed), to maximize the habitat benefits of  
24                   inundated and residual vegetation. In general, this impact would be similar to  
25                   Impacts Rec-4 (CP1) and Rec-4 (CP2), although the total area of potential hazard  
26                   resulting from remaining trees and stumps would be greater under CP3 than under  
27                   CP1 or CP2. Because the untreated areas of the new inundation zone would  
28                   represent an increased hazard to boaters and potentially other types of  
29                   recreationists, this impact would be significant. Mitigation for this impact is  
30                   proposed in Section 18.3.5.

31                   **Upper Sacramento River (Shasta Dam to Red Bluff)**

32                   *Impact Rec-5 (CP3): Seasonal Inundation of Portions of Recreation Facilities or*  
33                   *Informal River Access Sites as a Result of Increased River Flows* Within the  
34                   upper Sacramento River portion of the primary study area, increased mean  
35                   monthly river flows associated with project implementation and operation could  
36                   inundate recreation facilities or portions of recreation facilities, such as boat  
37                   launch ramps and unimproved riverbank sites used for boat launching and other  
38                   activities. In general, the flow increases that would occur in some years would be  
39                   expected to be small (averaging 15 percent or less for any month in all water year  
40                   types); likewise, only a small additional area would be inundated relative to the  
41                   area inundated under existing conditions or the No-Action Alternative. As a  
42                   result, the adverse effects are unlikely to be substantial. This impact would be less  
43                   than significant.

1 This impact would be similar to but greater than Impacts Rec-5 (CP1) and Rec-5  
2 (CP2), because the alteration of flow regimes of the lower Sacramento River and  
3 rivers below CVP and SWP reservoirs would be greater under CP3 than under  
4 CP1 or CP2. This impact would be less than significant. Mitigation for this impact  
5 is not needed, and thus not proposed.

6 *Impact Rec-6 (CP3): Increased Difficulty for Boaters in Using the Sacramento*  
7 *River as a Result of Increased River Flows* Increased mean monthly flows  
8 within the primary study area, particularly during summer and fall when boating  
9 activity is most likely, could result in more difficult conditions for boat launching  
10 and boating on the Sacramento River. Depending on the time of year and base  
11 river flows, increased flow may also have beneficial effects. Because the  
12 magnitude of flow increases associated with CP3 would be small (averaging less  
13 than 15 percent for any month or water year type), adverse effects on boaters  
14 within the primary study area are unlikely. This impact would be less than  
15 significant.

16 This impact would be similar to but greater than Impacts Rec-6 (CP1) and Rec-6  
17 (CP2), because the alteration of flow regimes of the lower Sacramento River and  
18 rivers below CVP and SWP reservoirs would be greater under CP3 than under  
19 CP1 or CP2. This impact would be less than significant. Mitigation for this impact  
20 is not needed, and thus not proposed.

21 *Impact Rec-7 (CP3): Increased Difficulty for Swimmers and Waders in Using the*  
22 *Sacramento River as a Result of Increased River Flows* Increased mean monthly  
23 flows within the upper Sacramento River, particularly during summer when  
24 swimming activity is most likely and during fall and winter nonpeak-flow periods  
25 when wade angling activity is most likely, could result in more difficult  
26 swimming and wading conditions. Increased flows can make swimming and  
27 wading more challenging and potentially more hazardous. The magnitude of flow  
28 increases associated with CP3 would be small (averaging less than 15 percent for  
29 any month or water year type), and the timing of the increases would be such that  
30 adverse effects on angling waders within the primary study area are unlikely.  
31 Swimming is not a common activity on the main channel of the river because of  
32 cold-water temperatures. As a result, this impact would be less than significant.

33 This impact would be similar to but greater than Impacts Rec-7 (CP1) and Rec-7  
34 (CP2), because the alteration of flow regimes of the lower Sacramento River and  
35 rivers below CVP and SWP reservoirs would be greater under CP3 than under  
36 CP1 or CP2. This impact would be less than significant. Mitigation for this impact  
37 is not needed, and thus not proposed.

38 *Impact Rec-8 (CP3): Increased Usability of the Sacramento River for Boating*  
39 *and Water-Contact Recreation as a Result of Decreased River Flows* Decreased  
40 mean monthly flows within the primary study area, particularly during summer  
41 when boating and swimming activity is most likely and during fall and winter  
42 low-flow periods when wade angling activity is most likely, could result in

1 enhanced boating, swimming, and wading conditions. Decreased flows during  
2 normally high-flow periods can make boating less challenging and potentially less  
3 hazardous. The magnitude of flow decreases associated with CP3 would be small  
4 (averaging less than 12 percent for any month or water year type), and the timing  
5 of the decreases (fall and winter months) would be such that effects on boaters,  
6 swimmers, and waders within the primary study area are unlikely. As a result, this  
7 impact would be less than significant.

8 This impact would be similar to but greater than Impacts Rec-8 (CP1) and Rec-8  
9 (CP2), because the alteration of flow regimes of the lower Sacramento River and  
10 rivers below CVP and SWP reservoirs would be greater under CP3 than under  
11 CP1 or CP2. This impact would be less than significant. Mitigation for this impact  
12 is not needed, and thus not proposed.

13 *Impact Rec-9 (CP3): Enhanced Angling Opportunities in the Upper Sacramento*  
14 *River as a Result of Improved Flows and Reduced Water Temperatures* Project  
15 operation would result in improved flow and water temperature conditions in the  
16 upper Sacramento River, which would benefit Chinook salmon populations. This  
17 would result in enhanced populations of these game fish in the river, which would  
18 provide enhanced sport angling opportunities. This impact would be beneficial.

19 This impact would be similar to Impact Rec-9 (CP1) and would be beneficial.  
20 Mitigation for this impact is not needed, and thus not proposed.

21 *Impact Rec-10 (CP3): Disruption of Sacramento River Boating and Access*  
22 *Resulting from the Gravel Augmentation Program* The proposed gravel  
23 augmentation program would not be implemented under CP3. Therefore, no  
24 impact would occur. Mitigation for this impact is not needed, and thus not  
25 proposed.

26 *Impact Rec-11 (CP3): Changes in Usability of Reading Island Fishing Access*  
27 *Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration*  
28 *Sites* The proposed restoration of flow through various sites along the upper  
29 Sacramento River, rehabilitation of the Reading Island boat ramp for use by  
30 motorized boats, and construction of a handicap fishing access area would not be  
31 implemented under CP3. Therefore, no impact would occur. Mitigation for this  
32 impact is not needed, and thus not proposed.

### 33 **Lower Sacramento River and Delta and CVP/SWP Service Areas**

34 *Impact Rec-12 (CP3): Seasonal Inundation of Portions of River Recreation*  
35 *Facilities or Informal River Access Sites on the Lower Sacramento River and*  
36 *Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows*  
37 Within the extended study area, if increased mean monthly river flows were to  
38 occur in some months of some years as a result of project implementation and  
39 operation under CP3, the increased flows could inundate recreation facilities or  
40 portions of recreation facilities, such as boat launch ramps and unimproved  
41 riverbank sites used for boat launching and other activities. However, even with

1 the increases, flows on the Sacramento and Feather rivers would remain moderate  
2 and well below normal winter and spring high flows. As a result, adverse effects  
3 on river facilities or informal use areas within the extended study area are  
4 unlikely. This impact would be less than significant.

5 This impact would be similar to but greater than Impacts Rec-12 (CP1) and Rec-  
6 12 (CP2), because the alteration of flow regimes of the lower Sacramento River  
7 and rivers below CVP and SWP reservoirs would be greater under CP3 than  
8 under CP1 or CP2. This impact would be less than significant. Mitigation for this  
9 impact is not needed, and thus not proposed.

10 *Impact Rec-13 (CP3): Increased Difficulty for Boaters in Using the Lower*  
11 *Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
12 *Increased River Flows* Increased mean monthly flows within the extended study  
13 area, particularly during summer and fall when boating activity is most likely,  
14 could result in more difficult boating launching and boating conditions on the  
15 Sacramento River and other rivers affected by the project. Depending on the time  
16 of year and base river flows, increased flow may also have beneficial effects on  
17 boating by reducing shallow bars and riffles, thus improving navigability.  
18 However, the timing and flow conditions under which the flow increases are  
19 likely to occur on the Sacramento, Feather, and American rivers under CP3, and  
20 the continuation of moderate flows even with the increase, suggest that adverse  
21 effects on boaters within the extended study area are unlikely. This impact would  
22 be less than significant.

23 Hydrologic changes in more distant areas of the CVP and SWP service areas  
24 resulting from CP3 cannot be accurately predicted but would be small. Such slight  
25 changes occur on a dynamic and daily basis under existing conditions as water is  
26 moved throughout California. Other CVP and SWP reservoir elevations, canal  
27 flows, and flows below the reservoirs could be modified slightly, but any  
28 resulting effects on recreation would be negligible and speculative.

