# CHAPTER 3.0

DESCRIPTION OF EXISTING FACILITIES AND OPERATIONS,
THE PROPOSED PROJECT, AND ALTERNATIVES

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# 3.0 DESCRIPTION OF EXISTING FACILITIES AND OPERATIONS, THE PROPOSED PROJECT, AND ALTERNATIVES

## 3.1 GENERAL LOCALE

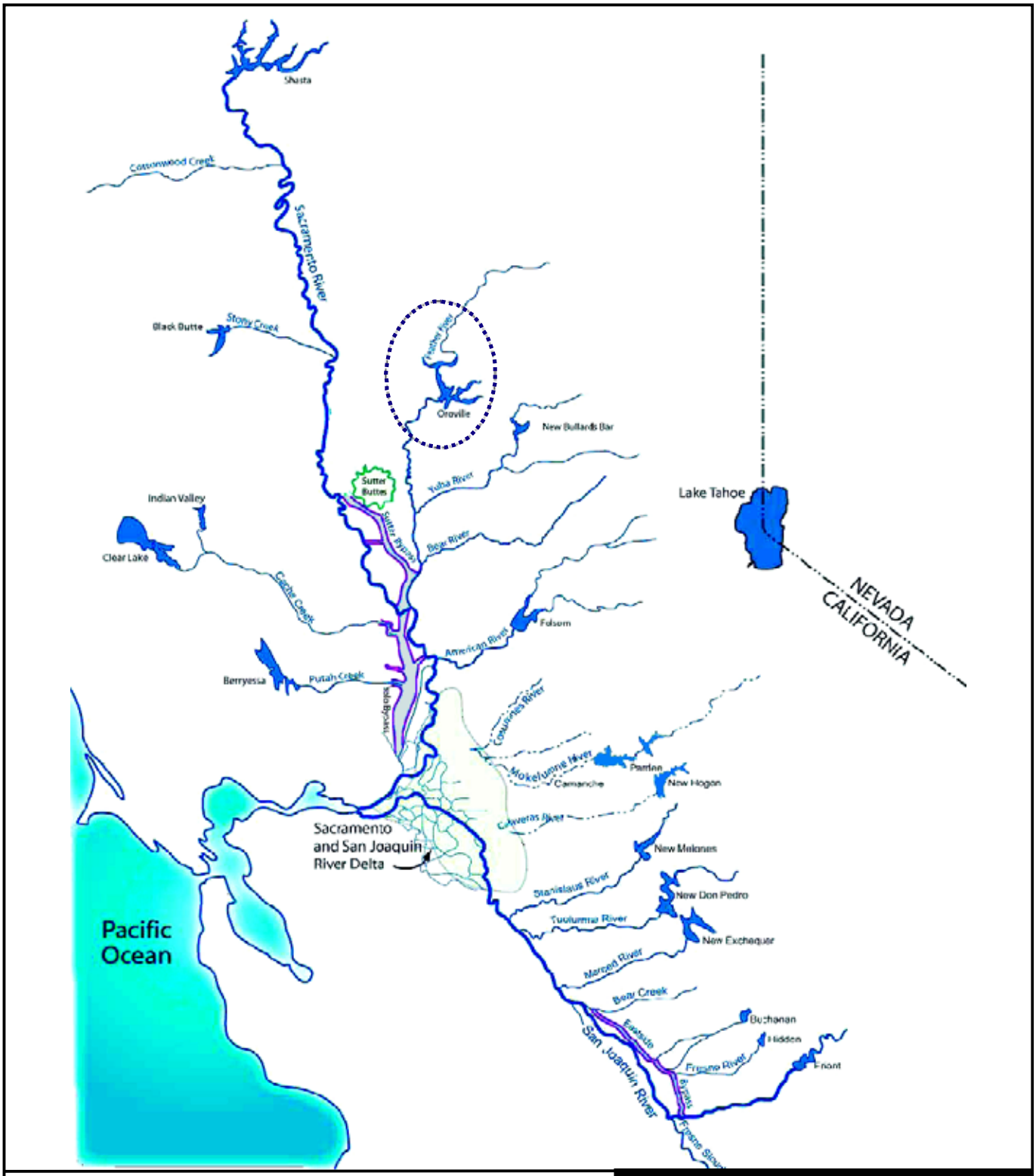
The Oroville Facilities are located in California's Central Valley. This valley is drained by two major river basins, the Sacramento River to the north and the San Joaquin River to the south, which converge in the Sacramento–San Joaquin Delta (Delta). From the Delta, water flows to San Francisco Bay and then to the Pacific Ocean. The Sacramento River contributes approximately 85 percent of the Delta water inflow in most years while the San Joaquin River contributes approximately 10–15 percent of inflow to the Delta (Figure 3.1-1).

The Sacramento River basin is composed of three major subbasins: the American River subbasin, the Feather River subbasin, and the Sacramento River subbasin. The Feather River subbasin is composed primarily of the Bear River, Yuba River, and Feather River. The Feather River is considered a major tributary to the Sacramento River, providing about 25 percent of the flow in the Sacramento River as measured at Oroville Dam.

Climate in the region follows a Mediterranean pattern, with cool wet winters and hot dry summers. Temperatures range from below zero to above 100 degrees Fahrenheit (ºF). Approximately 95 percent of the annual precipitation occurs during the winter months. Precipitation ranges from 33 inches at the City of Oroville, to more than 90 inches at the orographic (i.e., mountain) crest near Bucks Lake, to less than 20 inches in the eastern headwaters. Precipitation above 5,000 feet occurs primarily as snow, which regularly accumulates in excess of 5–10 feet in winter. There are infrequent summer thunderstorms, predominantly in the eastern third of the watershed. These storms can produce significant rainfall of short duration over a relatively small area.

Principal land use activities in the region include recreation, agriculture, timber production, hydropower generation, and livestock grazing. About 4 percent (roughly 70 square miles) of all land in Butte County is devoted to urban uses.

The Oroville Facilities project area and the surrounding region are described in further detail in Section 4.0.1 in Chapter 4.0, Environmental Setting.




Source: DWR

20 0 20 40 60 Miles

Original Scale 1 : 2,217,600
1" = 35 miles
(approximate)

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**Oroville Facilities**
**FERC Project No. 2100**

FIGURE 3.1-1

California Central Valley
and
San Francisco Bay-Delta Area

Prepared by: PJ -- EDAW, Inc.
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## 3.2 EXISTING OROVILLE FACILITIES AND OPERATIONS

The Oroville Facilities were developed as part of the SWP, a water storage and delivery system of reservoirs, aqueducts, power plants, and pumping plants. The SWP stores and distributes water to supplement the needs of urban and agricultural water users in Northern California, the San Francisco Bay Area, the San Joaquin Valley, Central Coast, and Southern California. As part of the SWP, the Oroville Facilities are also operated for flood management, power generation, water quality improvement in the Delta, recreation, and fish and wildlife enhancement. The Oroville Facilities generate electricity pursuant to a federal license issued by FERC (FERC Project No. 2100) on February 11, 1957. The FERC Project boundary encompasses 41,100 acres and includes both power and non-power facilities. The Oroville Facilities and FERC Project boundary are shown in Figure 3.2-1. Further detailed description of the Oroville Facilities is provided in Appendix B of the PDEA.

### 3.2.1 Impoundment and Power Facilities

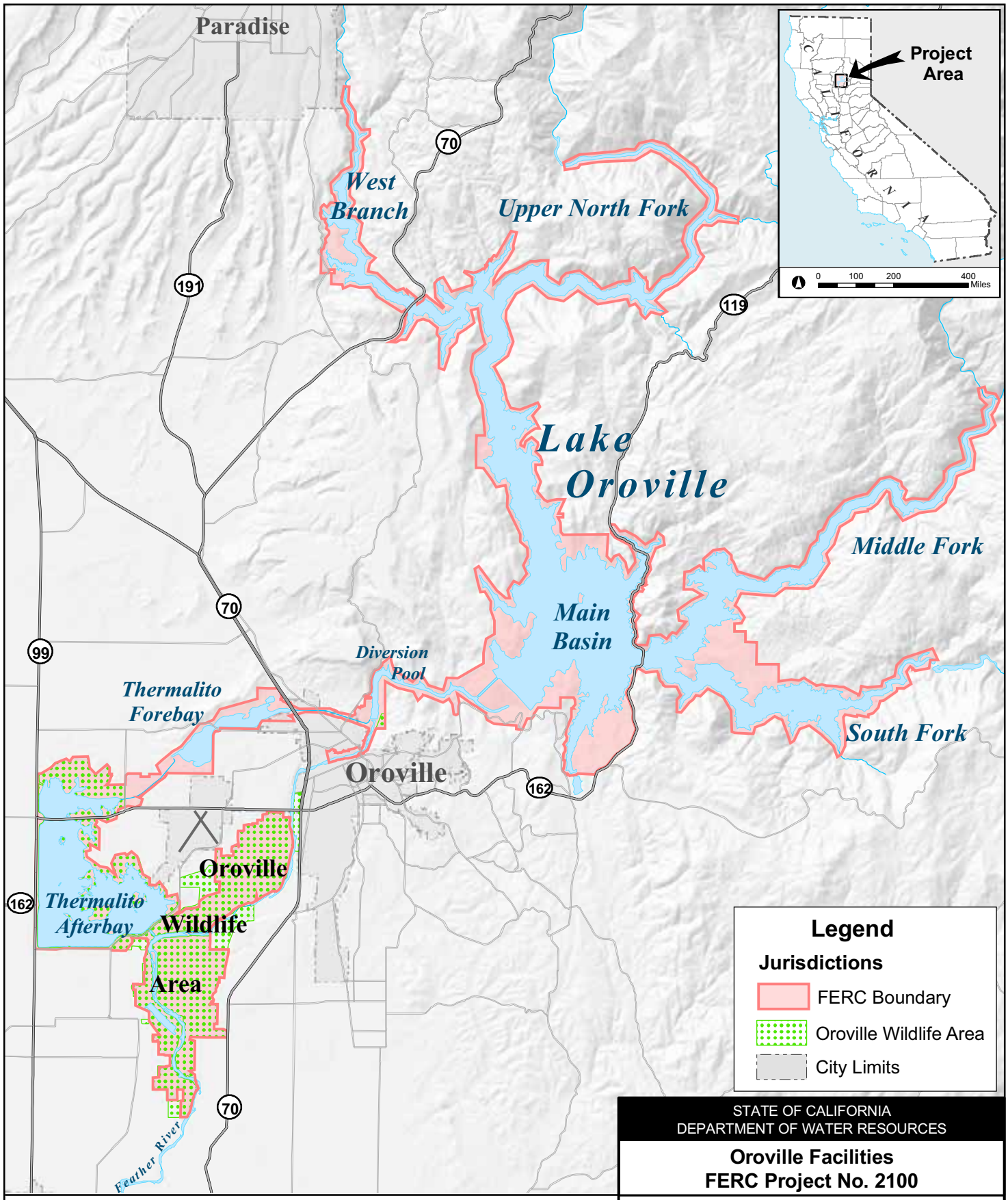
Oroville Dam, along with two small saddle dams, impounds Lake Oroville, a 3.5-million-acre-foot (maf) capacity storage reservoir with a surface area of 15,810 acres at its normal maximum operating level. The Oroville Facilities also include three power plants (two with pumpback capabilities) with combined licensed generating capacity of approximately 762 megawatts (MW).

The Hyatt Pumping-Generating Plant is the largest of the three power plants within the Oroville Facilities, with a capacity of 645 MW. Water from the six-unit underground power plant (three conventional generating and three pumping-generating units) is discharged through two tunnels into the Feather River just downstream of Oroville Dam. The plant has a generating and pumping flow capacity of 16,950 cubic feet per second (cfs) and 5,610 cfs, respectively.

The 114-MW Thermalito Pumping-Generating Plant is designed to operate in tandem with the Hyatt Pumping-Generating Plant and has generating and pumpback flow capacities of 17,400 cfs and 9,120 cfs, respectively. Smallest of the three power plants is the 3-MW Thermalito Diversion Dam Powerplant, located on the left abutment of Thermalito Diversion Dam. The power plant releases a maximum of 615 cfs of water into the Low Flow Channel (LFC) of the Feather River.

Thermalito Diversion Dam, 4 miles downstream of Oroville Dam, creates a tailwater pool for the Hyatt Pumping-Generating Plant and is used to divert water to the Thermalito Power Canal. The Thermalito Power Canal is a 10,000-foot (ft)-long channel designed to convey generating flows up to 16,900 cfs to Thermalito Forebay and pumpback flows to the Hyatt Pumping-Generating Plant. Thermalito Forebay is an off-stream regulating reservoir for the Thermalito Pumping-Generating Plant.

When in generating mode, the Thermalito Pumping-Generating Plant discharges into Thermalito Afterbay, which is contained by a 42,000-ft-long earthfill dam. Thermalito




Source: CA Spatial Information Library / DWR GIS / EDAW 2007

5 2.5 0 5 Miles

Original Scale 1 : 190,080
1" = 3 miles

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**Oroville Facilities**
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DRAFT ENVIRONMENTAL IMPACT REPORT

FIGURE 3.2-1

Oroville Facilities
FERC Project Area

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Afterbay is used to release water into the Feather River downstream of the Oroville Facilities. Thermalito Afterbay also helps regulate the power system, provides storage for pumpback operations, and provides recreational opportunities. Several local irrigation districts receive water released from Thermalito Afterbay.

### 3.2.2 Coordinated Operations

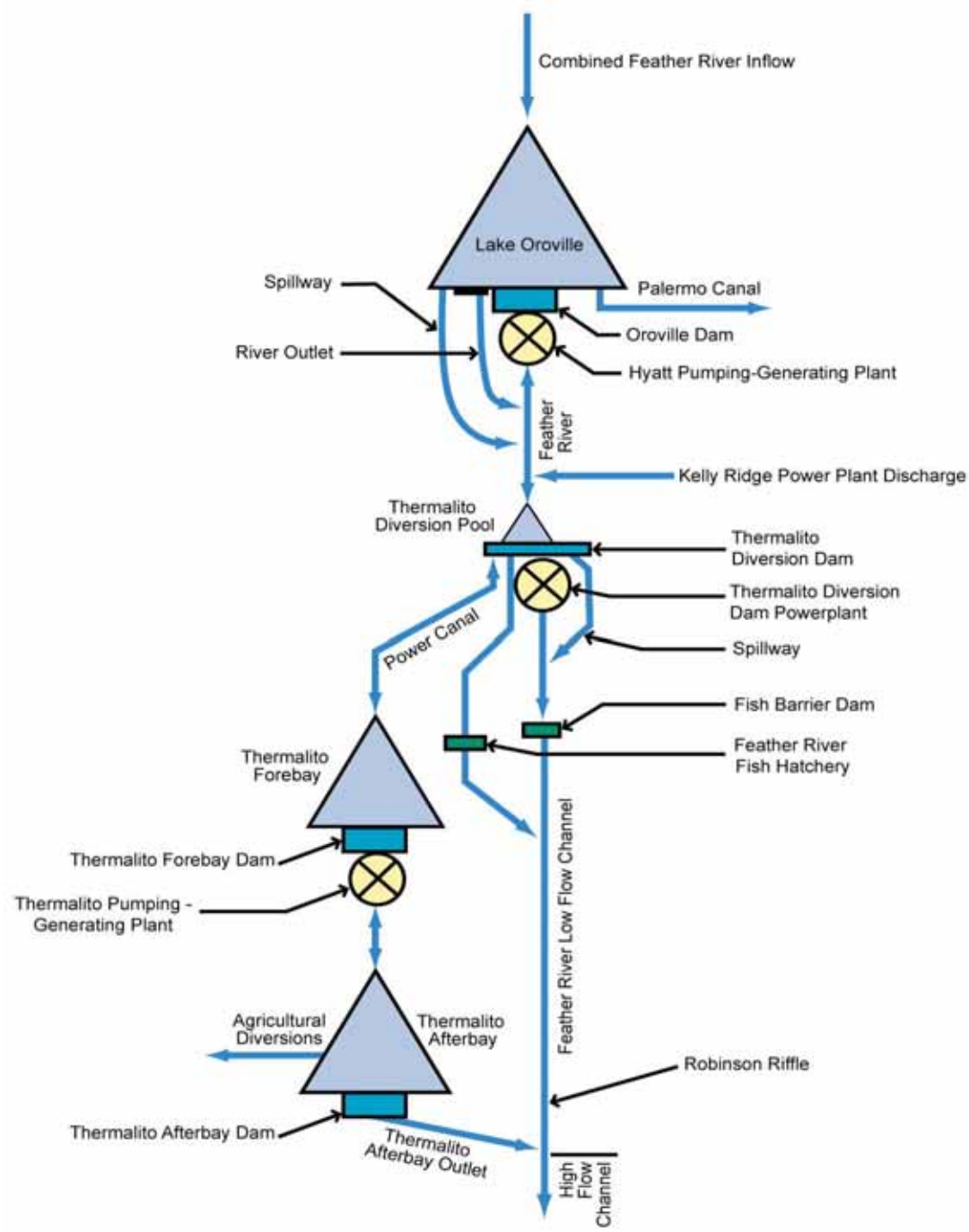
Lake Oroville stores and releases water that flows into the reservoir from upstream reservoir releases and runoff within the watershed. Water is released from the Oroville Facilities as part of a coordinated effort to meet water supply, flood protection, water quality improvement, and fish and wildlife enhancement requirements. Typically, power is generated when water is released from Lake Oroville through the Oroville Facilities for these purposes. Power is also generated through pumpback operations. Figure 3.2-2 contains a flow diagram that illustrates the overall Oroville Facilities configuration and primary water storage and release points.

Planning and implementing SWP operations is highly dependent on constraints placed upon the Oroville Facilities. The Oroville Facilities' operational planning is performed by the Operations Control Office (OCO).

The day-to-day operation of the Oroville Facilities is done through the Oroville Field Division. Decision-making for SWP operations begins with an overall long-range plan for the year. This long-range plan is used to establish general operational objectives and to assess the likelihood of achieving the operational objectives. Operations plans are developed on a weekly basis to meet the overall annual operational objectives. Daily schedules are subsequently developed to meet the weekly operational objectives and are adjusted in real-time as needed to respond to changes in conditions.