29 This impact would be similar to but greater than Impacts Rec-13 (CP1) and Rec-  
30 13 (CP2), because the alteration of flow regimes of the lower Sacramento River  
31 and rivers below CVP and SWP reservoirs would be greater under CP3 than  
32 under CP1 or CP2. This impact would be less than significant. Mitigation for this  
33 impact is not needed, and thus not proposed.

34 *Impact Rec-14 (CP3): Increased Difficulty for Swimmers and Waders in Using*  
35 *the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
36 *Increased River Flows* Increased mean monthly river flows within the extended  
37 study area during some months of some years, particularly during summer when  
38 swimming activity is most likely and during nonpeak-flow periods when wade  
39 angling activity is most likely, could result in more difficult swimming and  
40 wading conditions. These activities could become more hazardous and thus less  
41 attractive to river users. However, given the timing of the likely flow increases  
42 under CP3, the conditions under which such increases would occur, and the

1 continuation of moderate flows even with the increase, adverse effects on  
2 swimmers and waders in the extended study area are unlikely. This impact would  
3 be less than significant.

4 This impact would be similar to but greater than Impacts Rec-14 (CP1) and Rec-  
5 14 (CP2), because the alteration of flow regimes of the lower Sacramento River  
6 and rivers below CVP and SWP reservoirs would be greater under CP3 than  
7 under CP1 or CP2. This impact would be less than significant. Mitigation for this  
8 impact is not needed, and thus not proposed.

9 *Impact Rec-15 (CP3): Increased Difficulty for Boaters and Anglers in Using the*  
10 *Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
11 *Decreased River Flows* Decreased mean monthly flows below CVP and SWP  
12 reservoirs during fall and winter low-flow periods when wade angling activity is  
13 most common, and during summer and fall when boating and river floating is  
14 popular in some areas, could have adverse effects if reduced flows were to reduce  
15 fishing success or boating navigability. Given the modest flow decreases in the  
16 Sacramento River associated with CP3 and the timing of the changes, effects on  
17 these recreation uses of the Sacramento River in the extended study area are  
18 unlikely. However, given the magnitude and timing of the largest flow decreases  
19 during some years on the Feather and American rivers below CVP and SWP  
20 reservoirs in the extended study area, adverse effects may occur. This impact  
21 would be potentially significant.

22 This impact would be similar to but greater than Impacts Rec-15 (CP1) and Rec-  
23 15 (CP2), because the alteration of flow regimes of the lower Sacramento River  
24 and rivers below CVP and SWP reservoirs would be greater under CP3 than  
25 under CP1 or CP2. This impact would be potentially significant. Mitigation for  
26 this impact is proposed in Section 18.3.5.

27 ***CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply***  
28 ***Reliability***

29 Like each of the alternatives discussed above, CP4 would increase storage at  
30 Shasta Lake, thus changing the full pool elevation at Shasta Lake, and the  
31 seasonal pool elevations and the flow regime in the Sacramento River and  
32 potentially several other reservoirs and downstream waterways. In turn, these  
33 alterations to reservoir pool elevations and river flows could affect the usability of  
34 some types of recreation facilities on the lake and downstream waterways,  
35 particularly marinas, boat ramps, and nearshore campgrounds and day-use areas.  
36 These alterations could also affect the ability of recreationists to use the reservoirs  
37 and waterways for boating, camping, fishing, and similar activities.

38 As under CP3, under CP4, the full pool elevation of Shasta Lake would increase  
39 by 20.5 feet and the pool elevation would average as much as 18 to 24 feet higher  
40 than under existing (2005) and No-Action Alternative (2030) conditions at  
41 various times of the year. The greatest change would occur during the driest  
42 years. However, the dedicated Shasta Lake storage of 378 thousand acre-feet

1 (TAF) is unique to CP4 and would result in a different drawdown scenario than  
2 under CP3.

3 Raising the dam by 18.5 feet would increase the surface area of the reservoir at  
4 full pool by about 2,570 acres (9 percent). In general, the effect of this increase  
5 would be slight, given that the reservoir would exceed the current full pool  
6 elevation only during wetter-than-normal years. Also, the increase in acreage  
7 would be distributed around the several hundred miles of the reservoir's rim. The  
8 width of the water body would not increase substantially in most areas, and much  
9 of the increase would occur during spring rather than during the high-traffic  
10 summer boating period.

11 The changes in flow and river stage on the upper Sacramento River associated  
12 with CP4 would be the same as the changes associated with CP1, as outlined  
13 above, in that the operated storage of 256 TAF would be the same for CP1 and  
14 CP4.

15 Reservoir- and river-based recreation facilities and activities are similar in the  
16 primary and extended study areas downstream from Shasta Lake; thus, potential  
17 reservoir and river recreation impacts would be similar. However, changes to the  
18 flow regime affecting reservoirs and rivers in the extended study area would be  
19 increasingly attenuated by flows from tributary waterways and other water  
20 sources and diversions that are unaffected by the project, reducing the level of  
21 effects.

### 22 **Shasta Lake and Vicinity**

23 *Impact Rec-1 (CP4): Seasonal Inundation of Shasta Lake Recreation Facilities or*  
24 *Portions of Recreation Facilities and Public Access at Pool Elevations Above the*  
25 *Current Full Pool Elevation* The 20.5-foot increase in full pool elevation  
26 associated with an 18.5-foot dam raise would cause inundation of recreation  
27 facilities or portions of facilities at Shasta Lake. In many years, the reservoir  
28 would fill to an elevation greater than the current full pool elevation of 1,067 feet;  
29 in some years, it would fill to the new full pool elevation of 1,087.5 feet. In each  
30 case, portions of existing recreation facilities on the shoreline would be inundated,  
31 resulting in substantial effects. However, the affected recreation facilities would  
32 be relocated during construction and before inundation. The replacement facilities  
33 would be of equivalent overall capacity and quality to the affected facilities;  
34 would provide comparable shoreline access, where applicable; and would comply  
35 with ADA and ABA guidelines. Therefore, this impact would be less than  
36 significant.

37 This impact would be the same as Impact Rec-1 (CP3) because the full pool  
38 elevation would increase by the same amount under CP4 as under CP3. The same  
39 developed recreation facilities would be inundated under CP4 as under CP3 (see  
40 Tables 18-8 and 18-9 and Figure 18-5).

1 As described in Section 2.3.8 in Chapter 2, “Alternatives,” affected recreation  
2 facilities would be relocated as part of the construction activities for all action  
3 alternatives. This could include relocation of affected portions of facilities within  
4 existing use areas, in adjacent undeveloped areas, or at new sites in the general  
5 vicinity of the lake. Because of the possible consolidation of facilities, the total  
6 number of facilities of specific types may be reduced. However, all affected  
7 recreation capacity would be replaced. Replacement facilities would be of  
8 equivalent overall capacity and quality to affected facilities and would provide  
9 comparable shoreline access, where applicable. With the relocation of affected  
10 facilities, this impact would be less than significant. Mitigation for this impact is  
11 not needed, and thus not proposed.

12 *Impact Rec-2 (CP4): Temporary Construction-Related Disruption of Recreation*  
13 *Access and Activities at and near Shasta Dam* Construction activity that would  
14 be necessary to raise Shasta Dam and complete related modifications would  
15 prevent recreation visitors from crossing the dam, and could affect other  
16 recreation activities in the area. These effects are expected only during the  
17 construction period. However, this impact would be potentially significant.

18 This impact would be similar to Impact Rec-2 (CP1). If the increased dam-raise  
19 height relative to CP1 (18.5 feet versus 6.5 feet under CP1) would substantially  
20 lengthen the period during which construction would occur or otherwise increase  
21 construction-related disruption in the dam area, the effects described under CP1  
22 could be increased. This impact would be potentially significant. Mitigation for  
23 this impact is proposed in Section 18.3.5.

24 *Impact Rec-3 (CP4): Effects on Boating and Other Recreation Use and*  
25 *Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the*  
26 *Reservoir* An increase in the magnitude or rate or changes in the timing of the  
27 annual summer and fall drawdown of Shasta Lake could adversely affect boating  
28 enjoyment and safety on the reservoir. Conversely, a reduced or slower drawdown  
29 could have beneficial effects. However, under CP4, reservoir operations would be  
30 similar to existing operations, except during dry and critical water years. Little  
31 change would occur in the annual magnitude, rate, or timing of reservoir  
32 drawdown associated with any water year type. Therefore, this impact would be  
33 less than significant.

34 This impact would be similar to Impact Rec-3 (CP1) and would be less than  
35 significant. Mitigation for this impact is not needed, and thus not proposed.

36 *Impact Rec-4 (CP4): Increased Hazards to Boaters and Other Recreationists at*  
37 *Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of*  
38 *the Inundation Zone* At full pool, the increased pool elevation would result in  
39 approximately 1,738 acres of newly inundated area where the existing trees and  
40 other vegetation would not be removed. Anglers would generally benefit from the  
41 associated enhancement of fish habitat; however, the standing trees and stumps  
42 that would remain in these areas would increase the number of areas and total

1 area where this type of hazard to boaters and other types of recreation visitors  
2 would exist. Therefore, this impact would be significant.

3 This impact would be the same as Impact Rec-4 (CP3) and would be significant.  
4 Mitigation for this impact is proposed in Section 18.3.5.

5 **Upper Sacramento River (Shasta Dam to Red Bluff)**

6 *Impact Rec-5 (CP4): Seasonal Inundation of Portions of Recreation Facilities or*  
7 *Informal River Access Sites as a Result of Increased River Flows* Within the  
8 upper Sacramento River portion of the primary study area, increased mean  
9 monthly river flows associated with project implementation and operation could  
10 inundate recreation facilities or portions of recreation facilities, such as boat  
11 launch ramps and unimproved riverbank sites used for boat launching and other  
12 activities. In general, the flow increases that would occur in some years would be  
13 expected to be small (8 percent or less for any month in all water year types);  
14 likewise, only a small additional area would be inundated relative to the area  
15 inundated under existing conditions and the No-Action Alternative. As a result,  
16 the adverse effects are unlikely to be substantial. This impact would be less than  
17 significant.

18 This impact would be the same as Impact Rec-5 (CP1) and would be less than  
19 significant. Mitigation for this impact is not needed, and thus not proposed.

20 *Impact Rec-6 (CP4): Increased Difficulty for Boaters in Using the Sacramento*  
21 *River as a Result of Increased River Flows* Increased mean monthly flows  
22 within the primary study area, particularly during summer and fall when boating  
23 activity is most likely, could result in more difficult conditions for boat launching  
24 and boating on the Sacramento River. Depending on the time of year and base  
25 river flows, increased flow may also have beneficial effects. Because the  
26 magnitude of flow increases associated with CP4 would be small (averaging less  
27 than 8 percent for any month in all water year types), adverse effects on boaters  
28 within the primary study area are unlikely. As a result, this impact would be less  
29 than significant.

30 This impact would be the same as Impact Rec-6 (CP1) and would be less than  
31 significant. Mitigation for this impact is not needed, and thus not proposed.

32 *Impact Rec-7 (CP4): Increased Difficulty for Swimmers and Waders in Using the*  
33 *Sacramento River as a Result of Increased River Flows* Increased mean monthly  
34 flows within the upper Sacramento River, particularly during summer when  
35 swimming activity is most likely and during fall and winter nonpeak-flow periods  
36 when wade angling activity is most likely, could result in more difficult  
37 swimming and wading conditions. Increased flows can make swimming and  
38 wading more challenging and potentially more hazardous. The magnitude of flow  
39 increases associated with CP4 would be small (averaging less than 8 percent for  
40 any month in any water year type), and the timing of the increases would be such  
41 that adverse effects on angling waders within the primary study area are unlikely.



1 Swimming is not a common activity on the main channel of the river because of  
2 cold-water temperatures. As a result, this impact would be less than significant.

3 This impact would be the same as Impact Rec-7 (CP1) and would be less than  
4 significant. Mitigation for this impact is not needed, and thus not proposed.

5 *Impact Rec-8 (CP4): Increased Usability of the Sacramento River for Boating*  
6 *and Water-Contact Recreation as a Result of Decreased River Flows* Decreased  
7 mean monthly flows within the primary study area, particularly during the  
8 summer months when boating and swimming activity is most likely and during  
9 fall and winter low-flow periods when wade angling activity is most likely, could  
10 result in enhanced boating, swimming, and wading conditions. Decreased flows  
11 during normally high-flow periods can make boating less challenging and  
12 potentially less hazardous. The magnitude of flow decreases associated with CP4  
13 is small (averaging less than 7 percent for any month or water year type), and the  
14 timing of the decreases (fall and winter months) is such that effects on boaters,  
15 swimmers, and waders within the primary study area are unlikely. As a result, this  
16 impact would be less than significant.

17 This impact would be the same as Impact Rec-8 (CP1) and would be less than  
18 significant. Mitigation for this impact is not needed, and thus not proposed.

19 *Impact Rec-9 (CP4): Enhanced Angling Opportunities in the Upper Sacramento*  
20 *River as a Result of Improved Flows and Reduced Water Temperatures* Project  
21 operation would result in improved flow and water temperature conditions in the  
22 upper Sacramento River, which would benefit Chinook salmon populations, as  
23 well as steelhead, American shad, and striped bass. This would result in enhanced  
24 populations of these game fish in the river, which would provide enhanced sport  
25 angling opportunities. This impact would be beneficial.

26 Chinook salmon, steelhead, American shad, and striped bass all contribute to the  
27 popular sport fishery in the upper Sacramento River. (The salmon season has been  
28 closed on the upper Sacramento River in recent years, but may be reopened if the  
29 health of the runs improves.) With increased flows and cooler water temperature  
30 resulting from project operation, salmon populations would benefit from reduced  
31 mortality. Cooler water temperatures would also create more suitable conditions  
32 in the river for steelhead, American shad, and striped bass. These beneficial  
33 effects on game fish species could result in enhanced angling opportunities on the  
34 upper Sacramento River, which would have a beneficial effect on recreation.  
35 Mitigation for this impact is not needed, and thus not proposed.

36 *Impact Rec-10 (CP4): Disruption of Sacramento River Boating and Access*  
37 *Resulting from the Gravel Augmentation Program* Access to and boating on the  
38 upper Sacramento River may be affected temporarily while gravel is placed in the  
39 river under the proposed gravel augmentation program. However, gravel  
40 placement would occur during only a 1-month period and most augmentation sites  
41 would not be adjacent to public river access sites; further, the method of gravel

1 deposition would have little effect on boating. The program could increase the  
2 number of shallows encountered by boaters, but shallows are normal  
3 characteristics of the targeted river reaches. Therefore, this impact would be less  
4 than significant.

5 The proposed gravel augmentation program could affect boating on the upper  
6 Sacramento River by increasing the number of shallow riffles where boating  
7 could be made more difficult or hazardous, or where boats may drag the bottom  
8 during low-water periods. In the short term, river access and boating may be  
9 affected while the gravel is being placed in the river. However, the program  
10 would affect only a few sites between Keswick Dam and Clear Creek each year,  
11 and the sites under consideration are well distributed along more than 10 miles of  
12 the river. Gravel placement would most likely occur only during an  
13 approximately 1-month period of late summer (late August to late September),  
14 limiting the time during which access or boating could be disrupted. Only a few  
15 of the gravel augmentation sites under consideration are adjacent to public river  
16 access sites, where access could be disrupted for 1 or 2 days during gravel  
17 placement. Deposition of gravel at most sites would occur using a talus cone or  
18 lateral berm method, which would use dump trucks or conveyors to place gravel  
19 near the riverbank, and would have little effect on boating. Only a few sites would  
20 use a direct placement method, which would use front-end loaders to deposit  
21 gravel directly in the river channel, and which could conflict with boating during  
22 the 1 or 2 days of gravel deposition.

23 The gravel augmentation program would increase the number of shallows that  
24 boaters on the river could encounter. However, shallows as well as rocks and  
25 other obstructions are normal characteristics of the targeted reaches of the river  
26 (Tuthill 2005). As a result, the boats most commonly used on the upper river (e.g.,  
27 shallow-draft prop and jet-driven power boats, canoes, kayaks, and rafts) are able  
28 to navigate shallow waters, and published boating guides warn boaters of depth  
29 changes caused by shifting sands and silts, shallowness, snags, and other  
30 obstructions they may encounter (DBW 2011b). For these reasons, both short-  
31 and long-term effects on river access and boating are likely to be minimal. As a  
32 result, this impact would be less than significant. Mitigation for this impact is not  
33 needed, and thus not proposed.

34 *Impact Rec-11 (CP4): Changes in Usability of Reading Island Fishing Access*  
35 *Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration*  
36 *Sites* Restoring flow through various sites along the upper Sacramento River  
37 would increase boating and fishing access and opportunities for day-use visitors  
38 to the park. This impact would be beneficial.

39 Several options for restoring the upper Sacramento River to enhance habitat for  
40 anadromous salmonid fish species exist, including restoring flow through  
41 Anderson Slough at Reading Island. The restoration at Anderson Slough would  
42 deepen the slough and flush out the aquatic vegetation that now clogs the  
43 waterway and renders the Reading Island boat ramp on the slough nearly

1 unusable. Also under consideration are rehabilitation of the boat ramp for  
2 motorized boat use and construction of a handicap fishing access area. These  
3 actions to restore habitat and rehabilitate and enhance recreation facilities would  
4 increase boating and fishing access and opportunities for day-use visitors to the  
5 park. They would also make the park more functional and attractive for river float  
6 trip groups that occasionally camp at the island under BLM special-use permits.  
7 This impact would be beneficial. Mitigation for this impact is not needed, and  
8 thus not proposed.