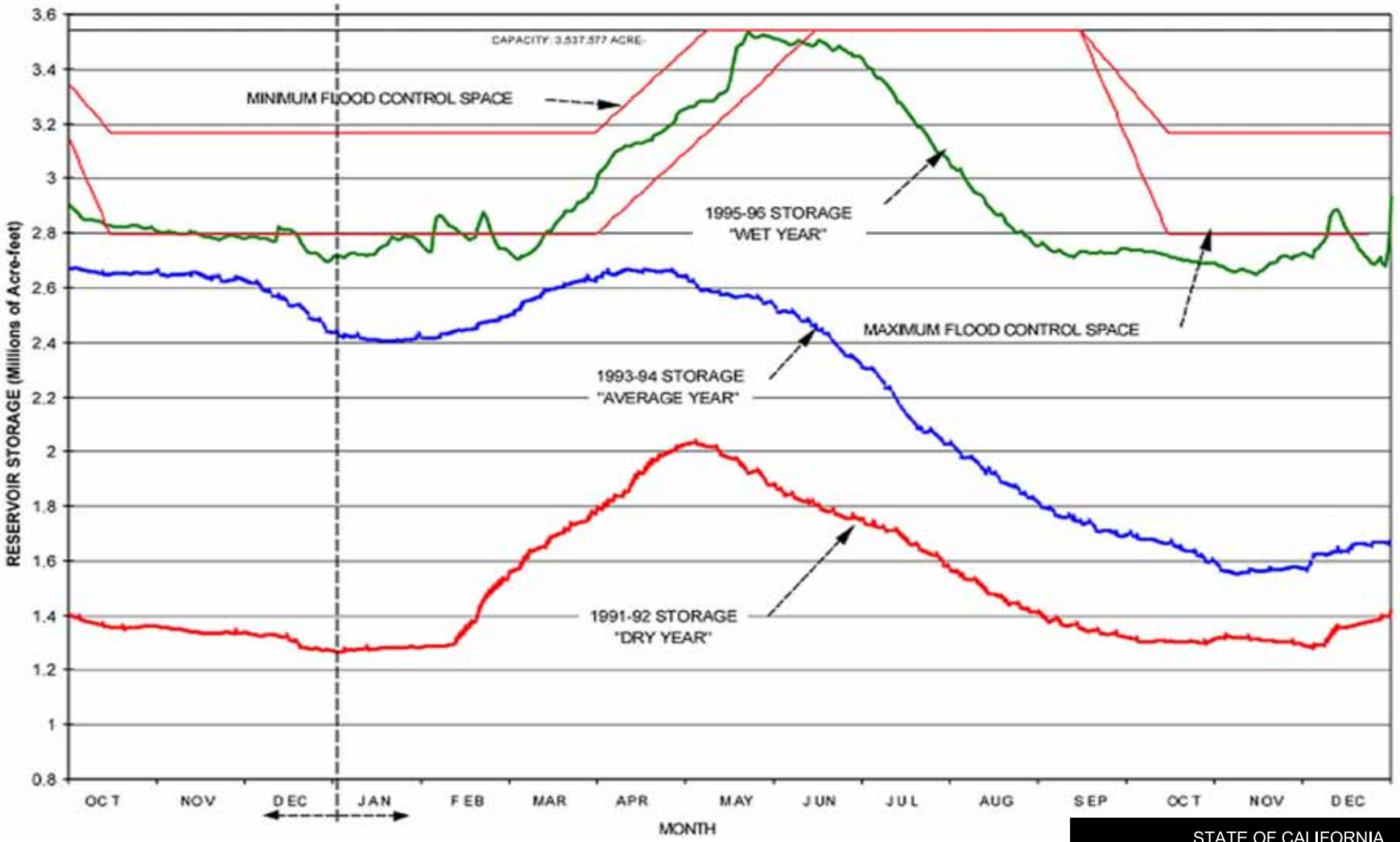
#### *3.2.2.1 General Reservoir Operation*

DWR stores winter and spring runoff in Lake Oroville for release to the Feather River, as necessary, to meet downstream demands. Annual operations planning is conducted for multi-year carryover, in which half the Lake Oroville storage above the minimum pool is assumed available for subsequent years. The U.S. Army Corps of Engineers (USACE) requires Lake Oroville to be operated to maintain up to 750,000 acre-feet (af) of storage space to capture significant inflows for flood management. The operations plan is updated regularly to reflect changes in hydrology and downstream operations. Lake Oroville is targeted to fill to near a maximum annual level of 900 ft above mean sea level (msl). Typically maximum storage, which in drier years may be below 900 ft msl, is achieved in June. After the maximum storage is achieved in June, Lake Oroville will then be lowered as necessary to meet downstream requirements, to its minimum level in December or January. During and following dry years, the reservoir may be drawn down more and may not fill to desired levels the following spring. During 1991, 1992, and 1993 (1991 and 1992 were dry years), the minimum elevations were 651 ft, 702 ft, and 723 ft, respectively. Historically, the maximum flood flow released from




*Source: MWH*

**Figure 3.2-2. Oroville Facilities flow diagram.**




COMBINATION WATER / CALENDAR YEAR

Source: DWR -- Operations Control Office

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**Oroville Facilities**
**FERC Project No. 2100**

Figure 3.2-3

Lake Oroville Water Levels
for Dry, Average and Wet Water Years

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Lake Oroville was about 160,000 cfs in 1997. Figure 3.2-3 shows Lake Oroville elevations under various water year type conditions.

#### *3.2.2.2 Annual Water Operations Planning*

Operations planning requires coordination with other federal, State, and local agencies, and must consider a number of factors. The OCO develops an annual water operations plan that considers forecasted water supply, projected operations of the CVP, and regulatory (flood management, instream requirements, and water quality) and contractual obligations. This first official plan for the next year is completed in early December as part of the allocation process and is a significant component in determining the amount of forecasted deliveries by the SWP. This monthly time-step plan includes projected release to the Feather River, forecasts of Oroville inflow, Lake Oroville end-of-month storage levels, and local demands. The water operations plan is updated and reissued each month through April to reflect changes in hydrology and downstream operations. The Oroville Facilities power generation plants operate within the constraints established by the water operations plan.

#### *3.2.2.3 Weekly Water Operations Planning*

Each week, the OCO develops a general plan for reservoir releases. This plan considers how much water will be needed downstream for local water supply demands, Delta water quality and quantity requirements, instream flow and temperature requirements, SWP pumping requirements in the Delta, and minimum flood management storage space. The weekly plan is revised as needed to meet changing operational conditions both upstream and downstream.

#### *3.2.2.4 Daily Water Operations Scheduling*

Hourly water releases through the power plants are scheduled daily. The hourly operation of the power plants is planned to maximize the amount of energy that may be produced during periods when electrical demand is highest. Additionally, ancillary services are bid into the California Independent System Operator (ISO) market on a day-ahead and an hour-ahead basis. These ancillary services include regulation up and down, spinning reserves, non-spinning reserves, and supplemental energy. Oroville Facilities operations are scheduled to maximize power benefits as long as the operations fit within the constraints of the overall daily Feather River release objective downstream of Thermalito Afterbay.

#### *3.2.2.5 Power Transactions*

Overall, the SWP uses more energy than it produces. When generation from the Oroville Facilities exceeds SWP load requirements, DWR sells the excess power on the market. Currently, DWR contracts with utilities and marketers for short-term purchase, sale, or exchange of power. In addition to selling firm power, DWR may sell power on a day-to-day or hour-to-hour basis according to the terms of its interchange agreements and the Western System Power Pool agreement. These agreements provide the basis

for making energy transactions, short-term capacity and energy sales or exchanges, unit commitments, and transmission service purchases.

To balance SWP loads with available resources, DWR relies on a suite of options that includes purchases from the day-ahead and hour-ahead markets; capacity exchanges; and energy contracts (both short and long-term). Two such contracts with Southern California Edison Company (SCE) have allowed DWR to exchange on-peak capacity and energy for off-peak energy that may be used elsewhere within the SWP system. Specifically, under the terms of the 1979 Power Contract and the 1981 Capacity Exchange Agreement, DWR provided SCE with up to 350 MW of capacity and approximately 40 percent of the energy from the Oroville Facilities. In return, DWR received off-peak energy from SCE equal to the amount of energy provided to SCE from the Oroville Facilities, plus an additional amount of energy as payment for the on-peak capacity. The amount of additional energy was determined annually based on the Capacity-Energy Exchange Formula defined in the 1979 Power Contract.

Several power purchases and sales agreements, the largest of which are the SCE power and capacity exchange contracts, expired on December 31, 2004; consequently, DWR developed the Post 2004 Program to establish new power and transmission contracts to replace these expired contracts. Through this program DWR is actively involved in solicitation and confidential negotiations with a number of utilities and power marketers. In any event, all new power contracts abide by applicable environmental and regulatory conditions. Implementation of these contracts does not alter the environmental analysis presented herein.

DWR controls the timing of SWP pumping load through an extensive computerized network. This control system allows DWR to minimize the cost of power it purchases by maximizing pumping during off-peak periods when power costs are lower—usually at night—and by selling power to other utilities during on-peak periods when power values are high. By taking advantage of this flexibility in scheduling SWP pumping load and generation, DWR reduces the net cost for SWP water deliveries.

#### *3.2.2.6 Releases*

Releases from Lake Oroville and Thermalito Afterbay are scheduled on a weekly basis to accommodate water supply requests and contracts, water quality requirements in the Delta; instream flow requirements in the Feather River; and minimum flood management space requirements. Weekly operational plans are updated as needed to respond to changing conditions. The Diversion Pool, Thermalito Forebay, and Thermalito Afterbay are too small for seasonal storage, so they are used only in weekly and daily operations planning. Releases through the Hyatt and Thermalito Pumping-Generating Plants are scheduled on an hourly basis to maximize the amount of energy produced when power values are highest. Because the downstream water supply is not dependent on hourly releases, and pumping of SWP water can be scheduled at off-peak times, hourly operational decisions are affected by the following considerations:

- Electrical energy prices and ancillary service requirements such as spinning reserve;
- Supplemental energy market activities; and
- Voltage regulation requirements.

Storage in Thermalito Forebay and Thermalito Afterbay is used to generate power and maintain uniform flows in the Feather River downstream of the Oroville Facilities. Thermalito Afterbay also provides storage for pumpback operations. The pumpback operations are designed to use water that is in excess of what is required for downstream flow requirements for pumping back into Thermalito Forebay and then into Lake Oroville during off-peak hours. This water is then released again during on-peak hours when power values increase. Generation provided by this pumpback activity contributes on average only about 6 or 7 percent to the total annual Oroville Facilities generation. Because the two main power plants are operated to take advantage of weekday generation when power values are highest, there is usually higher storage in Thermalito Afterbay by the end of the week. During the weekend, water from the afterbay continues to be released to the Feather River, generation at the Hyatt and Thermalito Pumping-Generating Plants is decreased, and pumpback operations into Lake Oroville may occur. By the end of the weekend, the elevation of Thermalito Afterbay is lowered to prepare for a similar operation the following week.

**Feather River Service Area Water Supply Deliveries**

DWR has contractual obligations to eight local agencies[1] along the Feather River from Lake Oroville to the confluence with the Sacramento River. They receive water according to the terms of settlement in various agreements stemming from the original construction of the Oroville Facilities. These settlements recognized the senior water rights of those agencies and determined that DWR would provide them certain quantities of water from storage in Lake Oroville in accordance with those senior water rights. Four of these agencies are allowed to divert up to 936,000 af during the irrigation season (April 1 through October 31), subject to provisions for reduction in supply under certain specific low-inflow conditions.[2] The agreements with these agencies also indicate that an unspecified amount may be diverted for beneficial use outside of the contract irrigation season (November 1 through March 31). The remaining four agencies are allowed to divert up to 45,055 af annually, also subject to provisions for reduction in supply under certain specific low-inflow conditions. Therefore, the actual amount diverted varies from year to year. These diversions are

[1] The agencies are the Thermalito Irrigation District; the South Feather Water and Power Agency (formerly Oroville-Wyandotte Irrigation District); the Western Canal Water District; the Joint Water District Board (comprising the Richvale Irrigation District, the Biggs-West Gridley Water District, the Butte Water District, and the Sutter Extension Water District); the Tudor Mutual Water Company; the Oswald Water District; the Garden Highway Water Company; and the Plumas Mutual Water Company. The settlement of water rights for these entities is typically expressed in terms of af of annual entitlement, although some settlement agreements also stipulate specific rates of flow in cfs.

[2] Individual contracts with these agencies determine the terms of flow reduction. Of the total entitlement, 187,245 af is not subject to reduction.

made at one location in Lake Oroville, one location in the Thermalito Power Canal, four locations in Thermalito Afterbay, and five locations on the Feather River below Thermalito Afterbay. The agencies[3] that divert directly from the Thermalito Afterbay are collectively referred to as the Feather River Service Area (FRSA) water users and are responsible for most of the local diversions.

DWR has also executed a number of small contracts with riparian landowners along the Feather River downstream of Oroville Dam. Riparian owners are entitled to divert unimpaired flow for use on riparian land, but are not entitled to augmented flow made available as a result of project storage. Although the quantities of water are relatively small and do not ordinarily influence SWP operations, in certain years riparian diversions can affect Oroville releases.

## Water Supply Requirements of the State Water Project Water Contractors

As a component of the SWP, the Oroville Facilities are operated to provide downstream water supply for municipal, industrial, and irrigation purposes, and water is exported to meet the requests of the SWP water contractors. To illustrate how water releases from the Oroville Facilities are distributed for multiple downstream uses, Table 3.2-1 shows DWR records from 2005 and 2006 indicating actual releases for various uses. As a practical matter, water supply exports are met with whatever water is available after Delta requirements are met. Some of the water released for instream and Delta requirements in the table below may be available for export by the SWP once the Delta standards have been met.

**Table 3.2-1. Primary Reason for Lake Oroville Releases (2005 and 2006)**

| Downstream Use | 2005 | | 2006 | |
|---|---|---|---|---|
| | Amount Used (taf) | Percentage of Release | Amount Used (taf) | Percentage of Release |
| Feather River Service Area | 1,035 | 29 | 1,057 | 15 |
| Support of Exports | 88 | 3 | 67 | 1 |
| Instream and Delta Requirements | 995 | 28 | 1,003 | 14 |
| Flood Management | 1,406 | 40 | 5,025 | 70 |
| Total | 3,524 | 100 | 7,152 | 100 |

*Note: taf = thousand acre-feet*
*Source: DWR SWP Operations Control Office*

## Releases for Water Quality in the Delta

Flows through the Delta are maintained to meet Bay-Delta water quality standards arising from DWR's water rights permits and the 1995 Delta Water Quality Control Plan. These standards are designed to meet several water quality objectives such as salinity,

[3] The FRSA agencies are the Western Canal Water District and the Joint Water District Board (comprising the Richvale Irrigation District, the Biggs-West Gridley Water District, the Butte Water District, and the Sutter Extension Water District).

Delta outflow, and river flows, and to meet export limits. The purpose of these objectives is to attain the highest water quality, which is reasonable, considering all demands being made on Bay-Delta waters. In particular, they protect a wide range of fish and wildlife including Chinook salmon, delta smelt, striped bass, and the habitat of estuarine-dependent species.

**Instream Flow Requirements in the Feather River**

An August 1983 agreement between DWR and DFG entitled *Agreement Concerning the Operation of the Oroville Division of the State Water Project for Management of Fish and Wildlife* (1983 Agreement) sets criteria and objectives for flow and temperatures in the LFC and the reach of the Feather River between Thermalito Afterbay and Verona. This agreement: (1) establishes minimum flows between the Thermalito Afterbay Outlet and Verona that vary by water year type; (2) requires flow changes under 2,500 cfs to be reduced by no more than 200 cfs during any 24-hour period (ramping rate), except for flood management, failures, etc.; (3) requires flow stability during the peak of the fall-run Chinook spawning season; and (4) sets an objective of suitable temperature conditions during the fall months for salmon and during the later spring/summer for shad and striped bass.

The 1983 Agreement specifies that the Oroville Facilities release a minimum of 600 cfs into the Feather River from the Thermalito Diversion Dam for fisheries purposes. This is the total volume of flows from the Thermalito Diversion Dam Powerplant and the Feather River Fish Hatchery pipeline. Generally, the instream flow requirements below Thermalito Afterbay are 1,700 cfs from October through March, and 1,000 cfs from April through September. However, if runoff for the previous April-through-July period is less than 1,942,000 af (i.e., the 1911–1960 mean unimpaired runoff near Oroville), the minimum flow can be reduced to 1,200 cfs from October to February and 1,000 cfs for March. A maximum flow of 2,500 cfs is maintained from October 15 through November 30 to prevent spawning in overbank areas that might become dewatered.

The Thermalito Afterbay Outlet is operated to meet minimum instream flow requirements as well as to meet needs for SWP delivery and Delta environmental protection. Flow releases through the Thermalito Afterbay Outlet do not normally vary on an hourly or even daily basis, but instead are scheduled on a weekly basis.

**Flood Management**

The Oroville Facilities are an integral component of the Sacramento River Flood Control Project, the flood management system for the areas along the Feather and Sacramento Rivers downstream of Oroville Dam. From September to June, the Oroville Facilities are operated under flood control requirements specified by USACE. Under these requirements, Lake Oroville is operated to maintain up to 750,000 af of storage space to allow for the capture of significant inflows. Flood control releases are based on the release schedule in the flood control diagram or the emergency spillway release diagram prepared by USACE, whichever requires the greater release. Decisions regarding such releases are made in consultation with USACE.