9 **Lower Sacramento River and Delta and CVP/SWP Service Areas**

10 *Impact Rec-12 (CP4): Seasonal Inundation of Portions of River Recreation*  
11 *Facilities or Informal River Access Sites on the Lower Sacramento River and*  
12 *Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows*

13 Within the extended study area, if increased mean monthly river flows were to  
14 occur in some months of some years as a result of project implementation and  
15 operation under CP4, the increased flows could inundate recreation facilities or  
16 portions of recreation facilities, such as boat launch ramps and unimproved  
17 riverbank sites used for boat launching and other activities. However, even with  
18 the increases, flows on the Sacramento, Feather, and American rivers would  
19 remain moderate and well below normal winter and spring high flows. As a result,  
20 adverse effects on river facilities or informal use areas within the extended study  
21 area are unlikely. This impact would be less than significant.

22 This impact would be the same as Impact Rec-12 (CP1) and would be less than  
23 significant. Mitigation for this impact is not needed, and thus not proposed.

24 *Impact Rec-13 (CP4): Increased Difficulty for Boaters in Using the Lower*  
25 *Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
26 *Increased River Flows* Increased mean monthly flows within the extended study  
27 area, particularly during summer and fall when boating activity is most likely,  
28 could result in more difficult conditions for boat launching and boating on the  
29 Sacramento River and other rivers affected by the project. Depending on the time  
30 of year and base river flows, increased flow may also have beneficial effects on  
31 boating by reducing shallow bars and riffles, thus improving navigability.  
32 However, the timing and flow conditions under which the flow increases are  
33 likely to occur on the Sacramento, Feather, and American rivers under CP4, and  
34 the continuation of moderate flows even with the increase, suggest that adverse  
35 effects on boaters within the extended study area are unlikely. This impact would  
36 be less than significant.

37 Hydrologic changes in more distant areas of the CVP/SWP service areas resulting  
38 from CP4 cannot be accurately predicted but would be small. Such slight changes  
39 occur on a dynamic and daily basis under existing conditions as water is moved  
40 throughout California. Other CVP and SWP reservoir elevations, canal flows, and  
41 flows below the reservoirs could be slightly modified, but any resulting impacts  
42 on recreation would be negligible and speculative.

1 This impact would be the same as Impact Rec-13 (CP1) and would be less than  
2 significant. Mitigation for this impact is not needed, and thus not proposed.

3 *Impact Rec-14 (CP4): Increased Difficulty for Swimmers and Waders in Using*  
4 *the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
5 *Increased River Flows* Increased mean monthly river flows within the extended  
6 study area during some months of some years, particularly during summer when  
7 swimming activity is most likely and during nonpeak-flow periods when wade  
8 angling activity is most likely, could result in more difficult swimming and  
9 wading conditions. These activities could become more hazardous and thus less  
10 attractive to river users. However, given the timing of the likely flow increases  
11 under CP1, the conditions under which such increases would occur, and the  
12 continuation of moderate flows even with the increase, adverse effects on  
13 swimmers and waders within the extended study area are unlikely. This impact  
14 would be less than significant.

15 This impact would be the same as Impact Rec-14 (CP1) and would be less than  
16 significant. Mitigation for this impact is not needed, and thus not proposed.

17 *Impact Rec-15 (CP4): Increased Difficulty for Boaters and Anglers in Using the*  
18 *Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
19 *Decreased River Flows* Decreased mean monthly flows below CVP and SWP  
20 reservoirs during fall and winter low-flow periods when wade angling activity is  
21 most common, and during summer and fall when boating and river floating is  
22 popular in some areas, could have adverse effects if reduced flows were to reduce  
23 fishing success or boating navigability. Given the modest flow decreases in the  
24 Sacramento River associated with CP4 and the timing of the changes, effects on  
25 these recreation uses of the Sacramento River in the extended study area are  
26 unlikely. However, given the magnitude and timing of the largest flow decreases  
27 during some years on the Feather and American rivers below CVP and SWP  
28 reservoirs in the extended study area, adverse effects may occur. This impact  
29 would be potentially significant.

30 This impact would be the same as Impact Rec-15 (CP1) and would be potentially  
31 significant. Mitigation for this impact is proposed in Section 18.3.5.

32 **CP5 – 18.5-Foot Dam Raise, Combination Plan**

33 Like each of the alternatives discussed above, CP5 would increase storage at  
34 Shasta Lake, thus increasing the full pool elevation at Shasta Lake, and the  
35 seasonal pool elevations and the flow regime in the Sacramento River and  
36 potentially several other reservoirs and downstream waterways. In turn, these  
37 alterations to reservoir pool elevations and river flows could affect the usability of  
38 some types of recreation facilities on the lake and downstream waterways,  
39 particularly marinas, boat ramps, and nearshore campgrounds and day-use areas.  
40 These alterations could also affect the ability of recreationists to use the reservoirs  
41 and waterways for boating, camping, fishing, and similar activities.

1 The full pool elevation of Shasta Lake would increase by 20.5 feet and the pool  
2 elevation would average as much as 18 to 24 feet higher than under existing  
3 (2005) and No-Action Alternative (2030) conditions at various times of the year.  
4 The greatest change would occur during the wettest years. Raising the dam by  
5 18.5 feet would increase the surface area of the reservoir at full pool by about  
6 2,570 acres (9 percent). In general, the effect of this increase would be slight,  
7 given that the reservoir would exceed the current full pool elevation only during  
8 wetter-than-normal years. Also, the increase in acreage would be distributed  
9 around the several hundred miles of the reservoir's rim. The width of the water  
10 body would not increase substantially in most areas, and much of the increase  
11 would occur during spring rather than during the high-traffic summer boating  
12 period.

13 Changes in flow and river stage on the upper Sacramento River associated with  
14 CP5 would be similar to those associated with CP3, as outlined above.

15 Reservoir- and river-based recreation facilities and activities in the primary and  
16 extended study areas downstream from Shasta Lake are similar; thus potential  
17 reservoir and river recreation impacts would be similar. However, changes to the  
18 flow regime affecting reservoirs and rivers in the extended study area would be  
19 increasingly attenuated by flows from tributary waterways and other water  
20 sources and diversions that are unaffected by the project, reducing the level of  
21 impacts.

### 22 **Shasta Lake and Vicinity**

23 *Impact Rec-1 (CP5): Seasonal Inundation of Shasta Lake Recreation Facilities or*  
24 *Portions of Recreation Facilities and Public Access at Pool Elevations Above the*  
25 *Current Full Pool Elevation* The 20.5-foot increase in full pool elevation  
26 associated with an 18.5-foot dam raise would cause seasonal inundation of  
27 recreation facilities or portions of facilities at Shasta Lake. In many years, the  
28 reservoir would fill to an elevation greater than the current full pool elevation of  
29 1,067 feet; in some years, it would fill to the new full pool elevation of 1,087.5  
30 feet. In each case, portions of existing recreation facilities on the shoreline would  
31 be inundated, resulting in substantial effects. However, the affected recreation  
32 facilities would be relocated during construction and before inundation. The  
33 replacement facilities would be of equivalent overall capacity and quality to the  
34 affected facilities; would provide comparable shoreline access, where applicable;  
35 and would comply with ADA and ABA guidelines. Therefore, this impact would  
36 be less than significant.

37 This impact would be the same as Impact Rec-1 (CP3) because the full pool  
38 elevation would increase by the same amount under CP5 as under CP3. The same  
39 developed recreation facilities would be inundated under CP5 as under CP3 (see  
40 Tables 18-8 and 18-8 and Figure 18-5).

41 As described in Section 2.3.8 in Chapter 2, "Alternatives," affected recreation  
42 facilities would be relocated as part of the construction activities for all action

1 alternatives. This could include relocation of affected portions of facilities within  
2 existing use areas, in adjacent undeveloped areas, or at new sites in the general  
3 vicinity of the lake. Because of the possible consolidation of facilities, the total  
4 number of facilities of specific types may be reduced. However, all affected  
5 recreation capacity would be replaced. Replacement facilities would be of  
6 equivalent overall capacity and quality to affected facilities and would provide  
7 comparable shoreline access, where applicable. With the relocation of affected  
8 facilities, this impact would be less than significant. Mitigation for this impact is  
9 not needed, and thus not proposed.

10 *Impact Rec-2 (CP5): Temporary Construction-Related Disruption of Recreation*  
11 *Access and Activities at and near Shasta Dam* Construction activity that would  
12 be necessary to raise Shasta Dam and complete related modifications would  
13 prevent recreation visitors from crossing the dam, and could affect other  
14 recreation activities in the area. These effects are expected only during the  
15 construction period. However, this impact would be potentially significant.

16 This impact would be similar to Impact Rec-2 (CP1). If the increased dam-raise  
17 height relative to CP1 (18.5 feet versus 6.5 feet under CP1) would substantially  
18 lengthen the period during which construction would occur or otherwise increase  
19 construction-related disruption in the dam area, the effects described under CP1  
20 could be increased. This impact would be potentially significant. Mitigation for  
21 this impact is proposed in Section 18.3.5.

22 *Impact Rec-3 (CP5): Effects on Boating and Other Recreation Use and*  
23 *Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the*  
24 *Reservoir* An increase in the magnitude or rate or changes in the timing of the  
25 annual summer and fall drawdown of Shasta Lake could adversely affect boating  
26 enjoyment and safety on the reservoir. Conversely, a reduced or slower drawdown  
27 could have beneficial effects. However, under CP5, reservoir operations would be  
28 similar to existing operations, except during dry and critical water years. Little  
29 change would occur in the annual magnitude, rate, or timing of reservoir  
30 drawdown associated with any water year type. Therefore, the impact would be  
31 less than significant.

32 This impact would be similar to Impact Rec-3 (CP1) and would be less than  
33 significant. Mitigation for this impact is not needed, and thus not proposed.

34 *Impact Rec-4 (CP5): Increased Hazards to Boaters and Other Recreationists at*  
35 *Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of*  
36 *the Inundation Zone* At full pool, the increased pool elevation would result in  
37 approximately 1,738 acres of newly inundated area where the existing trees and  
38 other vegetation would not be removed. Anglers would generally benefit from the  
39 associated enhancement of fish habitat; however, the standing trees and stumps  
40 that would remain in these areas would increase the number of areas and total  
41 area where this type of hazard to boaters and other recreation visitors would exist.  
42 Therefore, this impact would be significant.

1 This impact would be the same as Impact Rec-4 (CP3) and would be significant.  
2 Mitigation for this impact is proposed in Section 18.3.5.

3 **Upper Sacramento River (Shasta Dam to Red Bluff)**

4 *Impact Rec-5 (CP5): Seasonal Inundation of Portions of Recreation Facilities or*  
5 *Informal River Access Sites as a Result of Increased River Flows* Within the  
6 upper Sacramento River portion of the primary study area, increased mean  
7 monthly river flows associated with project implementation and operation could  
8 inundate recreation facilities or portions of recreation facilities, such as boat  
9 launch ramps and unimproved riverbank sites used for boat launching and other  
10 activities. In general, the flow increases that would occur in some years would be  
11 expected to be small (19 percent or less for any month in all water year types);  
12 likewise, only a small additional area would be inundated relative to the area  
13 inundated under existing conditions or the No-Action Alternative. As a result, the  
14 adverse effects are unlikely to be substantial. This impact would be less than  
15 significant.

16 This impact would be similar to but greater than Impacts Rec-5 (CP1), Rec-5  
17 (CP2), and Rec-5 (CP3) because the alteration of flow regimes of the lower  
18 Sacramento River and rivers below CVP and SWP reservoirs would be greater  
19 under CP5 than under CP1, CP2, or CP3. This impact would be less than  
20 significant. Mitigation for this impact is not needed, and thus not proposed.

21 *Impact Rec-6 (CP5): Increased Difficulty for Boaters in Using the Sacramento*  
22 *River as a Result of Increased River Flows* Increased mean monthly flows  
23 within the primary study area, particularly during summer and fall when boating  
24 activity is most likely, could result in more difficult conditions for boat launching  
25 and boating on the Sacramento River. Depending on the time of year and base  
26 river flows, increased flow may also have beneficial effects. Because  
27 the magnitude of flow increases associated with CP5 would be small (averaging  
28 less than 19 percent for any month in all water year types), adverse effects on  
29 boaters within the primary study area are unlikely. This impact would be less than  
30 significant.

31 This impact would be similar to but greater than Impacts Rec-6 (CP1), Rec-6  
32 (CP2), and Rec-6 (CP3) because the alteration of flow regimes of the lower  
33 Sacramento River and rivers below CVP and SWP reservoirs would be greater  
34 under CP5 than under CP1, CP2, or CP3. This impact would be less than  
35 significant. Mitigation for this impact is not needed, and thus not proposed.

36 *Impact Rec-7 (CP5): Increased Difficulty for Swimmers and Waders in Using the*  
37 *Sacramento River as a Result of Increased River Flows* Increased mean monthly  
38 flows within the upper Sacramento River, particularly during summer when  
39 swimming activity is most likely and during fall and winter nonpeak-flow periods  
40 when wade angling activity is most likely, could result in more difficult  
41 swimming and wading conditions. Increased flows can make swimming and  
42 wading more challenging and potentially more hazardous. The magnitude of flow

1 increases associated with CP5 would be small (averaging less than 19 percent for  
2 any month in all water year types), and the timing of the increases would be such  
3 that adverse effects on angling waders within the primary study area are unlikely.  
4 Swimming is not a common activity on the main channel of the river because of  
5 cold-water temperatures. As a result, this impact would be less than significant.

6 This impact would be similar to but greater than Impacts Rec-7 (CP1), Rec-7  
7 (CP2), and Rec-7 (CP3) because the alteration of flow regimes of the lower  
8 Sacramento River and rivers below CVP and SWP reservoirs would be greater  
9 under CP5 than under CP1, CP2, or CP3. This impact would be less than  
10 significant. Mitigation for this impact is not needed, and thus not proposed.

11 *Impact Rec-8 (CP5): Increased Usability of the Sacramento River for Boating*  
12 *and Water-Contact Recreation as a Result of Decreased River Flows* Decreased  
13 mean monthly flows within the primary study area, particularly during summer  
14 when boating and swimming activity is most likely and during fall and winter  
15 low-flow periods when wade angling activity is most likely, could result in  
16 enhanced boating, swimming, and wading conditions. Decreased flows during  
17 normally high-flow periods can make boating less challenging and potentially less  
18 hazardous. The magnitude of flow decreases associated with CP5 would be small  
19 (averaging less than 12 percent for any month or water year type), and the timing  
20 of the decreases (fall and winter months) would be such that effects on boaters,  
21 swimmers, and waders within the primary study area are unlikely. As a result, this  
22 impact would be less than significant.

23 This impact would be similar to but greater than Impacts Rec-8 (CP1), Rec-8  
24 (CP2), and Rec-8 (CP3) because the alteration of flow regimes of the lower  
25 Sacramento River and rivers below CVP and SWP reservoirs would be greater  
26 under CP5 than under CP1, CP2, or CP3. This impact would be less than  
27 significant. Mitigation for this impact is not needed, and thus not proposed.

28 *Impact Rec-9 (CP5): Enhanced Angling Opportunities in the Upper Sacramento*  
29 *River as a Result of Improved Flows and Reduced Water Temperatures* Project  
30 operation would result in improved flow and water temperature conditions in the  
31 upper Sacramento River, which would benefit Chinook salmon populations. This  
32 would result in enhanced populations of these game fish in the river, which would  
33 provide enhanced sport angling opportunities. This impact would be beneficial.

34 This impact would be the same as Impact Rec-9 (CP2) and would be beneficial.  
35 Mitigation for this impact is not needed, and thus not proposed.

36 *Impact Rec-10 (CP5): Disruption of Sacramento River Boating and Access*  
37 *Resulting from the Gravel Augmentation Program* Access to and boating on the  
38 upper Sacramento River may be affected temporarily while gravel is placed in the  
39 river under the proposed gravel augmentation program. However, gravel  
40 placement would occur during only a 1-month period and most augmentation sites  
41 would not be adjacent to public river access sites; further, the method of gravel



1 deposition would have little effect on boating. The program could increase the  
2 number of shallows encountered by boaters, but shallows are normal  
3 characteristics of the targeted river reaches. Therefore, this impact would be less  
4 than significant.

5 This impact would be the same as Impact Rec-10 (CP4) and would be less than  
6 significant. Mitigation for this impact is not needed, and thus not proposed.

7 *Impact Rec-11 (CP5): Changes in Usability of Reading Island Fishing Access*  
8 *Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration*  
9 *Sites* Restoring flow through various sites along the upper Sacramento River  
10 would increase boating and fishing access and opportunities for day-use visitors  
11 to the park. This impact would be beneficial.

12 This impact would be the same as Impact Rec-11 (CP4) and would be beneficial.  
13 Mitigation for this impact is not needed, and thus not proposed.

#### 14 **Lower Sacramento River and Delta and CVP/SWP Service Areas**

15 *Impact Rec-12 (CP5): Seasonal Inundation of Portions of River Recreation*  
16 *Facilities or Informal River Access Sites on the Lower Sacramento River and*  
17 *Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows*  
18 Within the extended study area, if increased mean monthly river flows were to  
19 occur in some months of some years as a result of project implementation and  
20 operation under CP5, the increased flows could inundate recreation facilities or  
21 portions of recreation facilities, such as boat launch ramps and unimproved  
22 riverbank sites used for boat launching and other activities. However, even with  
23 the increases, flows on the Sacramento, Feather, and American rivers would  
24 remain moderate and well below normal winter and spring high flows. As a result,  
25 adverse effects on river facilities or informal use areas within the extended study  
26 area are unlikely. This impact would be less than significant.