The flood control requirements are consistent with multipurpose use of reservoir storage. During times when flood management space is not required to accomplish flood management objectives, the reservoir space can be used for storing water. From October through March, the maximum allowable storage limit (point at which specific flood release would have to be made to ensure adequate space in Lake Oroville to handle floodflows) varies from about 2.8 to 3.2 maf. Actual flood storage requirements are partially based on a wetness index, computed from accumulated basin precipitation. This allows higher levels in the reservoir when the prevailing hydrology is dry while maintaining adequate flood protection. When the wetness index is high in the basin (i.e., high potential runoff from the watershed above Lake Oroville), the flood management space required is at its greatest amount to provide the necessary flood protection. From April through June, the maximum allowable storage limit is increased as the flooding potential decreases, which allows capture of the higher spring flows for use later in the year. During September, the maximum allowable storage decreases again to prepare for the next flood season. During flood events, and in consultation with USACE, actual storage may encroach into the flood reservation zone to prevent or minimize downstream flooding along the Feather River.

### 3.2.3 Environmental Facilities and Operations

The Oroville Facilities include facilities and operations to help protect and enhance fish and wildlife species and their habitat. Many of the environmental programs implemented within the FERC Project boundary are cooperatively managed or are based on agreements with other agencies such as DFG and USFWS. This includes operation and maintenance of facilities such as the Feather River Fish Hatchery and the Oroville Wildlife Area (OWA) and implementation of measures developed in consultation to protect Endangered Species Act (ESA)–listed terrestrial species within the FERC Project boundary.

#### *3.2.3.1 Draft Biological Assessment Measures*

In 2004, DWR entered into informal consultation with USFWS to resolve issues related to terrestrial listed species prior to the initiation of formal consultation and FERC license application filing. Several of the measures were identified for early implementation (under the existing FERC license) to minimize or avoid take of federally listed species related to ongoing project activities. These measures include the identification of a listed-species coordinator within DWR, measures pertaining to the giant garter snake, measures pertaining to the bald eagle, and measures pertaining to the vernal pool-related species. These measures are described in a draft BA (see Appendix E of the PDEA), covering terrestrial resources, and have been implemented.

#### *3.2.3.2 Feather River Fish Hatchery Facilities*

The Feather River Fish Hatchery is an anadromous fish hatchery built to compensate for the loss of spawning grounds and rearing areas for returning salmon and steelhead that resulted from construction of Oroville Dam. The hatchery complex consists of the

Fish Barrier Dam and fish ladder, water supply lines and aeration tower, collection and holding tanks, enclosed spawning and early incubation facilities, grow-out ponds, and fish transport vehicles. The maximum intake for the Feather River Fish Hatchery is 115 cfs. The Thermalito Fish Hatchery Annex, a fish rearing facility on State Route (SR) 99 near Thermalito Afterbay, is used as a grow-out facility for some salmon and steelhead hatched at the Feather River Fish Hatchery and other DFG purposes.

The Fish Barrier Dam is downstream of the Thermalito Diversion Dam and immediately upstream of the Feather River Fish Hatchery. Flow over the dam maintains fish habitat in the LFC of the Feather River between the Fish Barrier Dam and the Thermalito Afterbay Outlet and provides attraction flow for the hatchery. The dam diverts fish into a fish ladder that leads to the hatchery. The Fish Barrier Pool formed behind the Fish Barrier Dam has a storage capacity of 560 af and covers 50 acres.

#### *3.2.3.3 Feather River Fish Hatchery Operations*

The Feather River Fish Hatchery artificially spawns thousands of returning salmon and steelhead each year. DFG operates the hatchery under contract to DWR, and DWR pays for most hatchery-associated expenses. Water is released from the Oroville Facilities storage reservoirs to support fish hatchery operations downstream of the Fish Barrier Dam. Existing fish hatchery temperature objectives are listed in Table 3.2-2. The design of the Oroville Facilities provides for flexibility to enable water temperature control.

**Table 3.2-2. Feather River Fish Hatchery water temperature objectives.**

| Period | Temperature (+/- 4°F) |
|---|---|
| April 1–May 15 | 51° |
| May 16–May 31 | 55° |
| June 1–June 15 | 56° |
| June 16–August 15 | 60° |
| August 16–August 31 | 58° |
| September 1–September 30 | 52° |
| October 1–November 30 | 51° |
| December 1–March 31 | no greater than 55° |

*Source: Initial Information Package (DWR 2001)*

The Fish Barrier Dam diverts fish into a ladder leading to the hatchery. All fish are stopped at the dam. Fish ladder operations to allow entry of adult spring-run Chinook salmon have changed in recent years. When the gates are open, upstream migrating fish can move into the 0.5-mile-long ladder leading to the hatchery. Before 2003, the fish ladder gates were generally opened on or about September 1 to allow adult spring-run Chinook salmon to enter the hatchery. The early entries were ready for spawning in October. Fish entering the hatchery in the latter portion of September (the exact cut-off date has varied somewhat from year to year) were considered fall-run Chinook salmon. Since 2003, however, the fish ladder has opened during May and June to allow early

entry of spring-run Chinook salmon. These early-arriving spring-run Chinook salmon are counted, tagged, and released back into the river. When these tagged salmon re-enter the hatchery in the fall, they can be distinguished and spawned separately from fall-run Chinook salmon.

All salmon adults entering the hatchery are retained for egg taking or fertilization. The entire process of egg/milt collection, fertilization, incubation, rearing, and holding of fry, fingerlings, and yearlings is conducted within the facilities. As fish reach the end of the ladder, they swim into the gathering tank, and a mechanical sweep moves the fish into the spawning building. Salmon and steelhead that are not ready to be artificially spawned are moved to one of four circular holding tanks. The main hatchery building houses the spawning operation and incubators.

Unlike Chinook salmon, not all adult steelhead die after spawning; therefore, adult steelhead that have spawned at the hatchery are released. The fish ladder gate is open continuously through the fall and winter, as long as fish with viable eggs ascend the hatchery ladder. Hatchery steelhead are reared to the yearling stage and released in the Feather River. All steelhead fish produced in the Feather River Fish Hatchery are marked with an adipose fin clip. The external fin clip allows anglers to determine quickly whether the fish is of hatchery origin and can be kept. The hatchery also marks a percentage (currently about 10 percent) of its steelhead and spring- and fall-run Chinook salmon using coded wire tags. Each year, approximately 9,000–18,000 salmon and 2,000 steelhead are artificially spawned, a process that produces 18–20 million eggs. Salmon and steelhead are raised at the hatchery then transported in oxygenated, temperature-controlled tanks for release in the Feather and Sacramento Rivers, in Lake Oroville and other California reservoirs, and in San Pablo Bay near San Francisco Bay.

A variety of cold water fish have been stocked in Lake Oroville since its creation in 1968, including various strains of rainbow and brown trout, kokanee salmon, coho salmon, Chinook salmon, lake trout, and brook trout. DWR became involved with Lake Oroville fish stocking in 1993, and expanded the Feather River Hatchery in 1998 to enhance these activities. Since 2000, numerous problems have occurred with coldwater fish diseases, necessitating extensive disease management efforts. These include a cessation of stocking Chinook salmon, and the current practice of using domesticated strains of coho salmon from the Pacific Northwest.

#### *3.2.3.4 Water Releases in Support of Environmental Resources*

The 1983 Agreement between DWR and DFG sets criteria and objectives for flow and temperatures in the LFC and the reach of the Feather River between Thermalito Afterbay and Verona. The 1983 Agreement:

- Establishes minimum flows between the Thermalito Afterbay Outlet and Verona, which vary by water year type;

- Requires flow changes under 2,500 cfs to be reduced by no more than 200 cfs during any 24-hour period, except for flood management operations;
- Requires flow stability during the peak of the fall-run Chinook spawning season;
- Sets an objective of suitable temperature conditions during the fall months for salmon and during the later spring/summer for shad and striped bass; and
- Establishes a process whereby DFG could recommend each year, by June 1, a spawning gravel maintenance program to be implemented during that calendar year.

Additionally, a 1984 FERC Order states that upon completion of construction of the Thermalito Diversion Dam Powerplant, DWR shall operate the Oroville Facilities in such a manner as to maintain a minimum flow of 600 cfs within the Feather River downstream of Thermalito Diversion Dam. Downstream of the Thermalito Afterbay Outlet, the license requires a minimum release so that flows in the Feather River are 1,000 cfs from April through September, and 1,700 cfs from October through March when the April–July unimpaired runoff in the Feather River is greater than 55 percent of normal. When the April–July unimpaired runoff is less than 55 percent of normal, the license requires minimum flows of 1,000 cfs from March to September and 1,200 cfs from October to February. This requirement is to protect any spawning that could occur in overbank areas during the higher flow rate by maintaining flow levels high enough to keep the overbank areas submerged. In practice, flows are maintained below 2,500 cfs from October 15 to November 30 to prevent spawning in the overbank areas. According to the 1983 Agreement, if, during the period of October 15 to November 30, the average highest 1-hour flow of combined releases exceeds 2,500 cfs, except for flood management, accidents, or maintenance, then the minimum flow shall not be less than 500 cfs less than that flow. The 1983 Agreement also states that if the April 1 runoff forecast in a given year indicates that the reservoir level will be drawn to 733 ft, water releases for fish may be reduced, but not by more than 25 percent.

**Operations to Achieve Temperature Targets for Anadromous Species Protection**

There are several temperature objectives for the Feather River downstream of the Thermalito Afterbay Outlet. During the fall months, after September 15, the temperatures must be suitable for fall-run Chinook. From May through August, they must be suitable for shad, striped bass, and other warm water fish. The National Oceanic and Atmospheric Administration (NOAA) has established an explicit criterion for steelhead trout and spring-run Chinook salmon, memorialized in a Biological Opinion (BO) on the effects of the CVP and SWP on Central Valley spring-run Chinook and steelhead as a reasonable and prudent measure. DWR is required to control water temperature at Feather River mile 61.6 (Robinson Riffle in the LFC) from June 1 through September 30 unless DWR consults with the Feather River Technical Team and receives approval from NMFS to deviate from the BO temperature requirement. This measure requires water temperatures less than or equal to 65ºF on a daily average. The requirement is not intended to preclude pumpback operations at the

Oroville Facilities needed to assist the State of California with supplying energy during periods when the California ISO anticipates a Stage 2 or higher alert.

The hatchery and river water temperature requirements contained within the BO sometimes conflict with temperatures desired by agricultural diverters. Under existing agreements, DWR provides water for the FRSA water users. The FRSA water users desire warmer water during spring and summer for rice germination and growth. To the extent practical, DWR uses its operational flexibility to accommodate the FRSA water users' temperature goals.

#### *3.2.3.5 Sport Fishery Operations*

DWR manages a cold and warmwater sport fishery in Lake Oroville. DWR funds a full-time fishery biologist and a salmonid stocking program and prepares 90-day and quarterly reports to FERC. Habitat improvements for warmwater game fish include brush shelter construction, planting of willows and/or buttonbush slips and annual grasses, and installation and operations and maintenance (O&M) for irrigation systems and channel catfish spawning structures.

#### *3.2.3.6 Oroville Wildlife Area Facilities*

The OWA comprises approximately 11,000 acres west of Oroville that are managed for wildlife habitat and recreational activities. It includes Thermalito Afterbay and surrounding lands (approximately 6,000 acres) along with 5,000 acres adjoining the Feather River. The 5,000-acre area straddles 12 miles of the Feather River, which includes willow and cottonwood-bordered ponds, islands, and channels. Limited gravel extraction also occurs within the OWA.

DWR, DFG, the California Waterfowl Association, and other stakeholders have worked cooperatively to reduce waterfowl losses and increase production in the OWA through programs that have included brood pond construction in Thermalito Afterbay. These ponds or impoundments, created by extending small earthen dams across inlets of the Afterbay, maintain relatively stable water surface elevation, which allows the establishment of emergent vegetation and submerged aquatic habitat while providing open water and terrestrial cover habitats for a variety of terrestrial and aquatic species including special status species.

DFG maintains wood duck/wildlife nest boxes each year with the help of public volunteers in the OWA. Although these nest boxes are intended for wood ducks, many other types of wildlife also use them. The work associated with the nest box program includes cleaning as well as replacing those that are in disrepair.

DWR also maintains fishing platforms and fish cleaning stations at various locations within the OWA.

### *3.2.3.7 Oroville Wildlife Area Operations*

As a result of interagency agreements negotiated between DWR and DFG, DFG manages Thermalito Afterbay and other OWA locations. The first significant management agreement was executed in 1968, when DWR transferred to DFG "control and possession" of the borrow area used during Oroville Facilities construction and adjacent property along the Feather River. This agreement set forth DFG responsibility for establishing, operating, and maintaining a public fish and wildlife management area and providing for recreation on that property. In addition, DFG agreed to be responsible for all costs associated with operation and maintenance. The California Fish and Game Commission formally established this State Wildlife Area in coordination with that agreement.

The second significant management agreement was negotiated between DWR and DFG in 1986. This agreement transferred an easement to DFG for management of the Thermalito Afterbay water surface and adjoining lands for use as a State Wildlife Area and associated recreation. DWR did not transfer possession of the property but established an easement to allow DFG access to fulfill management responsibilities. DFG became responsible for all costs associated with operation and maintenance of this property as a subunit of the OWA, although some Thermalito Afterbay recreation facilities have subsequently been constructed and are maintained by DWR. Thermalito Afterbay has a 5 mph boating speed limit however it is rarely enforced.

DFG is responsible for providing staff to manage and operate the OWA and sets guidelines for public use of this area. This area had full-time staff assigned until March 1, 2004, when DFG management reassigned the staff to other State Wildlife Areas in response to State budget cuts. DFG allows public use from 1 hour before sunrise to 1 hour after sunset; a designated area for overnight camping allows for a maximum stay of 14 nights in any calendar year. Enforcement of these hours or stay limits has been difficult. DFG periodically conducts controlled burning to reduce fuel loading in various locations, primarily around Thermalito Afterbay and DFG and DWR have constructed and maintain fuel breaks in several locations to reduce the potential for spread of wildfire.

DFG has planted and maintained upland forage and cover crops in the OWA to provide winter waterfowl forage and nesting cover per land management guidelines of the Central Valley Habitat Joint Venture (CVHJV). Both DWR and DFG, among others, are signatories to this waterfowl management plan. In addition to this planting, DFG's habitat enhancement program in the OWA includes thinning and/or removal of vegetation around the Thermalito Afterbay brood ponds, scattered dredging ponds, and rock piles within the OWA to provide improved access for waterfowl and improved recreational access to the various habitats. DFG has drained a brood pond on at least one occasion to eliminate non-native fish species. Brood pond recharge is accomplished through either typical Afterbay water level fluctuations or through pumping.

Approximately 200 acres of land are tilled and planted each year and remain as suitable nesting/foraging habitat for approximately 5 years before beginning to revert to the existing grasses. In addition, DFG thins and removes vegetation in and around scattered ponds.

DFG does not directly conduct mosquito abatement programs within the OWA. However, the annual operating budget includes up to $40,000 per year (including up to $20,000 that is contributed by DWR) that is paid to the local mosquito abatement district. This program consists of spraying pesticides in amounts and locations determined appropriate by abatement program staff.

DWR utilizes Best Management Practices (BMPs) to prevent damage to fish and wildlife resulting from construction or operation of the Oroville Facilities by taking special precautions to prevent discharge of silt, petroleum products, and other harmful substances or debris into the Feather River.

#### *3.2.3.8 Water Quality Monitoring*

SWP water quality monitoring by DWR's Division of Operation and Maintenance for various inorganic, organic, and biological parameters has occurred regularly since 1968. Nutrients are monitored twice a year, in April and November, at Oroville Dam. Aluminum, barium, cadmium, mercury, silver, chlorinated organics, organo-phosphorus pesticides, herbicides, carbamates, and other pesticides are monitored quarterly at Thermalito Forebay. At Thermalito Afterbay, nutrients are monitored twice a year while aluminum, barium, cadmium, mercury, and silver are monitored monthly and bromide and suspended solids are monitored quarterly. This information is located on DWR's website (www.water.ca.gov) or by requesting it directly from DWR.

### 3.2.4 Recreation Facilities and Operations

#### *3.2.4.1 Recreation Facilities*

The Oroville Facilities support a wide variety of recreational opportunities, including: boating (several types), fishing (several types), fully developed and primitive camping (including boat-in and floating sites), picnicking, swimming, horseback riding, hiking, off-road bicycle riding, wildlife watching, and hunting. There are also visitor information sites with cultural and informational displays about the developed facilities and the natural environment. The majority of recreation facilities in the project area are within the Lake Oroville State Recreation Area (LOSRA), which has numerous facilities and sites offering diverse recreational opportunities. The LOSRA, managed by DPR, includes Lake Oroville and the surrounding lands and facilities within the project area as well as the land and waters in and around the Diversion Pool and Thermalito Forebay, downstream of Oroville Dam. Additional recreational facilities and opportunities exist within the project area but outside the LOSRA, specifically the OWA including Thermalito Afterbay, and the Feather River Fish Hatchery. Some facilities cross over from outside to inside LOSRA, such as the extensive and popular trail system.

## Equestrian, Bicycle, and Hiking Trails

The Oroville Facilities include miles of trails offering diverse user groups with opportunities to walk, hike, bicycle, or horseback ride. Figure 3.2-4 is a map showing the existing trails within the project boundary. The Dan Beebe Trail and the Brad Freeman Trail are two of the more popular trails in the project area.

The Dan Beebe Trail is a 14.3-mile trail that is for equestrian and hiking use. The trail is commonly used by joggers and hikers and provides both difficult and easy terrain as it winds past the Diversion Pool and Lake Oroville. Restroom facilities and trailheads are dispersed along the route.