27 This impact would be similar to but greater than Impacts Rec-12 (CP1), Rec-12  
28 (CP2), and Rec-12 (CP3) because the alteration of flow regimes of the lower  
29 Sacramento River and rivers below CVP and SWP reservoirs would be greater  
30 under CP5 than under CP1, CP2, or CP3. This impact would be less than  
31 significant. Mitigation for this impact is not needed, and thus not proposed.

32 *Impact Rec-13 (CP5): Increased Difficulty for Boaters in Using the Lower*  
33 *Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
34 *Increased River Flows* Increased mean monthly flows within the extended study  
35 area, particularly during summer and fall when boating activity is most likely,  
36 could result in more difficult conditions for boat launching and boating on the  
37 Sacramento River and other rivers affected by the project. Depending on the time  
38 of year and base river flows, increased flow may also have beneficial effects on  
39 boating by reducing shallow bars and riffles, thus improving navigability.  
40 However, the timing and flow conditions under which the flow increases are  
41 likely to occur on the Sacramento, American, and Feather rivers under CP5, and

1 the continuation of moderate flows even with the increase, suggest that adverse  
2 effects on boaters within the extended study area are unlikely. This impact would  
3 be less than significant.

4 This impact would be similar to but greater than Impacts Rec-13 (CP1), Rec-13  
5 (CP2), and Rec-13 (CP3) because the alteration of flow regimes of the lower  
6 Sacramento River and rivers below CVP and SWP reservoirs would be greater  
7 under CP5 than under CP1, CP2, or CP3. This impact would be less than  
8 significant. Mitigation for this impact is not needed, and thus not proposed.

9 *Impact Rec-14 (CP5): Increased Difficulty for Swimmers and Waders in Using*  
10 *the Sacramento River and Rivers below CVP and SWP Reservoirs as a Result of*  
11 *Increased River Flows* Increased mean monthly river flows within the extended  
12 study area during some months of some years, particularly during summer when  
13 swimming activity is most likely and during nonpeak-flow periods when wade  
14 angling activity is most likely, could result in more difficult swimming and  
15 wading conditions. These activities could become more hazardous and thus less  
16 attractive to river users. However, given the timing of the likely flow increases  
17 under CP5, the conditions under such increases would occur, and the continuation  
18 of moderate flows even with the increase, adverse effects on swimmers and  
19 waders in the extended study area are unlikely. This impact would be less than  
20 significant.

21 This impact would be similar to but greater than Impacts Rec-14 (CP1), Rec-14  
22 (CP2), and Rec-14 (CP3) because the alteration of flow regimes of the lower  
23 Sacramento River and rivers below CVP and SWP reservoirs would be greater  
24 under CP5 than under CP1, CP2, or CP3. This impact would be less than  
25 significant. Mitigation for this impact is not needed, and thus not proposed.

26 *Impact Rec-15 (CP5): Increased Difficulty for Boaters and Anglers in Using the*  
27 *Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of*  
28 *Decreased River Flows* Decreased mean monthly flows below CVP and SWP  
29 reservoirs during fall and winter low-flow periods when wade angling activity is  
30 most common, and during summer and fall when boating and river floating is  
31 popular in some areas, could have adverse effects if reduced flows were to reduce  
32 fishing success or boating navigability. Given the modest flow decreases in the  
33 Sacramento River associated with CP5 and the timing of the changes, effects on  
34 these recreation uses of the Sacramento River within the extended study area are  
35 unlikely. However, given the magnitude and timing of the largest flow decreases  
36 during some years on the Feather and American rivers below CVP and SWP  
37 reservoirs in the extended study area, adverse effects may occur. This impact  
38 would be potentially significant.

39 This impact would be similar to but greater than Impacts Rec-15 (CP1), Rec-15  
40 (CP2), and Rec-15 (CP3) because the alteration of flow regimes of the lower  
41 Sacramento River and rivers below CVP and SWP reservoirs would be greater

1                   under CP5 than under CP1, CP2, or CP3. This impact would be potentially  
2                   significant. Mitigation for this impact is proposed in Section 18.3.5.

3   **18.3.5 Mitigation Measures**

4                   Table 18-10 presents a summary of mitigation measures for recreation and public  
5                   access.

**Table 18-10. Summary of Mitigation Measures for Recreation and Public Access**

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Rec-1 (No-Action): Increased Use of Shasta Lake Recreation Facilities and Demand for Recreation Opportunities on Shasta Lake and in the Vicinity	LOS before Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
Impact Rec-1 (CP1–CP5): Seasonal Inundation of Shasta Lake Recreation Facilities or Portions of Recreation Facilities and Public Access at Pool Elevations Above the Current Full Pool Elevation	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Rec-2 (No-Action): Increased Use and Demand for Recreation Opportunities on the Upper Sacramento River  Impact Rec-2 (CP1–CP5): Temporary Construction-Related Disruption of Recreation Access and Activities at and near Shasta Dam	LOS before Mitigation	LTS	PS	PS	PS	PS	PS
	Mitigation Measure	None required.	Mitigation Measure Rec-2: Provide Information About and Improve Alternate Recreation Access and Opportunities to Mitigate the Temporary Loss of Recreation Access and Opportunities During Construction at Shasta Dam.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Rec-3 (No-Action): Increased Use and Demand for Recreation Opportunities on the Lower Sacramento River and in the Delta  Impact Rec-3 (CP1–CP5): Effects on Boating and Other Recreation Use and Enjoyment of Shasta Lake as a Result of Changes in the Annual Drawdown of the Reservoir	LOS before Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None required.	None needed; thus, none proposed.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS
Impact Rec-4 (No-Action): Increased Use and Demand for Recreation Opportunities in the CVP and SWP Service Areas  Impact Rec-4 (CP1–CP5): Increased Hazards to Boaters and Other Recreationists at Shasta Lake from Standing Timber and Stumps Remaining in Untreated Areas of the Inundation Zone	LOS before Mitigation	LTS	S	S	S	S	S
	Mitigation Measure	None required.	Mitigation Measure Rec-4: Provide Information to Shasta Lake Visitors About Potential Safety Hazards in Newly Inundated Areas from Standing Timber and Stumps.				
	LOS after Mitigation	LTS	LTS	LTS	LTS	LTS	LTS

**Table 18-10. Summary of Mitigation Measures for Recreation and Public Access (contd.)**

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Rec-5 (CP1–CP5): Seasonal Inundation of Portions of Recreation Facilities or Informal River Access Sites as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-6 (CP1–CP5): Increased Difficulty for Boaters in Using the Sacramento River as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-7 (CP1–CP5): Increased Difficulty for Swimmers and Waders in Using the Sacramento River as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-8 (CP1–CP5): Increased Usability of the Sacramento River for Boating and Water-Contact Recreation as a Result of Decreased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-9 (CP1–CP5): Enhanced Angling Opportunities in the Upper Sacramento River as a Result of Improved Flows and Reduced Water Temperatures	LOS before Mitigation	NI	B	B	B	B	B
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	B	B	B	B	B

**Table 18-10. Summary of Mitigation Measures for Recreation and Public Access (contd.)**

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Rec-10 (CP1–CP5): Disruption of Sacramento River Boating and Access Resulting from the Gravel Augmentation Program	LOS before Mitigation	NI	NI	NI	NI	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	NI	NI	NI	LTS	LTS
Impact Rec-11 (CP1–CP5): Changes in Usability of Reading Island Fishing Access Boat Ramp and Enhanced Recreation at Upper Sacramento River Restoration Sites	LOS before Mitigation	NI	NI	NI	NI	B	B
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	NI	NI	NI	B	B
Impact Rec-12 (CP1–CP5): Seasonal Inundation of Portions of River Recreation Facilities or Informal River Access Sites on the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-13 (CP1–CP5): Increased Difficulty for Boaters in Using the Lower Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS

**Table 18-10. Summary of Mitigation Measures for Recreation and Public Access (contd.)**

Impact		No-Action Alternative	CP1	CP2	CP3	CP4	CP5
Impact Rec-14 (CP1–CP5): Increased Difficulty for Swimmers and Waders in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Increased River Flows	LOS before Mitigation	NI	LTS	LTS	LTS	LTS	LTS
	Mitigation Measure	None Required.	None needed; thus, none proposed.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS
Impact Rec-15 (CP1–CP5): Increased Difficulty for Boaters and Anglers in Using the Sacramento River and Rivers Below CVP and SWP Reservoirs as a Result of Decreased River Flows	LOS before Mitigation	NI	PS	PS	PS	PS	PS
	Mitigation Measure	None Required.	Mitigation Measure Rec-15: Implement Mitigation Measure Aqua-15: Maintain Flows in the Feather River, American River, and Trinity River Consistent with Existing Regulatory and Operational Requirements and Agreements.				
	LOS after Mitigation	NI	LTS	LTS	LTS	LTS	LTS

Key:

B = beneficial

LOS = level of significance

LTS = less than significant

NI = no impact

PS = potentially significant

S = significant

1                    **No-Action Alternative**  
2                    No mitigation measures are needed for this alternative.