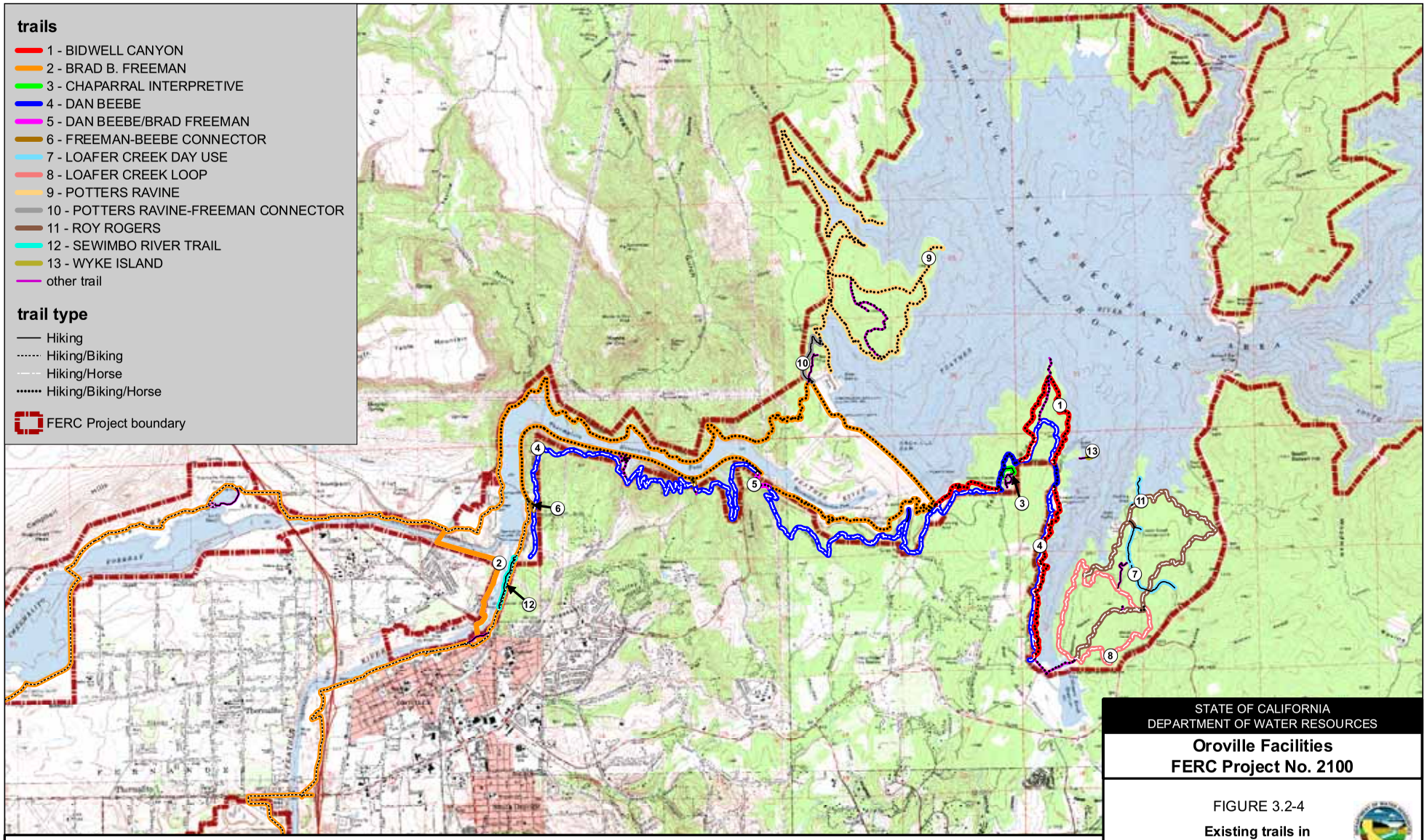
The 41-mile Brad Freeman Trail encircles Thermalito Forebay, Thermalito Afterbay, and the Diversion Pool, and crosses the crest of Oroville Dam. It was constructed in the mid-1990s as a mountain bicycle trail but became popular with equestrians and now has portions considered multi-purpose. There are about a dozen popular or marked access points, many at other popular project recreation sites, from which trail users can stage. The mostly unpaved trail provides scenic off-road recreation, while some short sections are along paved roads and can be used by less-specialized bicycles. More than 30 miles of the trail are flat but include some rolling terrain; steep grades can be found on either side of Oroville Dam. The Brad Freeman Trail has been used for downhill and cross-country mountain-bicycle races.

Most of the hiking trails at Lake Oroville are located in the Bidwell Canyon and Loafer Creek areas; however, there is also a trail in the Spillway area. Informal trails offering shoreline access are found at Thermalito Afterbay, the Craig Saddle area, and the Foreman Creek Car-top Boat Ramp (BR) area. Hiking trail locations and access points in the project area include Bidwell Canyon, Kelly Ridge, Loafer Creek, Potter's Ravine, Wyk Island, the Saddle Dam, Powerhouse Road, Lakeland Boulevard, East Hamilton Road, Toland Road, Tres Vias Road, and the Visitors Center Chaparral Interpretive Trail. DWR recently completed a group staging area at Thompson Flat that includes signage, a graveled driveway to Cherokee Road, graded parking, and a spur trail from the staging area to an existing trail.

The Sewim Bo River Trail was also recently developed along the southeast bank of the Feather River starting at the Feather River Nature Center and extending north to the Thermalito Diversion Dam. Amenities include picnic tables, shade ramadas, restrooms, and interpretive signage.

## Recreation Facilities by Location

Lake Oroville, with more than 15,000 surface acres at full pool, is one of the largest reservoirs in California. Major recreation facilities are located around the reservoir at Bidwell Canyon, Loafer Creek, the Spillway, and Lime Saddle. An overview of these and other existing recreation facilities that are maintained and operated under the existing FERC license and included in the No-Project Alternative is presented below. Figure 4.7-1 in Section 4.7, Recreation Resources, is a map showing the location of




1 0 1 2 Miles

Original Scale 1:48,000, 1" = 4000 feet

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

**Oroville Facilities**
**FERC Project No. 2100**

FIGURE 3.2-4

**Existing trails in the LOSRA**

Prepared by: HJS - DWR-DES

Date 4/10/07

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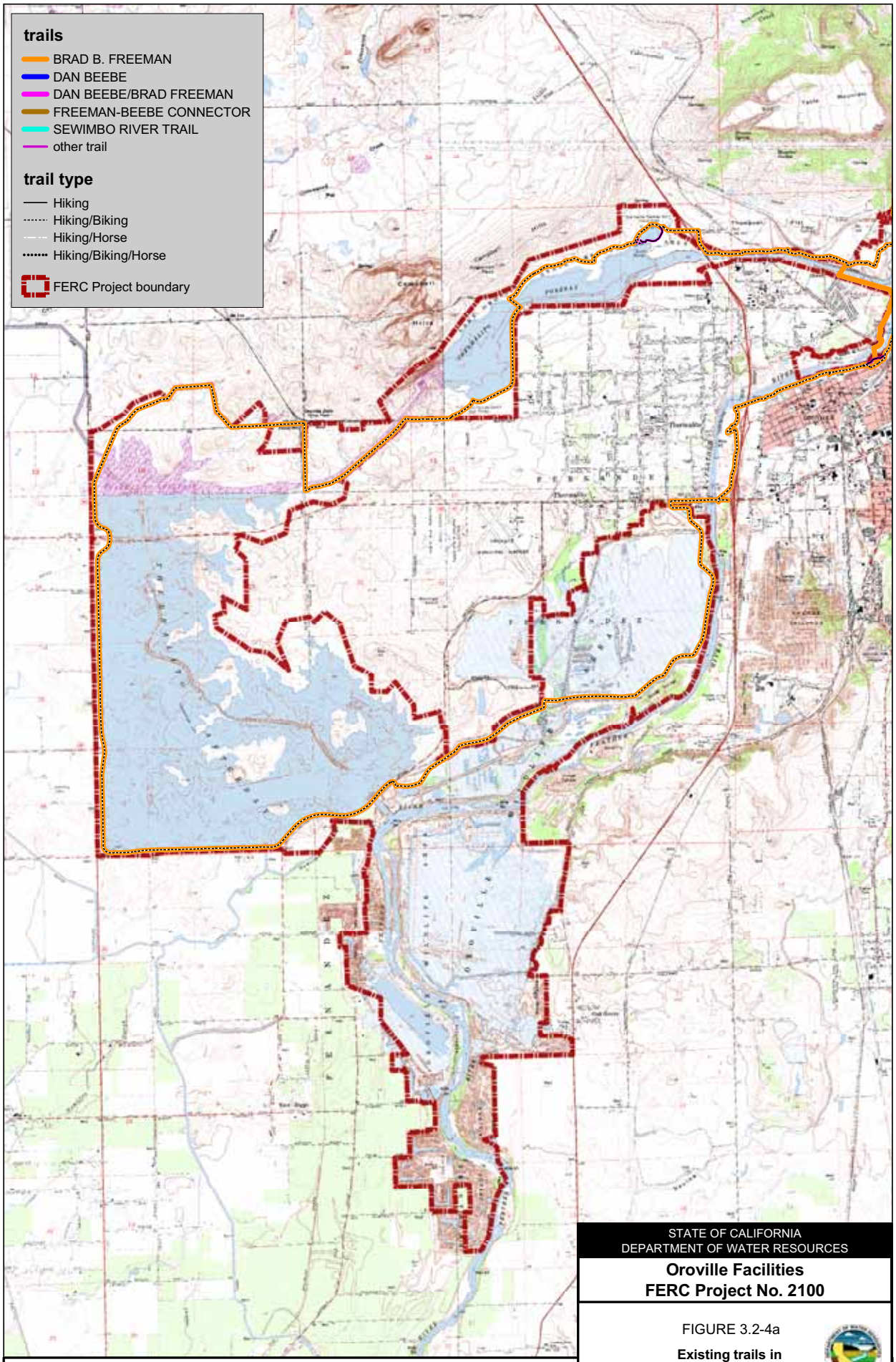


STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

**Oroville Facilities**
**FERC Project No. 2100**

FIGURE 3.2-4a

**Existing trails in the LOSRA**

Prepared by: HJS - DWR-DES
Date 4/10/07
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these facilities. More detailed information is provided in the SA Recreation Management Plan, Appendix B.

**Bidwell Canyon Campground, Boat Ramp, Day Use Area, and Marina**

Bidwell Canyon Campground is located along the southern shore of Lake Oroville, east of Oroville Dam. This facility provides campsites for tents or recreational vehicles (RVs), the latter with full hookups. This site has flush toilets, piped water, showers, gray water sumps, and a picnic area with fire grills.

The Bidwell Canyon Marina area, approximately 1 mile east of Oroville Dam on the southern shore of the reservoir, includes a fuel dock, pumping station for boat holding tanks, boat docks and storage, trailer facilities with RV hookups, a multi-lane boat launch ramp, and an exhibit describing the history of the Bidwell Bar Bridge.

**Loafer Creek Campground, Boat Ramp, Day Use Area, and Equestrian Campground**

Loafer Creek Campground is the largest campground within the FERC Project boundary and is located on the southern shore of Lake Oroville east of Oroville Dam. This facility has campsites for tents, RVs, and large groups. The multi-lane Loafer Creek boat ramp is located nearby. The campground is equipped with restrooms, showers, piped water, gray water sumps, picnic tables, and fire grills.

The Loafer Creek Equestrian Campground is equipped with shower stalls and feed troughs for horses. Restroom facilities and trailheads are located nearby. Recently, a paved access road, new feeder boxes, pipe corrals, and a 50-ft round pen were added at this location to provide enhanced equestrian recreational opportunities.

**Lime Saddle Campground, Day Use Area, and Marina**

Lime Saddle Campground is located on the western shoreline of the West Branch of the North Fork arm of Lake Oroville. This facility provides campsites for tents, RVs (some with hookups), and groups. The campground has restrooms, showers, and potable water; each site has a picnic table and fire grill.

Lime Saddle Marina includes boat docks and storage, fishing and boating supplies, gas, and oil. The marina is located on the West Branch of the Feather River near Lime Saddle Road. Close to the marina are the multi-lane Lime Saddle Boat Ramp and picnic facilities at the Day Use Area.

**Spillway Recreation Area at Oroville Dam**

The Spillway Recreation Area at Oroville Dam has the largest boat launching facility on Lake Oroville. A 12-lane ramp with more than 800 parking spaces, renovated in 2002, is used during periods of high lake level; an 8-lane second-stage ramp is used during

low-water periods. This site also provides limited day use activities, en-route camping, and opportunities for picnicking and bicycle riding.

**Enterprise Boat Ramp and Day Use Area**

The Enterprise Boat Ramp and Day Use Area, located on the South Fork arm of Lake Oroville, provides boat launching and shoreline access. This site has a multi-lane boat ramp used during periods of high lake level.

**Car-Top Boat Ramps**

The following locations provide access to boaters launching canoes, small sailboats, and other small watercraft.

*Nelson Bar.* Nelson Bar Car-top BR is located on the West Branch of the North Fork arm of Lake Oroville. The lower section of the boat ramp below the improved paved ramp is available for hand launching only. The site has a gravel parking lot, available at all but the highest water levels, and one vault toilet.

*Vinton Gulch.* Vinton Gulch Car-top BR is located on the West Branch of the North Fork arm of Lake Oroville. The single-lane boat ramp is used during periods of high lake level. This site has no designated parking area and one vault toilet.

*Dark Canyon.* Dark Canyon Car-top BR is located on the West Branch of the North Fork arm of Lake Oroville. This single-lane boat ramp is available at most water levels. There is a paved parking lot but no restroom.

*Foreman Creek.* Foreman Creek Car-top BR is located on the north side of the main body of Lake Oroville. This multi-lane boat ramp provides access at most water levels but has no formally designated parking area and no restroom.

*Stringtown.* Stringtown Car-top BR is located on the South Fork arm of Lake Oroville. The boat ramp is available at most water levels. This site has a small parking area and one vault toilet.

**Lake Oroville Visitors Center**

Located east of Oroville Dam on Kelly Ridge, the 10,000-square-foot (sq ft) center features exhibits on the engineering and construction of the Oroville Facilities. Additionally, there are interpretive displays on the Native American culture and the natural resources of the area. The center has observation decks with picnic tables and an observation tower. Visitors to the Lake Oroville Visitors Center can also obtain specific information about recreational opportunities and activities in the area.

**Boat-in Campgrounds**

In addition to traditional campgrounds, Lake Oroville provides boat-in campgrounds (BICs) around the reservoir. These camps are accessible only by boat and service

vehicles and are popular during periods of high lake level. There are a total of 84 individual/family boat-in campsites in the project area.

*Bloomer Area.* Bloomer Area BICs are located on the North Fork arm of Lake Oroville. Bloomer Area has four separate camp areas: Bloomer Cove, Bloomer Knoll, Bloomer Point, and Bloomer Group. Each has campsites equipped with tables and fire rings with cooking grills. The Bloomer Group is the only BIC in the Bloomer Area that offers a group site (one 75-person group site).

*Goat Ranch.* Goat Ranch BIC is located on the North Fork arm of Lake Oroville between the Bloomer campgrounds and where the West Branch splits from the North Fork arm. The campsites are equipped with tables and fire rings with cooking grills.

*Foreman Creek.* Foreman Creek BIC is located at the north side of Lake Oroville. This campground is equipped with potable water, gray water sump, tables, and fire rings with cooking grills.

*Craig Saddle.* Craig Saddle BIC is located between the Middle and South Fork arms of Lake Oroville. This area has 18 sites, each equipped with tables, potable water, and fire rings with cooking grills.

**Floating Campsites and Restrooms**

Lake Oroville has ten floating campsites that are anchored in different areas of the reservoir. Each is a 2-story structure that provides a unique on-water camping experience and can accommodate up to 15 people, with living space and amenities such as cooking grill, table, sink, restroom, and sleeping area.

There are seven floating restrooms on Lake Oroville designed to protect water quality and provide convenience for boaters. They are stationed around the reservoir, and each has two individual restrooms with vaults that are periodically pumped out.

**Saddle Dam Day Use Area**

This primarily equestrian-use trailhead is located in the southeastern portion of the project area.

**Diversion Pool Day Use Area**

The Diversion Pool Day Use Area is open for day use activities such as hiking, biking, trail access, and picnicking. Only non-motorized and electric boats are allowed on the Diversion Pool. The Diversion Pool Day Use Area has one vault toilet but few other amenities.

**North Thermalito Forebay Recreation Area**

The North Thermalito Forebay area offers picnicking, swimming, and en-route camping. Boating is restricted to non-motorized boats such as sailboats and canoes. The boat launch area has two multi-lane boat launch ramps. There are numerous picnic tables, group facilities and shade ramadas, and a popular sand beach.

**South Thermalito Forebay Recreation Area**

The South Thermalito Forebay Recreation Area provides outdoor recreational activities such as boating, picnicking, fishing, and swimming. The site has a multi-lane boat ramp with power boating limited to 330 acres of the 630-acre Thermalito Forebay. The site has several picnic tables with fire grills.

**Thermalito Afterbay Boat Ramps**

Several boat ramps are available on Thermalito Afterbay at the following locations:

*Wilbur Road.* The Wilbur Road boat launch area consists of a multi-lane paved boat ramp and a parking lot with 14 car/trailer combination spaces.

*Larkin Road.* The Larkin Road boat launch area has a graded and graveled car-top boat ramp. This site has a paved lot approximately 50 yards by 50 yards with a single-vault, handicap-accessible toilet.

*Monument Hill.* The boat ramp consists of a multi-lane paved boat launch ramp with a floating dock and is located on the eastern shoreline of Thermalito Afterbay. The paved and unpaved parking lots can accommodate about 75 car/trailer combinations.

**Monument Hill Day Use Area**

Monument Hill Day Use Area provides recreational activities such as boating, swimming, fishing, picnicking, and limited hunting. This site has several picnic tables, four flush toilets, a multi-lane boat launching ramp, and a fish cleaning station.

**Dispersed Recreation Sites in the OWA**

Other recreation areas in the OWA include dispersed recreation (hunting, fishing, and bird watching), model aircraft grounds, a boat launch on the Feather River, and a designated primitive camping area with minimal amenities for users.

#### *3.2.4.2 Recreation Operations and Maintenance*

The LOSRA, managed by DPR, includes Lake Oroville and the surrounding lands and facilities within the project area, as well as the land and waters in and around the Diversion Pool and Thermalito Forebay, downstream of Oroville Dam. Additional recreational facilities and opportunities exist within the project area but outside the LOSRA, specifically at Thermalito Afterbay, the OWA, and the Feather River Fish Hatchery. Each of these areas is managed by DFG.

## 3.3 DESCRIPTION OF ALTERNATIVES UNDER CONSIDERATION

### 3.3.1 No-Project Alternative

CEQA requires the evaluation of the No-Project Alternative, against which the effects of the alternatives can be compared. The purpose of describing and analyzing a No-Project Alternative for the Oroville Facilities is to allow decision-makers to better understand the environmental consequences of continuing to operate the project under the terms and conditions of its existing FERC license. Such consequences can then be compared to those associated with alternatives proposed for the project.

Under the No-Project Alternative, the Oroville Facilities would continue to be operated as it is now under the terms and conditions in the existing FERC license, and no new protection, mitigation, and enhancement measures would be implemented, other than those arising from existing legal obligations and agreements. In addition, DWR would continue existing maintenance practices needed to maintain the Oroville Facilities.

The No-Project Alternative includes all existing facilities and operations as described in Section 3.2, key conditions of the existing FERC license, environmental commitments such as those associated with DWR's water rights, recreation programs, and other agreements that affect current Oroville Facilities operations. This includes interim measures implemented by DWR during the ALP collaborative effort and further described in Section 3.3.1.1 below. These conditions and measures would continue to affect operations in the future under the No-Project Alternative.

During development of the FERC license application, the assessment of effects for the No-Project Alternative used the CALSIM II, HYDROPS™, WQRRS, and other modeling and technical studies completed for the "benchmark" modeling scenarios to simulate existing and future hydrologic conditions. These scenarios and related modeling results were completed with input provided by stakeholders at several hydrology modeling workshops and are described in the PDEA provided to FERC as part of the license application. Appendix C of the PDEA includes technical information on the operations modeling tools used for the assessment of effects and additional detail on existing project operations based on the models. Additional modeling discussion is included in Chapter 5 of this DEIR and Appendix E.

#### *3.3.1.1 Interim Recreation Projects Included in the No-Project Alternative*

Early in the ALP, DWR agreed to consider implementing some actions prior to receiving a new license provided no license amendment was needed, environmental review requirements were limited, and there was agreement to include the actions in the new license application when filed. A task force was initiated through the Recreation and Socioeconomics Work Group to evaluate potential actions that could be taken in advance of license renewal. The task force eventually recommended two dozen actions for consideration. DWR identified those actions that were feasible to accomplish before

license renewal and began implementation. The completed interim recreation projects included as part of the No-Project Alternative are listed and described below:

- Riverbend Park—DWR provided over $5 million toward funding the design, permitting, and construction of the expansion of the existing Riverbend Park along the eastern bank of the Feather River LFC adjacent to the City of Oroville. Phase one of the park includes trails, picnic facilities, a boat launch, playgrounds, a Frisbee golf course, and paved parking.

- Restroom Upgrades—Vault type, handicap accessible restrooms were installed at Wilbur Road Boat Ramp, Model Aircraft Flying Facility at Thermalito Afterbay, Enterprise Boat Ramp, South Thermalito Forebay, and Saddle Dam.

- Loafer Creek Equestrian Campground Improvements—A paved access road, new feeder boxes, pipe corrals, and a 50-ft round pen were added near Loafer Creek Campground to enhance equestrian recreational opportunities.

- Group Staging Area—DWR secured the Thompson Flat property, graded parking, installed signage, graveled the drive from Cherokee Road, and developed a spur trail from the staging area to an existing bicycle trail.

- Bidwell Exhibit—DWR coordinated with DPR to develop an exhibit of the history of Bidwell Bar Bridge.

- Saddle Dam Improvements—The existing Saddle Dam equestrian parking area was improved by re-grading and adding gravel to the parking area, and by adding picnic tables, hitching posts for horses, and plans to add native shade trees.

- Lake Oroville Overlook Improvements—The Lake Oroville overlook located off the Oro-Quincy Highway (SR 162) was improved by removing the existing cyclone fencing, installing a new California Department of Transportation (Caltrans) specification fence and automobile safety barrier, and adding interpretive signs.

- Seed the face of Oroville Dam—DWR seeded the downstream face of Oroville Dam with a wildflower mixture dominated by California poppies.

- Model Aircraft Flying Facility Improvements—At the Model Aircraft Flying Facility, DWR paved the crossing runways, graded and graveled the parking lot, installed aircraft staging tables, constructed picnic facilities with shade ramadas, installed a restroom, and added fencing.

- Promote Existing Recreation Facilities—DWR provided funding to the Oroville Chamber of Commerce for billboards along SR 99 and Pentz Road to direct people to LOSRA facilities.

- Boating Safety Training—DWR continues to work cooperatively with DPR, the Butte Sailing Club, and the Feather River Recreation and Parks District to fund improved boat storage facilities, boating safety equipment, and instructional programs. The latter includes a recurring "Aquatic Adventure Camp" that targets local disadvantaged youth.

- Sewim Bo Path—A walking trail was developed along the southeastern bank of the Feather River starting at the Old Bath House (now the Nature Center and Native Plant Garden) and extending north to the Thermalito Diversion Dam. Improvements along the river trail include picnic tables, shade ramadas, native trees and shrubs, a restroom, interpretive signs, and parking, including Americans with Disabilities Act (ADA) access.

- Feather River Fish Hatchery Landscaping Improvements—DWR planted new shade trees and assorted native plants and grasses on the Feather River Fish Hatchery grounds.

#### *3.3.1.2 Actions Taken to Comply with Draft Biological Assessment*

DWR entered into informal consultation with USFWS to resolve terrestrial listed species issues prior to the initiation of formal consultation to be conducted after license application filing. USFWS recommended four measures for early implementation (under the existing FERC license) to minimize or avoid take of federally listed species related to ongoing project activities. These measures include the identification of a listed-species coordinator within DWR, measures pertaining to the giant garter snake, measures pertaining to the bald eagle, and measures pertaining to the vernal pool-related species. These measures are described in a draft BA (see Appendix E of the PDEA), covering terrestrial resources, and are included in the No-Project Alternative.

The report for Relicensing Study Plan T-1 (SP-T1) identified a potential impact on nesting bank swallow, a State-listed Threatened species, related to July Feather River flows. DWR in consultation with DFG cooperatively agreed to mitigation in the form of habitat protection. Final site selection is subject to DFG approval. This measure is included in the No-Project Alternative.

### 3.3.2 Proposed Project

This section describes how the existing Oroville Facilities and project operations described in Section 3.3.1 would be modified under the Proposed Project. The Proposed Project is the SA signed March 21, 2006, and submitted to FERC. In the submittal, DWR requested that the SA become the preferred alternative, replacing the preferred alternative proposed and analyzed in the PDEA that was part of the license application in January 2005 for consideration as future license conditions for the Oroville Facilities for the next 50 years. The Proposed Project includes existing measures described in the No-Project Alternative, including interim recreation projects as well as

SA Appendix B sections not considered by FERC in their DEIS, unless otherwise indicated.

The SA includes a commitment by DWR to develop, in consultation with stakeholders, a number of plans and programs to enhance, protect, mitigate, restore, and/or create habitat within the FERC Project boundary. It also requires that DWR complete a number of studies and conduct monitoring to guide future decisions and activities. While these plans, programs, studies and monitoring activities will likely lead to future actions that would be subject to CEQA environmental review prior to implementation, the preparation of plans, development of programs, and completion of studies themselves do not result in a physical change to the environment and thus are not ready for project-specific CEQA analysis at this time. Articles and actions included in the Proposed Project that do not result in a physical change to the environment and are thus not analyzed in this document are identified on Table 5.0-1 in Chapter 5.0, Environmental Impacts. In some cases, during the ALP process DWR and the stakeholders evaluated potential options associated with actions included and generally described in SA articles. The level of detail necessary to analyze these actions on a project-specific level is not available at this time. Therefore, this document includes an analysis of these actions on a programmatic level, and in some cases provides options that would likely be considered based on collaborative discussions during the ALP. Table 5.0-1 identifies SA articles and sections not analyzed at a project level in this DEIR. Please review the SA for the complete description of the plans and programs DWR has committed to develop.

The SA also includes two separate documents developed through the collaborative relicensing process as proposed license articles: SA A127, the SA Recreation Management Plan (RMP), which provides a long-term plan to enhance recreational resources; and SA A128, the draft Historic Properties Management Plan (HPMP), which provides guidance to protect sensitive cultural and historical resources in the project area. These documents are incorporated in the SA, and thus in the Proposed Project and the FERC Staff Alternative, by reference.

In addition to specific actions, plans, and programs described in the SA articles, the Proposed Project also includes a multi-party Draft Habitat Expansion Agreement (HEA), which is described in Appendix F of the SA.

The SA originally included as Appendix E, the U.S. Forest Service (USFS) Draft Section 4(e) conditions that would be included in the development of plans, programs, and studies involving USFS lands. Since the SA was signed, the USFS has filed Final Section 4(e) conditions for the project. As provided for in the SA, these final conditions are incorporated into the SA and are included in Appendix A1 of this DEIR.

The planning and execution of Proposed Project SA articles that involve site preparation and construction activities to be undertaken by DWR would include the adoption of numerous Best Management Practices (BMPs) designed to avoid or mitigate short-term effects typically associated with such activities. The BMPs to be adopted as part of the Proposed Project are presented in Appendix D of this DEIR.

### *3.3.2.1 Impoundments and Power Facilities*

**Power Facilities**

No new facilities designed to increase or enhance power production are planned under the Proposed Project. Existing operations and maintenance activities would continue unless noted below.

**Oroville Dam and River Outlet Structure**

The Howell-Bunger river outlet valves located at the base of Oroville Dam are sometimes used to release water into the Feather River to meet temperature objectives for the hatchery downstream. Section B108 of the SA states that DWR will evaluate the river valves and determine if they should be refurbished or replaced. DWR initiated studies necessary to evaluate river valve refurbishment or replacement after it filed the SA with FERC.

**Interim Operations Prior to Facilities Modifications**

As part of the SA, DWR is evaluating a number of facilities modifications that could be constructed to improve water temperature conditions downstream. Structural modifications, if any, to improve downstream water temperatures would be constructed after Year 10 of the new FERC license. For purposes of analysis in this EIR, the period of time before facilities modification is referred to as the “initial new license period” to distinguish it from the post-facilities modification period. The initial new license period would include non-facilities modifications such as augmentation of minimum flow releases (up to 1,500 cfs or the total releases into the High Flow Channel (HFC), whichever is less), shutter manipulation, or adjustments to pumpback operations to meet temperature targets in the LFC until facilities modifications to provide colder water for coldwater fisheries protection to the LFC and HFC, if any, are constructed. In addition, the river valves may be used to meet hatchery temperature targets. Potential future facilities modifications could include one or more of the actions described below.

**Feasibility of Improving Temperature Conditions through Facilities Modifications**

Under the terms of the SA, a feasibility study will be prepared within 3 years following license issuance to consider potential future facilities modifications to improve water temperature conditions in the LFC and the HFC to protect anadromous fish over the term of the new FERC license in the least costly manner. The SA calls for preparation of a reconnaissance study in advance of the feasibility study. In January 2007 DWR filed a final reconnaissance study with FERC. The intent of the reconnaissance study was to identify measures that could be combined into alternatives that might be expected to achieve the desired water temperature targets. These alternatives would be evaluated in more depth including additional project-specific modeling in the subsequent feasibility study.

The reconnaissance study includes potential actions within the LFC and actions associated with Thermalito Afterbay. Measures described in the reconnaissance study and briefly described below require further evaluation and development into feasible alternatives before specific environmental effects can be analyzed. Upon completion of the feasibility study, a project-specific CEQA analysis would be required for any alternative before construction. Future project-specific analysis, including operations modeling of potential future facility modifications, would tier from this programmatic DEIR.

Palermo Canal Improvements

The Palermo Canal currently draws water from Lake Oroville at approximately 549 feet msl and delivers approximately 50 cfs to the South Feather Power and Water Agency. Improvements would include increasing the volume of water passed through the Palermo Outlet Works to deliver the 50 cfs to the canal and to provide, via a pipeline, approximately 500 cfs to cool Feather River water temperatures at one or more points within the FERC Project boundary. These points could be the Feather River Fish Hatchery, the LFC downstream of Thermalito Diversion Dam, and the HFC near Thermalito Afterbay Outlet.

Hyatt Intake Extension

Currently, the lowest elevation for Hyatt Pumping-Generating Plant intake from Lake Oroville is at 613 feet msl. An extension at the intake structure to approximately 500 feet msl would allow access to an increased volume of cold water for release through the Hyatt Pumping-Generating Plant and downstream into the LFC. The extension would connect to the existing intake structure and existing shutters could continue to be used to mix flow from the deeper intake with flows from the upper water column.

River Valve Improvements

The existing river valves have been used as a low-level outlet works in the event reservoir storage is too low for release through Hyatt Pumping-Generating Plant. While the valves are exercised annually, they are not designed for frequent use as a temperature control device, and they are also limited to 1,500 cfs release for safety considerations. Potential improvements to the river valves could allow for more frequent usage and potentially higher flow release to benefit the Feather River Fish Hatchery and downstream water temperature control.

Canal Around Thermalito Afterbay

A canal would be constructed to route water from the Thermalito Pumping-Generating Plant tailrace directly to the LFC upstream of Thermalito Afterbay Outlet. This reduces residence time for Oroville water releases within Thermalito Afterbay. Reducing residence time in Thermalito Afterbay could reduce water temperatures released into the HFC.

Canal Through Thermalito Afterbay

A system of dikes, channels, and gated structures would be constructed within Thermalito Afterbay to route water more directly from the Thermalito Pumping-Generating Plant tailrace to the existing Thermalito Afterbay Outlet. This reduces the travel time for flows from the Thermalito Pumping-Generating Plant through Thermalito Afterbay to the Feather River, resulting in decreased water temperature releases to the HFC.

Alternate Afterbay Outlet and Channel

An alternate outlet and channel would be constructed to deliver water 4–8 miles downstream of the existing Thermalito Afterbay Outlet. It would work in concert with the existing outlet to provide additional temperature benefits for that portion of the HFC between the existing outlet and the alternate outlet. Minimum flow requirements for the HFC would be maintained through releases from the existing Thermalito Afterbay Outlet, while the remaining flows returning to the Feather River (up to 4,000 cfs) would be redirected for release at the new outlet. Releases in excess of 4,000 cfs would continue to be made through the existing Thermalito Afterbay Outlet.

Thermalito Afterbay Temperature Curtain

This measure would employ a temperature curtain installed within Thermalito Afterbay near the western and southern embankment. The intent of this option is to cause water released for irrigation to travel through the entire length of Thermalito Afterbay, by redirecting the flows, thereby increasing residence time and thus likely increasing water temperatures, before release through the irrigation diversion outlets.

#### *3.3.2.2 Coordinated Operations*

The Proposed Project does not include any changes to the general reservoir operations, scheduling, or power transactions. No changes are proposed to water supply deliveries or contracts and, as the keystone storage component of the larger SWP, the Proposed Project would not affect future water deliveries to the SWP water contractors.

**Flood Management (SA Article A130, A131 and Section B103)**

The Proposed Project provides for the continued operation of the Oroville Facilities in accordance with the rules and regulations prescribed by the Secretary of the Army pursuant to Section 204 of the Flood Control Act of 1958 and other applicable law (SA Article A130).

Under the Proposed Project, within 1 year of license issuance DWR would develop and file for FERC approval an Early Warning Plan, describing how DWR would communicate and coordinate project operations with USACE, the U.S. Bureau of Reclamation, the California Office of Emergency Services, and the Butte County Office of Emergency Services before and during flood emergency events (SA Article A131).

DWR would also evaluate and potentially implement additional stage and/or precipitation gaging locations to improve flood forecasting and monitoring (SA Section B103).

#### *3.3.2.3 Environmental Facilities and Operations*

Environmental measures included in the Proposed Project are designed to address ongoing effects of project operations over the term of the new FERC license. The Proposed Project includes measures contained within the draft BAs (terrestrial and fishery) and Final Terrestrial BO prepared in consultation with USFWS and NMFS, respectively, as well as final terms and conditions provided by USFS in accordance with Section 4(e) and recommendations in accordance with Section 10(a) of the Federal Power Act. In general, the Proposed Project includes the development and implementation of numerous environmental plans and programs to improve fish spawning and rearing habitat to complement federal Endangered Species Act (FESA) anadromous fish species recovery programs, support the Feather River Fish Hatchery, provide additional habitat for waterfowl, provide protection for terrestrial FESA and California Endangered Species Act (CESA) species, monitor water quality in project waters, improve habitat for warmwater fish species and improve the coldwater fishery in Lake Oroville, and provide various improvements in management direction for the OWA.

The environmental programs, plans, and specific actions included in the Proposed Project are described below. Additional specific information related to each of the proposed programs and plans is included in the SA, provided as Appendix A.

**Ecological Committee (SA Article A100)**

Under the Proposed Project and within 3 months of FERC license issuance, DWR would establish and convene an Ecological Committee (EC) to advise it on ecological issues related to the implementation of specific elements of the new project license. Membership would be composed of signatories to the SA who represent relevant federal and State regulatory agencies (such as NMFS, USFWS, BLM, DFG, and DPR), local governmental entities, Native American tribes, and other interested signatories to the SA (such as SWC and American Rivers). The SWRCB and the Central Valley Regional Water Quality Control Board (RWQCB) are also included in the membership even though they are not signatories to the SA. Specific information related to EC membership, organization, and scope of the EC is included as Appendix C of the SA.

**Feather River Fish Hatchery Improvement Program (SA Article A107)**

A proposed Feather River Fish Hatchery Improvement Program would include a Feather River Fish Hatchery Production Program, measures related to meeting Feather River Fish Hatchery temperature requirements, a Feather River Fish Hatchery Management Program, provisions for a hatchery disinfectant system, and approaches to facility assessment for operations and maintenance.

Feather River Fish Hatchery Production Program

Under the Proposed Project, DWR would ensure the continued operation of the Feather River Fish Hatchery, in cooperation with DFG, for the production of anadromous salmonids.