3                    **CP1 – 6.5-Foot Dam Raise, Anadromous Fish Survival and Water Supply**  
4                    **Reliability**  
5                    No mitigation is needed for Impact Rec-1 (CP1), Impact Rec-3 (CP1), and  
6                    Impacts Rec-5 (CP1) through Rec-14 (CP1). Mitigation is provided below for  
7                    Impacts Rec-2 (CP1) and Rec-4 (CP1), which would affect recreation at Shasta  
8                    Lake recreation facilities, and for Impact Rec-15 (CP1), which would affect  
9                    recreation on rivers in the extended study area.

10                   **Mitigation Measure Rec-2 (CP1): Provide Information About and Improve**  
11                   **Alternate Recreation Access and Opportunities to Mitigate the Temporary**  
12                   **Loss of Recreation Access and Opportunities During Construction at**  
13                   **Shasta Dam** Reclamation will inform recreation users of the Chappie-Shasta  
14                   OHV Area about an alternate route to the area from the south, and will improve  
15                   this alternative route (e.g., by grading unpaved portions) if necessary for  
16                   vehicles pulling trailers to use the road. To mitigate the temporary disruption in  
17                   public tours of Shasta Dam during construction, Reclamation will develop and  
18                   provide enhanced information about the dam and its operation at the  
19                   Reclamation Visitor Center at the dam, which would remain open. Mitigation  
20                   for temporary loss of access to the trailhead at the west end of Shasta Dam is  
21                   not necessary because the trailhead itself would be affected by construction.

22                   Implementation of this mitigation measure would reduce Impact Rec-2 (CP1) to  
23                   a less-than-significant level.

24                   **Mitigation Measure Rec-4 (CP1): Provide Information to Shasta Lake**  
25                   **Visitors About Potential Safety Hazards in Newly Inundated Areas from**  
26                   **Standing Timber and Stumps** To mitigate impacts on visitor safety from  
27                   remaining trees and stumps in untreated areas of the newly inundated zone,  
28                   Reclamation will work with USFS to provide maps, bulletins, informational  
29                   postings, and other media as deemed appropriate by USFS at boat ramps,  
30                   marinas, and other developed Shasta Lake recreation sites. Similar information  
31                   could be provided at public meetings and events and at USFS and other Web  
32                   sites used by Shasta Lake visitors to learn about conditions at the lake. The  
33                   information provided will identify the general areas of the shoreline where the  
34                   hazard exists. It will also inform boaters of the nature of the hazard, the periods  
35                   of time when the hazard is of concern (i.e., when the reservoir elevation is  
36                   above the current full pool elevation), and best practices to avoid the hazard  
37                   while recreating on the lake. Implementation of this mitigation measure would  
38                   reduce Impact Rec-4 (CP1) to a less-than-significant level.

39                   **Mitigation Measure Rec-15 (CP1): Implement Mitigation Measure Aqua-**  
40                   **15: Maintain Flows in the Feather River, American River, and Trinity**  
41                   **River Consistent with Existing Regulatory and Operational Requirements**



1 **and Agreements** This measure is identical to Mitigation Measure Aqua-15  
2 (CP1), described in Chapter 11, “Fisheries and Aquatic Ecosystems.”

3 This measure would also protect recreation uses on these rivers by ensuring that  
4 any potential changes in flow would be within the current range of variability.  
5 Implementation of this mitigation measure would reduce Impact Rec-15 (CP1)  
6 to a less-than-significant level.

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

9 No mitigation is needed for Impact Rec-1 (CP2), Impact Rec-3 (CP2), and  
10 Impacts Rec-5 (CP1) through Rec-14 (CP2). Mitigation is provided below for  
11 Impacts Rec-2 (CP2) and Rec-4 (CP2), which would affect recreation at Shasta  
12 Lake recreation facilities, and for Impact Rec-15 (CP2), which would affect  
13 recreation on rivers in the extended study area.

14 **Mitigation Measure Rec-2 (CP2): Provide Information About and Improve**  
15 **Alternate Recreation Access and Opportunities to Mitigate the Temporary**  
16 **Loss of Recreation Access and Opportunities During Construction at**  
17 **Shasta Dam** This mitigation measure is identical to Mitigation Measure Rec-2  
18 (CP1). Implementation of this mitigation measure would reduce Impact Rec-2  
19 (CP2) to a less-than-significant level.

20 **Mitigation Measure Rec-4 (CP2): Provide Information to Shasta Lake**  
21 **Visitors About Potential Safety Hazards in Newly Inundated Areas from**  
22 **Standing Timber and Stumps** This mitigation measure is identical to  
23 Mitigation Measure Rec-4 (CP1). Implementation of this mitigation measure  
24 would reduce Impact Rec-4 (CP2) to a less-than-significant level.

25 **Mitigation Measure Rec-15 (CP2): Implement Mitigation Measure Aqua-**  
26 **15: Maintain Flows in the Feather River, American River, and Trinity**  
27 **River Consistent with Existing Regulatory and Operational Requirements**  
28 **and Agreements** This mitigation measure is identical to Mitigation Measure  
29 Rec-15 (CP1). Implementation of this mitigation measure would reduce Impact  
30 Rec-15 (CP2) to a less-than-significant level.

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

33 No mitigation is needed for Impact Rec-1 (CP3), Impact Rec-3 (CP3), and  
34 Impacts Rec-5 through Rec-14 (CP3). Mitigation is provided below for Impacts  
35 Rec-2 (CP3) and Rec-4 (CP3), which would affect recreation at Shasta Lake  
36 recreation facilities, and for Impact Rec-15 (CP3), which would affect  
37 recreation on rivers in the extended study area.

38 **Mitigation Measure Rec-2 (CP3): Provide Information About and Improve**  
39 **Alternate Recreation Access and Opportunities to Mitigate the Temporary**  
40 **Loss of Recreation Access and Opportunities During Construction at**  
41 **Shasta Dam** This mitigation measure is identical to Mitigation Measure Rec-2

1 (CP1). Implementation of this mitigation measure would reduce Impact Rec-2  
2 (CP3) to a less-than-significant level.

3 **Mitigation Measure Rec-4 (CP3): Provide Information to Shasta Lake**  
4 **Visitors About Potential Safety Hazards in Newly Inundated Areas from**  
5 **Standing Timber and Stumps** This mitigation measure is identical to  
6 Mitigation Measure Rec-4 (CP1). Implementation of this mitigation measure  
7 would reduce Impact Rec-4 (CP3) to a less-than-significant level.

8 **Mitigation Measure Rec-15 (CP3): Implement Mitigation Measure Aqua-**  
9 **15: Maintain Flows in the Feather River, American River, and Trinity**  
10 **River Consistent with Existing Regulatory and Operational Requirements**  
11 **and Agreements** This mitigation measure is identical to Mitigation Measure  
12 Rec-15 (CP1). Implementation of this mitigation measure would reduce Impact  
13 Rec-15 (CP3) to a less-than-significant level.

14 ***CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply***  
15 ***Reliability***

16 No mitigation is needed for Impact Rec-1 (CP4), Impact Rec-3 (CP4), and  
17 Impacts Rec-5 through Rec-14 (CP4). Mitigation is provided below for Impacts  
18 Rec-2 (CP4) and Rec-4 (CP4), which would affect recreation at Shasta Lake  
19 recreation facilities, and for Impact Rec-15 (CP4), which would affect  
20 recreation on rivers in the extended study area.

21 **Mitigation Measure Rec-2 (CP4): Provide Information About and Improve**  
22 **Alternate Recreation Access and Opportunities to Mitigate the Temporary**  
23 **Loss of Recreation Access and Opportunities During Construction at**  
24 **Shasta Dam** This mitigation measure is identical to Mitigation Measure Rec-2  
25 (CP1). Implementation of this mitigation measure would reduce Impact Rec-2  
26 (CP4) to a less-than-significant level.

27 **Mitigation Measure Rec-4 (CP4): Provide Information to Shasta Lake**  
28 **Visitors About Potential Safety Hazards in Newly Inundated Areas from**  
29 **Standing Timber and Stumps** This mitigation measure is identical to  
30 Mitigation Measure Rec-4 (CP1). Implementation of this mitigation measure  
31 would reduce Impact Rec-4 (CP4) to a less-than-significant level.