Feather River Fish Hatchery Temperature

The Proposed Project requires that DWR operate to meet new temperature targets at the Feather River Fish Hatchery. The new targets will become requirements upon facilities modifications outlined in SA Article A108, but no later than Year 10 after new FERC License acceptance.

Feather River Fish Hatchery Management Program

Under the Proposed Project, DWR would prepare a comprehensive Feather River Fish Hatchery Management Plan within 2 years of license issuance. The plan would include production goals for the Feather River Fish Hatchery and the protocols that would be utilized to meet these goals. Hatchery and Genetics Management plans would be included for each anadromous fish species managed by the hatchery to identify the effects of the hatchery program on FESA–listed salmonids, and to identify methods to reduce negative impacts on FESA-listed salmonids. A full description of the hatchery operations and issues would be provided including egg taking, hatching, rearing, tagging, straying, and release methods and locations. Diseases of concern at the Feather River Fish Hatchery would be identified and disease management procedures and activities employed at the hatchery would be described. The plan would include a methodology to study Feather River Fish Hatchery management effects on salmonids, and the interaction between in-river and hatchery-produced salmonids. The plan would also include a procedure for coordinating the Feather River Fish Hatchery operations with those of other Central Valley salmonid hatcheries. Annual summary reports would be prepared, and a comprehensive report of the Feather River Fish Hatchery Management Program would be prepared every 5 years for public and EC review.

Feather River Fish Hatchery Water Disinfection System

In the event that anadromous salmonids are passed upstream of the Feather River Fish Hatchery, the Proposed Project would also include the installation of a water disinfection system for the Feather River Fish Hatchery water supply before such passage.

Feather River Fish Hatchery Annual Operations and Maintenance

The Proposed Project requires DWR to provide the operational and maintenance funding to support the Feather River Fish Hatchery programs described above. This would include a comprehensive inspection of the Feather River Fish Hatchery facilities at least once every 5 years to identify maintenance and repair needs, as well as possible facility improvements. The inspection reports would be a component of the Lower Feather River Habitat Improvement Plan.

**Habitat Expansion Agreement and A109 Reservation of Section 18 Authority**

A subset of the SA parties, including NMFS, USFWS, and DFG, and Pacific Gas and Electric Company (PG&E) separately negotiated a draft HEA to address blockage of upstream passage by anadromous fish caused by several dams on the Feather River, including Oroville Dam. These SA parties and PG&E have reached an agreement in principle on habitat expansion, which may include off-site habitat enhancement. A draft of the agreement is attached to the SA as Appendix F. NMFS and USFWS have reserved their authority to prescribe fishways pursuant to Section 18 of the Federal Power Act, during the term of the new FERC license. As provided in the HEA, NMFS and USFWS may include in their reservation of authority the ability to modify that reservation, before or after FERC license issuance, and may submit fishway prescriptions, in the event that the HEA and the underlying agreement between DWR and PG&E are not executed or DWR and PG&E fail to perform.

The specific goal of the agreement is to expand habitat sufficiently to accommodate an estimated net increase of 2,000 to 3,000 spring-run Chinook salmon for spawning (habitat expansion threshold).

Within 2 years of signing the HEA, DWR and PG&E would, in consultation with NMFS, USFWS, the State Water Resources Control Board (SWRCB), USFS, and DFG, complete identification, evaluation, and selection of habitat expansion action(s) using the Evaluation Criteria and Selection Criteria listed in the agreement. Potential habitat actions would occur in the Sacramento River basin and may include, but are not limited to dam removal, dam re-operation, flow and water temperature improvements, fish passage, and physical habitat improvements.

**Instream Flow and Temperature Improvement for Anadromous Fish (SA Article A108)**

The Proposed Project establishes a new minimum flow of 700 cfs in the LFC during most of the year, increasing to a minimum flow of 800 cfs during the Chinook salmon spawning season from September 9 through March 31 unless NMFS, USFWS, DFG, and SWRCB provide a written notice that a lower flow (between 700 and 800 cfs) substantially meets the needs of anadromous fish. The volume of increased flows was determined from results of negotiations based on instream flow investigations (SP-F16, Phase 2) and spawning habitat utilization studies (SP-F10, Tasks 2B and 2C) conducted by DWR during the ALP. During the initial new license period the Proposed Project would operate the Oroville Facilities to achieve new water temperature objectives for the LFC as measured at Robinson Riffle (River Mile 61.6) as indicated on Table 1 of SA Article A108. The proposed water temperature objectives in Table 2 of SA Article A108, measured at the southern FERC Project boundary (River Mile 53.9), would be evaluated and new temperature targets would be established after potential future project modifications to improve water temperatures in both the LFC and the HFC have been constructed and tested.

HFC minimum flows would remain the same as the existing license and consistent with the 1983 DWR and DFG Operating Agreement. Oroville Facilities ramping rates would also remain consistent with the 1983 DWR and DFG Operating Agreement.

As described earlier in Section 3.3.2.1, DWR would study options for potential future facilities modifications to achieve temperatures consistent with the SA. Under the Proposed Project, DWR would complete a Feasibility Study and Implementation Plan to protect and improve temperature conditions for spawning, egg incubation, rearing, and holding habitat for anadromous fish in the LFC and the HFC. The plan would recommend a specific alternative for implementation and would be prepared in consultation with the resource agencies. The SA describes a 5-year test of facilities modifications after construction to determine resulting downstream water temperature improvements and to establish the final HFC temperature targets.

The SA also describes specific actions that would be taken to manage the coldwater pool to minimize exceedances of Table 1 temperature targets, consistent with water supply and other legal obligations, during conference years. A Conference Year is defined as any year in which the Oroville Temperature Management Index (OTMI) is equal or less than 1.35 million acre-feet. An explanation of how the OTMI is calculated and how Conference Year flows would be addressed under the Proposed Project is included in SA Article A108.6.

Additional details on flow and temperature measures in support of anadromous fish are included in SA Article A108.

**Lower Feather River Habitat Improvement Plan (SA Article A101)**

The Lower Feather River Habitat Improvement Plan consists of nine components that would improve the lower Feather River habitat for Chinook salmon and steelhead. The overall strategy is to coordinate various habitat improvement activities to maximize benefits to fish and wildlife species and to assess and correct potential predation problems created or exacerbated by any DWR-sponsored or implemented project modifications. For the first 5 years, DWR would annually report monitoring results and activities to the EC; after the fifth year of the new FERC license, DWR would consolidate the reports into a single, comprehensive monitoring and adaptive management summary report to be prepared every 5 years for the remainder of the FERC license term. The summary report would include the results of each of the various components of the Lower Feather River Habitat Improvement Plan and would provide a summary of actions taken, management decisions, and proposed modifications to the various program components.

**Gravel Supplementation and Improvement Program (SA Article A102 and B105)**

The Gravel Supplementation and Improvement Program is designed to address the current spawning habitat in the lower Feather River due to the blockage by Oroville Dam of suitable spawning gravel movement from upstream sources into the LFC.

Because sediments, including gravels, will continue to be trapped behind Oroville Dam, DWR would develop a Gravel Supplementation and Improvement Program to mitigate the cumulative impacts of the project on the quantity and quality of spawning gravels available for Chinook salmon and steelhead.

DWR would immediately initiate the planning, development, and implementation of a program to supplement up to 15 locations in the lower Feather River with at least 8,300 cubic yards of spawning gravels suitable for spring-run Chinook salmon and steelhead. This initial gravel supplementation would be completed within 5 years following FERC license issuance.

Gravel Management Plan

Within 2 years of license issuance, DWR would also develop a Gravel Management Plan to address ongoing and future gravel management for the lower Feather River. The Gravel Management Plan would provide for:

- A physical assessment of the spawning riffles from River Mile 54.2 (downstream FERC Project Boundary) to River Mile 67.2 of the Feather River (Fish Barrier Dam);
- A gravel budget for the LFC and, if necessary, portions of the HFC within the FERC Project boundary;
- A strategy to augment existing gravel recruitment in the LFC and HFC with gravel injections, placements, or other methods developed through site-specific investigations;
- Plans to monitor and evaluate the effectiveness of gravel augmentation and biological response of fish species;
- Annual summary of activities;
- Definition of high-flow events; and
- Coordination with other components of the Lower Feather River Habitat Improvement Program.

Specific measures, criteria, and timelines are included in SA Article A102.

**Channel Improvement Program (SA Article A103)**

The Channel Improvement Program includes habitat improvement measures to increase the quality and complexity of salmonid spawning and rearing habitat in two existing side channels (Moe's Ditch and Hatchery Ditch). Additionally, the Proposed Project includes development of 5 additional side channel riffle/glide complexes over a 5-year period, which would provide a minimum of 2,460 feet in length of new spawning and rearing habitat for Chinook salmon and steelhead. The EC and agencies would be

instrumental in recommending the locations and habitat components of the five additional projects. All side channels created would be adjacent to existing riffle complexes and would, as feasible, approximate historic habitat with respect to base flow ranges and other environmental conditions. Side channel flows would probably range between 10 and 75 cfs and should be designed to provide appropriate depth, velocity, substrate, and in-stream and riparian cover. The Channel Improvement Program would include monitoring of use by target species and annual reports describing the monitoring and implementation of Program activities would be submitted to the EC for review.

**Structural Habitat Supplementation and Improvement Program (SA Article A104)**

The Oroville Facilities currently block the upstream contribution of large woody debris (LWD) in the lower Feather River, contributing to the reduction in structural habitat and habitat complexity. The Structural Habitat Supplementation and Improvement Program is designed to address the need to provide habitat complexity in the lower Feather River, particularly in the LFC. The primary target for these actions would be steelhead and spring-run Chinook salmon juveniles. The Proposed Project would create additional cover, edge, and channel complexity through the addition of LWD, boulders, and other native objects. LWD includes multi-branched trees at least 12 inches in diameter at chest height and a minimum of 10 feet in length with approximately 50 percent of the structures containing intact root wads. Placement would be within the Feather River to maximize the instream benefit at lowest minimum flow. Safety issues will be addressed to minimize risk to human safety.

Structural Habitat Supplementation and Improvement Plan

The Proposed Project includes development of a Structural Habitat Supplementation and Improvement Program Plan in consultation with the EC. The Plan would include an analysis of safety issues to avoid unreasonable risk to safety of river users. Annual summary reports describing monitoring and implementation of Plan activities would be prepared by DWR for EC review and would be part of the 5-year Lower Feather River Habitat Improvement Plan Report.

**Fish Weir Program (SA Article A105)**

The presence of Oroville Dam and other upper Feather River dams and associated facilities block passage of migratory fishes and cause spring-run and fall-run Chinook salmon to share spawning habitat in the lower Feather River. The reduced amount of spawning habitat available in the lower river results in an increased rate of redd superimposition (subsequent spawning on top of an existing redd) that causes increased rates of egg and alevin mortality. The Proposed Project includes a Fish Weir Program whereby two fish barrier weirs would be installed in phases; the first-phase weir would be used to determine the abundance of phenotypic spring-run and steelhead in the LFC, after which a second weir would be installed that would spatially separate

spring-run and fall-run in the LFC to create a dedicated spawning area to protect the spring-run Chinook salmon.

Phase 1 of the Fish Weir Program includes monitoring and data collection over a period of time sufficient to allow for the collection of adequate baseline information on the migration timing and abundance of Chinook salmon and steelhead adults in the LFC necessary to develop the Phase 2 segregation weir plan. The location selected for the implementation of the second-phase fish segregation weir would be designed to isolate and dedicate an amount of spawning habitat adequate to meet the spring-run Chinook salmon population quantified in Phase 1. Phase 2 would also evaluate the installation of an egg-taking station, if appropriate, to collect fall-run Chinook salmon eggs for transport to the Feather River Fish Hatchery. DWR would compile annual reports into the 5-year Lower Feather River Habitat Improvement Plan Report.

**Riparian and Floodplain Improvement Program (SA Article A106)**

Under the Proposed Project, DWR would investigate and implement projects to improve riparian habitat and habitat for associated terrestrial and aquatic species and connect portions of the Feather River to its floodplain within the OWA. The Riparian and Floodplain Improvement Program would be implemented in four phases by DWR in consultation with the EC and resource agencies. Phase 1 consists of a screening level analysis of potential projects and identification of the recommended alternative. In the screening level analysis, higher priority would be given to those projects that maximize benefits for all species and habitats, including restoring riparian vegetation and the riparian corridor, restoring habitat for terrestrial species, reconnecting the river to its floodplain, and restoring and enhancing riparian and channel habitat for fish and other aquatic species. Phase 2 consists of implementing the Phase 1 recommended alternative. Phase 3 would reevaluate other potential feasible projects including those considered under Phase 1 and identify a Phase 3 alternative. Phase 4 consists of implementing the Phase 3 alternative. The full scope of the recommended alternative as well as design, project level environmental documentation for any physical changes proposed, permitting, and construction, is dependent on the gravel value and potential extraction processes that will define the timing and magnitude of the Program.

**Lake Oroville Warm Water Fishery Habitat Improvement Program (SA Article A110)**

Under the Proposed Project, DWR would develop a Lake Oroville Warm Water Fishery Habitat Improvement Program. This program would be similar to the existing program designed to improve the warmwater fish habitat in Lake Oroville that supports warmwater game fish such as black bass and channel catfish. The Lake Oroville Warm Water Fishery Habitat Improvement Program would increase and/or improve the structural complexity of the Lake Oroville fluctuation zone, which provides benefits to warmwater fish that use these areas for spawning and rearing, by constructing habitat with materials such as boulders, weighted pipes, riprap, vegetation and woody material, and artificial structures designed for fish habitat.

The program would be implemented over the license term in 7-year intervals. Within each 7-year interval, DWR would construct, on average, at least 15 “habitat units” during each of the 7 years. A “habitat unit” refers to a quantifiable measure of fish habitat and may include placement of brush shelters, flood-tolerant trees and annual grasses, and channel catfish spawning structures. An evaluation of site-specific conditions such as slope, soil type, exposure, access, and other factors would determine the specific placement and type of structure.

Brush shelters are common black bass spawning areas and would typically be constructed using various materials including discarded Christmas trees, trees/brush cut from the upland areas near Lake Oroville, and artificial habitat structures made of plastic. These materials would be anchored to the lakebed using steel fence posts, concrete blocks, or other suitable materials and would be typically installed in clusters in the back of coves with shallow sloping banks.

Flood-tolerant trees such as willow and buttonbush would be planted in the fluctuation zone in the 850- to 890-foot msl elevation range. These trees can survive periodic inundation as well as dry conditions found in the fluctuation zone, and once established, would provide large amounts of structural complexity over a long period of time. Annual grasses that germinate in the fall and grow during the winter could also be planted to provide microcover for juvenile fish.

Channel catfish spawning structures would primarily involve the placement of 3- to 4-foot sections of 9- to 18-inch diameter concrete and PVC pipe. Rock rubble and other materials that create similar cavities may also be used and would be placed in the same areas identified for brush shelters.

Within the first year of each 7-year interval, DWR would prepare a plan for the habitat improvement projects to be completed during that interval and present it to the EC for comments and recommendations. Success of these projects would be evaluated through monitoring and fish utilization assessments. Habitat units would be assessed for their durability, longevity, cost-effectiveness, and fish use monitored through snorkel surveys, electrofishing, creel surveys, or other suitable methods. Informational reports of the monitoring results would be provided to FERC every 2 years summarizing the habitat units completed over that time period, except during the final year of each 7-year period when a summary report for the entire 7-year period would be submitted to FERC. These reports would be provided to the EC for review and comment before submission to FERC.

**Lake Oroville Cold Water Fishery Improvement Program (SA Article A111)**

Under the Proposed Project, DWR would develop and implement a Lake Oroville Cold Water Fishery Improvement Program, similar to the existing fish stocking program designed to support a coldwater sport fishery at a level that is desirable to Lake Oroville anglers. Through the Lake Oroville Cold Water Fishery Improvement Program, DWR

would stock coldwater fish in Lake Oroville to improve the sport fishery, which should increase recreational opportunities and tourism at the reservoir.

Coldwater Fisheries Management Plan for Lake Oroville

Within 1 year of license issuance, DWR would develop a Coldwater Fisheries Management Plan for Lake Oroville in consultation with the EC. The plan would provide for the stocking, management, and monitoring of salmonids at approximately the same level of stocking as under the existing FERC license, which is 170,000 (+/- 10 percent) yearlings (or their equivalent) per year. The plan would focus on the first 10 years of coldwater fish stocking, and would be revised every 10 years thereafter. DWR would submit a monitoring report to the EC for review and recommendations every 2 years, before filing the report with FERC.

**Oroville Wildlife Area Operations (SA Articles A115, A116, and Sections B106 and B107)**

The OWA is currently managed pursuant to the Oroville Wildlife Area Management Plan prepared in 1978. Under the Proposed Project, within 2 years of license issuance, DWR in coordination with DFG, DPR, and USFWS, and in consultation with the EC, would develop and submit to FERC for approval an Oroville Wildlife Area Management Plan, including Thermalito Afterbay.

Oroville Wildlife Area Management Plan (SA Article A115)

The Oroville Wildlife Area Management Plan would include 11 components designed to comply with conservation measures contained within the Draft Terrestrial BA, minimize current and future conflicts between wildlife and recreation, meet wildlife management goals and objectives, identify agency management and funding responsibilities, manage invasive plants, and utilize best management practices including fuel load management to reduce fire risk to surrounding areas.

The Oroville Wildlife Area Management Plan would be reviewed every 5 years after initial implementation. The Recreation Advisory Committee would have an opportunity to provide input, consistent with recreation measures within the OWA outlined in the Recreation Management Plan.

As part of the SA, DFG agreed to use its best efforts to obtain adequate funding to develop the Oroville Wildlife Management Plan as described (SA Section B106). Additionally, there is currently a speed limit regulation of 5 mph on all of Thermalito Afterbay, but this regulation is rarely enforced. DFG agreed to make a recommendation to the California Fish and Game Commission to rescind the speed limit for that portion of Thermalito Afterbay south of SR 162 (SA Section B107).