32 **Mitigation Measure Rec-15 (CP4): Implement Mitigation Measure Aqua-**  
33 **15: Maintain Flows in the Feather River, American River, and Trinity**  
34 **River Consistent with Existing Regulatory and Operational Requirements**  
35 **and Agreements** This mitigation measure is identical to Mitigation Measure  
36 Rec-15 (CP1). Implementation of this mitigation measure would reduce Impact  
37 Rec-15 (CP4) to a less-than-significant level.

38 ***CP5 – 18.5-Foot Dam Raise, Combination Plan***

39 No mitigation is needed for Impact Rec-1 (CP5), Impact Rec-3 (CP5), and  
40 Impacts Rec-5 (CP5) through Rec-14 (CP5). Mitigation is provided below for

1 Impacts Rec-2 (CP5) and Rec-4 (CP5), which would affect recreation at Shasta  
2 Lake recreation facilities, and for Impact Rec-15 (CP5), which would affect  
3 recreation on rivers in the extended study area.

4 **Mitigation Measure Rec-2 (CP5): Provide Information About and**  
5 **Improve Alternate Recreation Access and Opportunities to Mitigate the**  
6 **Temporary Loss of Recreation Access and Opportunities During**  
7 **Construction at Shasta Dam** This mitigation measure is identical to  
8 Mitigation Measure Rec-2 (CP1). Implementation of this mitigation measure  
9 would reduce Impact Rec-2 (CP5) to a less-than-significant level.

10 **Mitigation Measure Rec-4 (CP5): Provide Information to Shasta Lake**  
11 **Visitors About Potential Safety Hazards in Newly Inundated Areas from**  
12 **Standing Timber and Stumps** This mitigation measure is identical to  
13 Mitigation Measure Rec-4 (CP1). Implementation of this mitigation measure  
14 would reduce Impact Rec-4 (CP5) to a less-than-significant level.

15 **Mitigation Measure Rec-15 (CP5): Implement Mitigation Measure Aqua-**  
16 **15: Maintain Flows in the Feather River, American River, and Trinity**  
17 **River Consistent with Existing Regulatory and Operational Requirements**  
18 **and Agreements** This mitigation measure is identical to Mitigation Measure  
19 Rec-15 (CP1). Implementation of this mitigation measure would reduce Impact  
20 Rec-15 (CP5) to a less-than-significant level.

### 21 **18.3.6 Cumulative Effects**

22 A diverse variety of programs that have been developed or are under  
23 development by Federal, State, and local agencies—individually and in  
24 conjunction with other agencies—are among the other past, present, and  
25 reasonably foreseeable future projects that may affect environmental conditions  
26 in the primary and extended study areas and therefore may contribute to  
27 cumulative effects.

28 These projects include construction and operation of projects or implementation  
29 of programs that may have the potential to adversely affect both land- and  
30 water-based recreation and, in combination, to cause an existing significant  
31 cumulative effect. For example, construction of some projects or  
32 implementation of programs may temporarily constrain boat navigation. Some  
33 of these project facilities may displace recreation facilities or activities, or may  
34 cause a long-term impediment to navigation on waterways. Water-based  
35 recreation may also be indirectly affected because of changes in reservoir water  
36 storage or changes in river flows downstream from reservoirs attributable to  
37 these projects. To the extent possible, foreseeable actions have been  
38 incorporated in the CalSim-II model and data developed for analysis of  
39 operational impacts on reservoir elevations and river flows under the project  
40 alternatives.

1 Several programs provide only general plans or frameworks for potential future  
2 projects or actions; no construction or other implementation of the programs has  
3 yet occurred, and no site-specific projects have been identified or undergone  
4 environmental analysis. Therefore, no effects of past or present projects are  
5 associated with these programs, and future projects that may occur are  
6 uncertain. Some of the programs or projects may result in temporary  
7 construction effects; however, the exact locations of these projects are unknown  
8 at this time. Many ongoing and future programs include public access or  
9 recreation objectives or measures, or would protect or enhance water quality,  
10 fisheries, wildlife habitat, and other biological resources that support recreation  
11 uses. These programs have the potential to result in beneficial effects on  
12 recreation, which could help reduce potentially significant cumulative effects.

13 The effects of climate change on operations at Shasta Lake could potentially  
14 affect water-based recreation opportunities both at the lake and downstream. As  
15 described in the Climate Change Appendix, climate change could result in  
16 higher reservoir releases in the future because of an increase in winter and  
17 early-spring inflow into the lake from high-intensity storm events. The change  
18 in reservoir releases could be necessary to manage for flood events resulting  
19 from these potentially larger storms. The potential increase in releases from the  
20 reservoir could lead to long-term changes in downstream channel equilibrium,  
21 which could affect the Sacramento River's ease of use for water-based  
22 recreation.

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

25 As described in Section 18.3.4 above, without mitigation, CP1 could cause  
26 significant and potentially significant effects on recreation and public access.  
27 These effects consist of temporary construction-related disruption of recreation  
28 access and activities at and near Shasta Dam; increased hazards to boaters and  
29 other recreationists at Shasta Lake from standing timber and stumps remaining  
30 in untreated areas of the inundation zone; and increased difficulty for boaters  
31 and anglers in using the Sacramento River and rivers below CVP and SWP  
32 reservoirs as a result of decreased river flows. These contributing adverse  
33 effects from CP1 would be cumulatively considerable. With implementation of  
34 Mitigation Measures Rec-2 (CP1), Rec-4 (CP1), and Rec-15 (CP1), adverse  
35 effects from CP1 would be reduced to a less-than-significant level. These  
36 adverse effects would no longer result in a cumulatively considerable  
37 incremental contribution to significant cumulative effects on recreation and  
38 public access. This would not be a cumulatively significant effect.

39 As stated previously, effects of climate change on operations at Shasta Lake  
40 could include a higher frequency of high-flow events, potentially resulting in  
41 changes to water-based recreation opportunities downstream. As described in  
42 the Climate Change Appendix, climate warming could result in more intense  
43 rainstorms, an increased occurrence of high-intensity rainfall, earlier melting of  
44 seasonal snowpack, and more events of rain or snow. These expected

1 consequences of climate change may create more frequent and severe flooding  
2 associated with lakes and rivers, and thus greater challenges to water-based  
3 recreation in the Sacramento River in the primary and extended study areas.

4 However, as noted in the Climate Change Appendix, studies also generally  
5 predict that climate change may cause Shasta Lake to be unable to stay above  
6 the 550 TAF dead pool in some critical years. With the lake at such a low level,  
7 an increase in adverse effects on recreation on the lake could result in critical  
8 years.

9 Implementation of CP1 could potentially diminish the effects of increased flows  
10 and potential flooding on downstream recreation in the Sacramento River by  
11 providing additional reservoir storage capacity after construction; however, it  
12 would not likely increase the anticipated adverse effects on recreation on Shasta  
13 Lake in critical years. When added to the anticipated effects of climate change,  
14 raising Shasta Dam would not have a significant cumulative effect on  
15 recreation.

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

18 The cumulative effects of CP2 would be similar to those of CP1, but greater in  
19 magnitude. With implementation of Mitigation Measures Rec-2 (CP2), Rec-4  
20 (CP2), and Rec-15 (CP2), adverse effects from CP2 would be reduced to a less-  
21 than-significant level. These adverse effects would no longer result in a  
22 cumulatively considerable incremental contribution to significant cumulative  
23 effects on recreation and public access. This would not be a cumulatively  
24 significant effect.

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

27 The cumulative effects of CP3 would be similar to those of CP1, but greater in  
28 magnitude. With implementation of Mitigation Measures Rec-2 (CP3), Rec-4  
29 (CP3), and Rec-15 (CP3), adverse effects from CP3 would be reduced to a less-  
30 than-significant level. These adverse effects would no longer result in a  
31 cumulatively considerable incremental contribution to significant cumulative  
32 effects on recreation and public access. This would not be a cumulatively  
33 significant effect.

34 ***CP4 – 18.5-Foot Dam Raise, Anadromous Fish Focus With Water Supply***  
35 ***Reliability***

36 The cumulative effects of CP4 would be similar to those of CP1, but greater in  
37 magnitude. With implementation of Mitigation Measures Rec-2 (CP4), Rec-4  
38 (CP4), and Rec-15 (CP4), adverse effects from CP4 would be reduced to a less-  
39 than-significant level. These adverse effects would no longer result in a  
40 cumulatively considerable incremental contribution to significant cumulative  
41 effects on recreation and public access. This would not be a cumulatively  
42 significant effect.

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**CP5 – 18.5-Foot Dam Raise, Combination Plan**

The cumulative effects of CP5 would be similar to those of CP1, but greater in magnitude. With implementation of Mitigation Measures Rec-2 (CP5), Rec-4 (CP5), and Rec-15 (CP5), adverse effects from CP5 would be reduced to a less-than-significant level. These adverse effects would no longer result in a cumulatively considerable incremental contribution to significant cumulative effects on recreation and public access. This would not be a cumulatively significant effect.