Oroville Wildlife Area Access (SA Article A116). The Proposed Project includes reasonable access for hunting and fishing in the OWA, except where such access poses safety, security, operational risks, or adverse environmental impacts, and subject

to applicable State and federal hunting and fishing regulations and other reasonable conditions.

**Draft Terrestrial Biological Assessment Actions (SA Articles A117–A121)**

Protection of Vernal Pools (SA Article A117)

As part of the Proposed Project, DWR would continue conservation measures required by USFWS contained within the Draft BA to protect vernal pool invertebrate habitat within the FERC Project boundary. DWR implemented the following actions after informal consultation with USFWS and studies conducted during the ALP identified off-road vehicle damage to vernal pool habitats capable of supporting federally listed invertebrates and plants. DWR's responsibilities in the Final BO issued by USFWS would include continuation of the following actions:

- The installation and maintenance of signage in coordination with DPR and DFG;
- Inspection and prompt maintenance of vehicular barriers (primarily existing fences) in coordination with DPR and DFG; and
- Continuation of existing patrol and enforcement of vehicular closures in coordination with DPR and DFG.

If the conservation measures implemented are deemed to be unsuccessful in protection of the species within the FERC Project boundary, DWR would coordinate with USFWS to develop and possibly implement additional or alternative conservation measures to protect the species.

Minimization of Disturbances to Nesting Bald Eagles (SA Article A118)

As part of the Proposed Project, DWR would continue conservation measures required by USFWS contained within the Draft BA for any bald eagle management plans, which would be filed with FERC for approval. Several bald eagle nest territories exist within the FERC Project boundary and nest territory management plans would be developed through the informal consultation process to minimize or avoid recreational impacts on nesting bald eagles. These plans are site-specific and would evaluate factors related to type, frequency, location, timing, duration, and magnitude of potential recreation disturbance. Site-specific conservation measures would be developed that identify allowable activities within primary and secondary zones. These conservation measures would be designed to minimize or avoid recreational disturbance displacement and may include seasonal closure of existing facilities, relocation of recreational facilities, shoreline closures, and habitat protection measures.

Protection of Giant Garter Snake (SA Article A119)

As part of the Proposed Project, DWR would continue conservation measures required by USFWS contained within the Draft BA to protect giant garter snakes within the FERC

Project boundary. DWR's responsibilities in the Final BO issued by USFWS would include:

- Notification and consultation with USFWS before initiating any activities in certain areas of the OWA that would significantly affect the quality or extent of the high-value giant garter snake habitat;
- Minimization of activities that disturb, destroy, fragment, or otherwise modify habitat within 200 feet of giant garter snake wetland habitat;
- Avoidance of certain rodent control activities in designated giant garter snake wetlands habitat;
- Restriction on methodologies for nonnative or noxious weed removal;
- Development and implementation of a public education program; and
- Restriction of dog-training field exercises in the Thermalito Afterbay area.

If the conservation measures implemented were deemed to be unsuccessful in protection of the species within the FERC Project boundary, DWR would coordinate with USFWS to develop and possibly implement additional or alternative conservation measures to protect the species.

Protection of Valley Elderberry Longhorn Beetle (SA Article A120)

As part of the Proposed Project, DWR would implement conservation measures contained in the Draft BA to protect the valley elderberry longhorn beetle within the FERC Project boundary. It is anticipated that DWR's responsibilities in the Final BO issued by USFWS would include such measures as maintaining the same amount and quality of beetle habitat that now exists within the FERC Project boundary, based on DWR's 2004 habitat mapping, and BMPs and other protective measures to ensure that elderberry plants are not inadvertently treated with herbicides or otherwise harmed during nonnative and noxious plant control activities. If the conservation measures implemented were deemed to be unsuccessful in protection of the species within the FERC Project boundary, DWR would coordinate with USFWS to develop and possibly implement additional or alternative conservation measures to protect the species.

Protection of Red-Legged Frog (SA Article A121)

As part of the Proposed Project, DWR would implement conservation measures contained in the Draft BA to protect the red-legged frog within the FERC Project boundary. DWR, in coordination with USFWS, would annually evaluate and report on the effectiveness of the conservation measures to FERC for information purposes. If the conservation measures implemented were deemed to be unsuccessful in protection of the species within the FERC Project boundary, DWR would coordinate with USFWS to develop and possibly implement additional or alternative conservation measures to protect the species.

**Construction and Recharge of Brood Ponds (SA Article A122)**

The Proposed Project includes the construction of four waterfowl brood ponds within Thermalito Afterbay. DWR would develop a plan in conjunction with DFG and in consultation with the EC to be submitted to FERC for approval. The plan would include the construction of 4 waterfowl brood ponds within the first 20 years following license acceptance. The ponds would be constructed by creating a small earthen berm across an inlet in Thermalito Afterbay. As part of the plan, DWR would maintain adequate water surface elevations within the existing and future brood ponds by sufficiently filling the ponds no later than April 15 of each year and by ensuring that once filled, the water surface level of the ponds does not fluctuate more than 1 foot throughout the waterfowl brooding season of April 15 through July 31. DWR would recharge waterfowl brood ponds every 3 weeks during this time period. DWR would recharge the brood ponds at least monthly for the giant garter snake between April 1 and October 31 each year.

**Provision of Upland Food for Nesting Waterfowl (SA Article A123)**

The Proposed Project includes a total of 60–70 acres of upland/cover/forage crops to be prepared and planted on an annual basis to support upland game birds and wintering waterfowl within the Thermalito Afterbay portion of the OWA on a rotational basis. The DFG habitat improvement practice of planting and fertilizing wildlife forage crops in upland areas around Thermalito Afterbay for upland game species, migratory and resident waterfowl would be continued. DWR would continue the DFG practice of dry land farming rather than irrigated farming to produce forage crops.

**Provision of Nest Cover for Upland Waterfowl (SA Article A124)**

As part of the Proposed Project, DWR would actively manage 240 acres of waterfowl nest cover, including preparing and planting 60 acres and fertilizing an additional 180 acres annually within the Thermalito Afterbay portion of the OWA on a rotational basis. DWR would continue the DFG practice of dry land farming rather than irrigated farming to produce cover crops.

**Installation of Wildlife Nesting Boxes (SA Article A125)**

The Proposed Project includes the installation and maintenance of 100 wildlife-nesting boxes in suitable habitat within the project area to improve wood duck production.

**Comprehensive Water Quality Monitoring Program (SA Article A112)**

The Proposed Project includes development of a Comprehensive Water Quality Monitoring Program intended to expand the existing program for data collection to document water quality conditions in project-affected waters, including contributions from upstream sources, limnologic changes occurring within the project impoundments, pathogen levels at recreation sites, effects of project operations on the Feather River thermal regime, and long-term effects of the project on water quality from present and future operations.

Within 6 months following FERC license issuance, DWR, in consultation with the EC, SWRCB, Central Valley RWQCB, and Butte County Health Department, would begin preparation of a draft initial Water Quality Monitoring Program designed to track potential changes to water quality associated with the project, and to collect data necessary to develop a water quality trend assessment through the life of the new FERC license. The draft initial Water Quality Monitoring Program would focus on the identification of those organic and inorganic constituent and physical parameter levels that may affect beneficial uses for surface waters. Following the consultation and within 9 months of FERC license issuance, DWR would submit the draft initial Water Quality Monitoring Program to the SWRCB for review and approval. Upon approval from the Chief of the Division of Water Rights, SWRCB, DWR would file the program with FERC for approval. Upon FERC approval, DWR would implement the initial Water Quality Monitoring Program, including any changes required by FERC. In each of the first 5 years of the initial program, DWR would collect, analyze, and compile the water quality data into annual reports that would be provided to the EC and Butte County Health Department.

Following completion of all data collected for year 5, DWR would compile a summary report of the initial program, which would be provided to FERC, the EC, Butte County Health Department, and any other entity upon request. A 45-day notice would accompany the report, inviting all recipients to attend a water quality meeting scheduled by DWR to discuss the findings of the 5-year data set. After consultation, DWR would submit recommendations for a final Comprehensive Water Quality Monitoring Program to the SWRCB for review and approval. Upon approval from the Chief of the Division of Water Rights, SWRCB, DWR would file the final Comprehensive Water Quality Monitoring Program with FERC for approval. Upon FERC approval, DWR would implement the final Comprehensive Water Quality Monitoring Program, including any changes required by FERC.

Water Chemistry Monitoring Plan

Within 6 months of FERC approval of the final Comprehensive Water Quality Monitoring Program, DWR would begin implementation of the Water Chemistry Monitoring Plan component of the program including monitoring at 15–20 locations 4 times (seasonally) each year for in-situ physical parameters such as water temperature, dissolved oxygen, pH, specific conductivity, and turbidity. Monitoring at 15–20 sites twice per year would evaluate nutrients, such as nitrate plus nitrite, ammonia, organic nitrogen, dissolved orthophosphate, and total phosphorus, as well as minerals including calcium, sodium, potassium, magnesium, sulfate, chloride, boron, and alkalinity. DWR would monitor 18–22 locations 4 times (seasonally) each year for metals including aluminum, arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, selenium, silver, zinc, and mercury. Locations for metal sampling would include developed marinas and other sites within Lake Oroville, the Diversion Pool, Thermalito Forebay, Thermalito Afterbay, the LFC, Mile Long Pond, and the Feather River at the southern FERC Project boundary. DWR would also monitor two locations two times a year for phytoplankton and zooplankton as part of the water quality assessment in Lake Oroville and Thermalito Afterbay.

Fish Tissue Bioaccumulation Monitoring Plan

Within 3 years of FERC approval of the final Comprehensive Water Quality Monitoring Program, DWR would begin implementation of the Fish Tissue Bioaccumulation Monitoring Plan. DWR would collect resident fish species from 7 locations within project waters once every 5 years and analyze tissue for metals and organic compounds. The sampling strategy for target species, sampling locations, and analytical methods would be consistent with SWRCB's Surface Water Ambient Monitoring Program needs and would be determined through consultation with SWRCB, the Office of Environmental Health Hazard Assessment (OEHHA), Central Valley RWQCB, USFWS, NMFS, DFG, and the EC before each sampling year. Constituents to be analyzed include metals and organic compounds.

Recreation Site Water Quality Monitoring Plan

Within 6 months of FERC approval of the final Comprehensive Water Quality Monitoring Program, DWR would begin implementation of the Recreation Site Water Quality Monitoring Plan. DWR would conduct bacteriological monitoring at 12–16 locations within project waters each summer season consistent with the Basin Plan objectives for protection of beneficial uses. Potential sampling locations include developed beach areas, marinas, boat launch locations, and high-use dispersed beach and shoreline locations in all waters affected by project operations. The list of bacteriological sampling locations would always include North Forebay Cove and South Forebay Swim Area, in addition to sampling at 10–14 annually rotating stations. Additionally, at the North Forebay Beach area, individual screening samples would be collected four times (seasonally) throughout the year. Analysis for pathogens would include total coliform, fecal coliform, E. coli, and enterococcus, or other representative bacterial species consistent with any future amendment to the Basin Plan objectives.

DWR would also monitor six locations—Bidwell Marina, Lime Saddle Marina, Foreman Creek Boat-in Campground, Spillway BR/DUA, Oroville Dam, and Monument Hill—for petroleum products in project waters. Monitoring would occur once each month from June through September and once after the first three significant storm events. Field sampling methods would include collection of both surface and bottom samples at each location and would be analyzed for total petroleum hydrocarbons, methyl tertiary butyl ether (MTBE), and benzene.

The Proposed Project includes an annual inspection by DWR of trails between May 1 and May 15 and following summer recreation season to identify soil erosion and potential subsidence into reservoirs or flowing waterways associated with the project.

Water Temperature Monitoring Plan

Within 3 months of FERC approval of the final Comprehensive Water Quality Monitoring Program, DWR would begin implementation of the Water Temperature Monitoring Plan to provide information that demonstrates compliance with the Feather River Fish

Hatchery water temperature requirements, the Operations Criteria and Plan Biological Opinion and Basin Plan water quality standards. DWR would install four permanent continuous temperature-monitoring devices at the following locations:

- Feather River Fish Hatchery aeration tower;
- Robinson Riffle;
- Thermalito Afterbay Outlet; and
- The Feather River adjacent to the southernmost FERC Project boundary.

These monitoring devices would be capable of providing real-time temperature data to the Feather River Fish Hatchery operators and to the public via an Internet-based medium and would remain operational throughout the life of the license.

The Water Temperature Monitoring Plan would be reviewed after 5 years to determine whether modifications to the Comprehensive Water Quality Monitoring Program are necessary for consistency with measures that may be implemented following decisions on water temperature management in the LFC and the HFC. DWR would also install and collect temperature data from temporary continuous recording devices at appropriate locations to provide additional data necessary for modeling or study associated with potential facility modifications under consideration during the Flow/Temperature Reconnaissance Study and subsequent Feasibility Study.

Water Quality Bioassay Monitoring Plan

Within 3 months of FERC approval of the final Comprehensive Water Quality Monitoring Program, DWR would begin implementation of the Water Quality Bioassay Monitoring Plan. DWR would collect water column samples from 2 locations in the LFC 4 times (seasonally) in a single year, every 5 years to conduct bioassay tests on aquatic organisms. Field sampling and laboratory analysis would be consistent with methods recognized by the SWRCB's Ambient Monitoring Program and would include the aquatic organisms Ceriodaphnia and Fathead minnow.

Aquatic Macroinvertebrate Monitoring Plan

Within 1 year of FERC approval of the final Comprehensive Water Quality Monitoring Program, DWR would begin implementation of the Aquatic Macroinvertebrate Monitoring Plan. DWR would collect benthic macroinvertebrate samples from a minimum of 7 stream locations during the fall index period one time every 3 years. Field sampling, laboratory identification, and statistical analysis would be consistent with the California Stream Bioassessment Procedures used by DFG or subsequent methodologies acceptable to the SWRCB's Ambient Monitoring Program and DFG. A minimum of four sites would be located in the LFC and one site would be located in the HFC at the southernmost FERC Project boundary. After construction of side channel habitat as part of the Lower Feather River Habitat Improvement Program, sampling

sites representative of each channel would be added to the Aquatic Macroinvertebrate Monitoring Plan.

**Monitoring of Bacteria Levels and Public Education (SA Article A113)**

Under the Proposed Project, DWR in coordination with other agencies would perform monitoring for fecal coliform, enterococcus bacteria, and other bacterial indicators as required by the Basin Plan from June 1 through September 30 at developed and popular undeveloped swim areas within the FERC Project boundary and, upon input from appropriate agencies, place notices notifying the public if unsafe levels of bacteria are present in the water. Locations to be included in the monitoring are the North Thermalito Forebay recreation area, South Thermalito Forebay recreation area, Loafer Creek recreation area, Monument Hill recreation area, Lime Saddle recreation area, Foreman Creek boat launch area, Stringtown boat launch area, and Mile Long Pond. Monitoring would be performed as required in the applicable Basin Plan and monitoring information would be shared with the Recreation Advisory Committee (RAC). DWR would promptly provide monitoring information to appropriate public agencies and confer with them on additional measures that may be necessary to inform and educate the public about bacteria levels in project waters. In addition, DWR, in consultation with the relevant public health agencies and the SWRCB and Central Valley RWQCB, would determine if a public education program designed to inform the public about potential sources of bacteria in the water is necessary.

**Public Education Regarding Risks of Fish Consumption (SA Article A114)**

Under the Proposed Project, DWR, in consultation with OEHHA, the SWRCB, and the Central Valley RWQCB, would post notices at all boat ramps and other locations within the FERC Project boundary notifying the public about health issues associated with consuming fish taken from within project waters. DWR would also provide funding to OEHHA to facilitate the publishing of written materials notifying the public about health issues associated with consuming fish taken from within project waters.

**Invasive Plant Management (SA Article A126)**

As part of the Proposed Project, within 1 year of license issuance DWR would develop a plan to manage and reduce target noxious nonnative and native plant species populations within the FERC Project boundary and on or affecting National Forest System (NFS) lands that would be submitted to FERC for approval. The management plan would be developed in conjunction with USFS, BLM, DFG, and DPR. Before submittal to FERC, DWR would submit the portion of the plan pertaining to NFS lands to USFS for approval; submit the portion of the plan pertaining to BLM lands to BLM for approval; submit the portion of the plan pertaining to DFG lands to DFG for approval; and submit the portion of the plan pertaining to DPR lands to DPR for approval. The EC would have the opportunity to provide input and comment on the plan. The plan would identify specific species, areas, acreages, and treatment methods and would include a monitoring program that would include surveys to inventory and map target weed

species and assess the effectiveness of control methods. The plan would specifically address but not be limited to the following species:

- Purple loosestrife (*Lythrum salicaria*)
- Giant reed (*Arundo donax*)
- Tree of heaven (*Ailanthus altissima*)
- Scarlet wisteria (*Sesbania punicea*)
- Parrot feather (*Myriopyllum aquaticum*)
- Himalayan blackberry (*Rubus discolor*)
- Aquatic primrose (*Ludwigia peploides*)
- Yellow starthistle (*Centaurea solstitialis*)
- Spanish broom (*Spartium junceum*)
- French broom (*Genista monspessulana*)
- Scotch broom (*Cytisus scoparius*)
- Skeleton weed (*Chondrilla juncea*)

The plan would be reevaluated as necessary.

**Forest Service Section 4(e) Conditions (Appendix E of the SA)**

USFS provided Final Section 4(e) Terms and Conditions in accordance with 18 Code of Federal Regulations 4.34(b)(1)(i) and Recommendations as allowed under Section 10(j) of the Federal Power Act. These Terms, Conditions, and Recommendations are included in the SA as Appendix E and are provided in Appendix A1 of this DEIR. The Terms and Conditions are based on the Land and Resource Management Plan for the Plumas National Forest and portions of the Lassen National Forest administered by the Plumas, as approved by the Regional Forester of the Pacific Southwest Region. All Terms, Conditions, and Recommendations included in the Final 4(e) conditions to be incorporated during development of Plans, Programs, and other relevant actions described in the SA involving Forest System lands, are further described below.

Pesticide Use Restrictions on National Forest System Lands

In accordance with USFS Final Section 4(e) conditions, pesticides would not be used on NFS lands or in areas affecting NFS lands to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, undesirable fish, or other pests without prior written approval of USFS. If pesticide use were proposed on NFS lands, DWR would submit a request for approval of planned uses. The request would cover

annual planned use and be updated as required by USFS. Only materials registered by the U.S. Environmental Protection Agency for the specific use planned would be used. As an alternative, DWR could provide an Integrated Pest Management Plan that would describe planned pesticide use on NFS lands on a regular basis.

Protection of USFS Special-Status Species

As part of the Proposed Project, before taking actions to construct new project features on NFS lands that may affect USFS special-status species or their critical habitat, DWR would prepare a biological evaluation, assessing the potential impact of the action on the species or its habitat, and submit it to USFS for approval. The evaluation would include procedures to minimize adverse effects on special-status species; ensure that project-related activities would meet restrictions included in site management plans for special-status species; and develop implementation and effectiveness monitoring of measures taken or employed to reduce effects on special-status species.

Invasive Weed Management

Under the Proposed Project, within 1 year of license issuance DWR would develop and file for FERC approval a plan to manage and reduce native and non-native invasive plant species populations on or affecting NFS lands. This plan is intended to be consistent with the Invasive Plant Management Plan described above. FERC approval to use pesticides for noxious weed control constitutes the approval required by USFS.

Fire Prevention, Response, and Investigation

Under the Proposed Project, within 1 year of license issuance DWR would develop and file for FERC approval a Fire Prevention and Response Plan for NFS lands. This plan would identify DWR's responsibility for the prevention, reporting, control, and extinguishing of fires in the vicinity of the Project resulting from project operations. Fire prevention needs would also be analyzed.

Heritage Resources

Under the Proposed Project, within 1 year of license issuance DWR would develop and file for FERC approval an HPMP to protect and interpret heritage resources located on NFS lands. The HPMP would include consultation with appropriate entities and would define the areas of potential effects. The HPMP would also identify measures to mitigate potential impacts, including a monitoring program, and management protocols to protect archaeological properties.

## Recreation Facilities and Operations (SA Recreation Management Plan, SA Article A127)

### Recreation Facilities—General

The Proposed Project includes measures recommended through the collaborative relicensing process after reviewing results of the Recreation Needs Analysis (DWR 2004a) and through the subsequent development of the RMP (DWR 2006) included as a part of the SA and provided in Appendix B of this document. Under the Proposed Project, recreation facilities in the project area would be upgraded and modernized over the term of the new license to address current needs identified in the Recreation Needs Analysis and to address future needs based on monitoring as described in the RMP. Actions contained within the RMP focus on water- and reservoir-based recreation resources within the FERC Project boundary that are under authority of DWR as the licensee of the Oroville Facilities.

In general, the Proposed Project would result in recreation facility changes that would improve accessibility; provide additional and improved day use facilities, trails and trail facilities, parking areas, group day use shelters, picnic tables, sanitation facilities, and provide for campground expansion and/or improvements at Bidwell Canyon, Loafer Creek, the Thermalito Afterbay Outlet, and the floating campsites. The Proposed Project would also enhance boating facilities (including increased access during times of low reservoir level) and develop two ADA accessible bank-fishing piers (South Thermalito Forebay and Diversion Pool). Programmatic elements of the RMP are described below, followed by descriptions of site-specific actions arranged by geographic location within the project area.

## Programmatic Elements of the RMP

### The Recreation Advisory Committee

The RMP does not make management or resource commitments for other entities such as federal and State agencies, Tribes, or other stakeholders. However, the continued active involvement of these other recreation participants in the project area is important in helping to meet the overall recreation needs of visitors and area residents during the term of the new license. The RMP includes formation and support of an RAC, to be formed within 6 months of license issuance. Membership on the RAC would include local governments, two at-large public representatives, relevant State agencies, and DWR, among others. The RAC would periodically review recreational usage monitoring data for project facilities and would recommend modifications to the RMP over time throughout the term of the new FERC license. Recreational use data, reports, and recommendations made by the RAC would be provided to FERC every 2 years. Specific information related to the organization, membership, and scope of the RAC is included in Section 4.4 of the RMP. The RAC would replace the Oroville Recreation Advisory Committee (ORAC), established during the previous FERC license. As such, coordination and cooperation with these participants would continue as defined in the RMP and in large part through the formation and continued activities of the RAC.

The License Coordination Unit

Meetings of the RAC would be one of the activities coordinated through the newly formed DWR License Coordination Unit (LCU) to be located in Oroville at the Oroville Field Division. Initially DWR, through the LCU, would also facilitate community workshops twice per year in the City of Oroville or in the Oroville area to inform the community on progress of projects associated with FERC license requirements, reservoir conditions, operations, and other issues related to implementation of the RMP. The LCU would also be responsible for maintaining a web-based bulletin board, updated monthly or as needed with project status reports, milestones, community events, license events, community workshop notes, and RAC summaries.

Coordinated Roles and Responsibilities

Through the RMP, the Proposed Project clarifies the role of DPR, DFG, the California Department of Boating and Waterways (DBW), and other entities to carry out DWR's responsibility for managing, maintaining, and developing recreational resources within the FERC Project boundary. The Proposed Project would resolve existing conflicts between wildlife management objectives and recreational activities in the OWA in coordination with DPR, DFG, and other appropriate agencies by developing a comprehensive description of recreation and wildlife management priorities and responsibilities, including specific recommendations contained within the RMP.

Law Enforcement

The RMP clarifies the roles of the various entities with enforcement responsibilities for facilities within the FERC Project boundary and clearly defines the enforcement responsibilities to ensure the safety of recreation users and protection of environmental resources in the FERC Project boundary.

Recreation Implementation Plan

Within 1 year of license issuance, DWR will file a Recreation Implementation Plan with FERC. The plan will include a schedule for recreation development and implementation of the SA RMP for the first 12 years of the new license term, as well as results of consultation with the RAC.

Recreation Facility Development Program

The Recreation Facility Development Program focuses on upgrading existing recreation facilities and constructing new recreation facilities, when appropriate, based on documented needs and associated monitoring results. This program defines construction-related responsibilities of DWR, identifies proposed development projects and their estimated costs, provides conceptual site diagrams, and defines facility development standards and design criteria through seven program elements covering facility development and upgrades, development locations, design guidelines and approvals, ADA compliance, NEPA/CEQA compliance and environmental project

review/permitting, agency and public review, and construction coordination, scheduling, and phasing.

Resource Integration and Coordination Program

This program is a formalized process whereby DWR would make coordinated, timely, and informed decisions related to implementation of the SA RMP and other project-related resource management plans. The program includes elements designed to encourage and enhance ongoing communication and coordination among agencies and stakeholders with DWR such as regularly scheduled community workshops, a web-based bulletin board, and a dispute resolution process.

Recreation Monitoring Program

Monitoring activities are described in a Recreation Monitoring Program included in the RMP that details data collection process methodology, indicators, and standards that trigger when proposed capital measures and O&M-related measures would be implemented over the course of the license. Additional measures that may be considered in the future should use triggers be met are outlined in the RMP and include additional campsites, parking facilities, and various improvements at day use areas.

Plan Review and Revision Program

The Plan Review and Revision Program is designed to address changes in recreation or resource conditions that are expected over time as recreational needs, visitor preferences and attitudes, new recreation technologies, and other resource issues arise over the course of the new license term. DWR will determine the frequency of RMP updates, which are expected to occur no more than once about every 12 years.

Interpretation and Education Program

The Proposed Project includes development of a project-wide Interpretation and Education (I&E) Program as described in the RMP to include measures such as the installation of additional interpretive and educational signage at various locations within the FERC Project boundary and the provision of timely information to boaters regarding changing access and reservoir conditions and alternative boating facility availability. Educational signage at the Feather River Fish Hatchery would be considered under the RMP I&E Program. The Proposed Project also includes development of interpretive and informative signage at various locations within the FERC Project boundary consistent with the program described within the HPMP.

Another element of the proposed I&E Program is the installation of new directional signs at various locations within the FERC Project boundary to help the public locate recreation sites. DWR would use the website to promote the recreation facilities consistent with other SWP facilities.

Operations and Maintenance Activities

The RMP includes measures to address continued O&M and monitoring at existing and new recreation sites, periodic recreation monitoring through the term of the new license, the identification of additional measures to be undertaken should use triggers be met or as concessionaire contracts are renegotiated, and compliance with ADA requirements and other applicable regulations. Project-wide operations and maintenance activities described in the Proposed Project include increased debris removal at boat ramps and adjacent recreation facilities, more frequent adjustment of floating docks, and the commitment to provide information to boaters about substitute boating facilities and reservoir conditions. In addition, the LCU located at the Oroville Field Division would facilitate license compliance activities.

Project Supplemental Benefits Fund (SA Section B100)

As a non-license commitment under the SA, the Proposed Project includes establishment of a Project Supplemental Benefits Fund (SBF) intended to allow the benefits of the project to be extended into the local communities in the vicinity of the FERC Project boundary. The SBF would be used solely to support projects outside of the FERC Project boundary and selected subject to provisions contained in Section B100 of the SA. The SBF would be administrated by a Fund Administrator and would include a Steering Committee to provide direction regarding proposed projects to be funded through the SBF. The SBF would receive up to $61,270,000 in unescalated funds through a combination of initial and annual payments as described in the SA. Grant funds would be solicited by the Steering Committee in cooperation with the SWC and local interests and any CEQA documents required for future projects would be completed by a local lead agency.

**Recreation Facilities—Equestrian, Bicycle, and Hiking Trails**

The Proposed Project identifies a number of trail segment enhancements and additional short shoreline access trails to be constructed throughout the Project area. Figure 3.2-3 in Section 3.2 shows the existing and proposed trail system at the Oroville Facilities. In addition to the actions described below, the Proposed Project includes minor grading improvement to an old construction road at the Lake Oroville scenic overlook on SR 162 and enhancements to trailhead facilities such as horse-watering troughs and hand-washing sinks at Saddle Dam and Lakeland Boulevard locations.

Trails in the Lake Oroville and Oroville Dam Area

The Proposed Project includes several trail improvements or additions within the Lake Oroville area including the construction of short shoreline access trails in the Saddle Dam area, realignment of a portion of the existing Brad Freeman Trail near the Hyatt Pumping-Generating Plant to address security/safety concerns, opening of the Dan Beebe Trail and an existing access road south of the Loafer Creek Equestrian Campground to bicycle use, opening the Bidwell Canyon Trail to equestrian use,

construction of a North Fork shoreline trail extension in Potter's Ravine, and construction of a new hiking and biking trail from the Lime Saddle Campground to the Lime Saddle Marina boat ramp.

Trails in the Low Flow Channel/Feather River Area

The Proposed Project includes a feasibility investigation for constructing a new 2- to 4-mile trail designed primarily for bicycling that would run east/west from Lakeland Boulevard, connecting with a multiple-use segment of the Dan Beebe Trail and/or Brad Freeman Trail near the Diversion Pool. A paved trail from the Fish Hatchery downstream to the FERC Project boundary could also be constructed, provided that another recreation agency constructs a paved trail on the north side of the Feather River from Riverbend Park north to the FERC Project boundary. The Proposed Project would open the Dan Beebe Trail to bicycle use (except the Sycamore Hill trail segment) and would open Burma Road and adjacent portions of the Brad Freeman Trail to equestrian use. The Proposed Project would also consider new non-motorized trail opportunities in Thermalito Forebay (North and South) as a component of the proposed trails program included in the RMP.

Analysis of a Non-motorized Water Trail Shoreline Access

Under the Proposed Project, within 1 year of license issuance DWR would complete an analysis of non-motorized water trail shoreline access opportunities along the Feather River within and in the vicinity of the FERC Project boundary. Suitable sites would be identified and ranked in consultation with the signatories to the SA. DWR would fund and/or construct or improve a total of 2–3 river access sites within 5 years after license issuance. DWR would also work cooperatively with DBW and other appropriate State or local agencies to expand the boating trail opportunities downstream along the Feather River to the Sacramento River confluence or beyond where practical.

**Recreation Facilities—Specific Actions at Lake Oroville**

Bidwell Canyon Campground, DUA, Boat Ramp, and Marina

The Proposed Project includes measures at Bidwell Canyon designed to expand parking opportunities, maximize boat-launching capacity, and enhance ADA accessibility to the marina. Measures include the expansion of existing parking capacity to include approximately 215 additional parking spaces at Bidwell Marina, of which a minimum of 90 parking spaces would be constructed at the existing location of the Big Pine Campground Loop. Other new parking spaces would be provided at Ramp #2 and at Ramp #3. Expansion of Bidwell Marina parking facilities would necessitate the construction of 30–38 new campsites adjacent to the remaining "Gold Flat" loop to compensate for the loss of campground space displaced for additional parking. If insufficient space were available to replace the 38 campsites currently at the site, up to 15 sites would be added at Loafer Creek Campground.

The Proposed Project includes construction of a new, low-water-access boat ramp at Bidwell Canyon by extending 3 lanes starting at about elevation 750 msl and extending

to elevation 640 msl (reservoir conditions allowing), providing for continued use of Lake Oroville by boaters even during low-water conditions. Bidwell Canyon presents the most feasible location on Lake Oroville for construction of a low-water ramp due to topography, security, and access issues. An additional boating dock planned for Bidwell Marina would improve boat launching/retrieval efficiency. The Proposed Project also would provide one additional boarding dock at the top of the boat ramp to maximize boat-launching capabilities. Changes to the existing concessionaire contract may include a concessionaire-operated campground activity center and store/snack bar in the underutilized group meeting facility and/or provision of additional dry boat storage. The Proposed Project also includes ADA-related upgrades at the marina to improve accessibility between site amenities.

Loafer Creek Campground, DUA, BR, and Equestrian Campground

The Proposed Project includes measures to improve boat launch capacity at Loafer Creek through the addition of a new floating boarding dock. The Proposed Project also includes the construction of a new camp loop for the two new group RV campsites, and enhancement of ADA accessibility at the Loafer Creek Group and Equestrian Campgrounds, the replacement of a restroom, and improved ADA accessibility for picnic areas and swimming beach/cove. A new fish cleaning station connected to existing infrastructure is also included. Up to 15 new RV campsites near or adjacent to the existing Loafer Creek Campground could be constructed here if, after the parking expansion project is completed within the Bidwell Canyon Complex, all 38 RV campsites cannot be reasonably relocated at that location.

The swim beach constructed as part of the original facilities is often inaccessible during a significant portion of the high-use summer season as water levels drop below the beach elevation. A feasibility study would be conducted to evaluate the possibility of providing improved swimming opportunities at either Loafer Creek or Lime Saddle during the primary 4-month recreation season, and if a feasible and cost-effective option were identified from that study, that option would be implemented under the Proposed Project. The Loafer Creek location would receive priority over other locations within the FERC Project boundary, given the existing swim facility at this location. In conjunction with the feasibility study, an evaluation would consider a concessionaire-operated campground activity center and store/snack bar.

The Proposed Project would replace and restore the vandalized portable toilet at nearby Brooks Orchard with a new single-vault toilet building. DWR proposes to widen, grade, and gravel the existing dirt service road at the Loafer Creek DUA to approximately 750 feet msl elevation. The gated service road would then be open to the public when the Loafer Creek Boat Ramp becomes dewatered to allow car-top boat launching within the Loafer Creek Complex.

Lime Saddle Campground, DUA, BR, and Marina

Under the Proposed Project, the existing marina, boat ramp, and day use picnic sites would be updated for enhanced ADA accessibility. DWR would provide one additional boarding dock to supplement the existing marina gangway and dock system. The Proposed Project also proposes to include the Lime Saddle location in the feasibility study to provide new swimming opportunities in the future within the FERC Project boundary during the primary 4-month recreation season.

Under the Proposed Project, 13 older existing picnic tables and pole stoves and 7 existing shade ramadas in the DUA would be upgraded or replaced, and would include ADA accessibility improvements. Ten additional RV campsites and 1 new 6-unit group RV campsite would be constructed, and approximately 60 additional new boat ramp/marina parking spaces would be constructed near the existing parking lot where feasible. DWR may seek transfer of the adjacent PG&E parcel to DWR or DPR for site expansion purposes.

Oroville Dam Overlook DUA

The Proposed Project would provide approximately 100 additional new parking spaces in the Oroville Dam Overlook DUA with ADA-compliant access routes/stairs, 4–5 additional picnic tables with shade ramadas, and interpretive panels.

Spillway BR and DUA

No additional measures are included at this location in the Proposed Project. En-route RV camping at this location would continue, subject to periodic FERC Project security reviews.

Enterprise BR

The Proposed Project includes the development of a low-water boat ramp and boarding dock at Enterprise to meet user demand during a wider range of water level conditions. The existing ramp would be extended to approximately 750 feet msl elevation to provide for boat launching during low-water conditions and a new boarding dock and cable system would be installed. DWR would also construct ten family picnic sites at this location and provide ten gravel parking spaces where feasible. Exact alignment of the ramp and additional facilities would depend on results from cultural resource surveys and engineering studies.

Nelson Bar Car-top BR

No additional facilities are included in the Proposed Project for this location; however, a sign, barrier, and/or gate at the terminus of the boat ramp during lowered reservoir elevations would be installed for safety purposes.

Vinton Gulch Car-top BR

The Proposed Project includes periodic updates to interpretive materials at this site.

Dark Canyon Car-top BR

The Proposed Project includes replacement of the defunct toilet building at this location. Improved directional signage to assist users in locating this site is also included.

Stringtown Car-top BR

This boat ramp uses a remnant of a pre-project road that is now largely inundated by Lake Oroville. Under the Proposed Project, a sign, barrier, or gate would be installed for safety purposes at the unmaintained, abandoned road in the inundation zone. Improved directional signage from the main access road is included in the Proposed Project.

Foreman Creek Area

Due to the large number of archaeological sites in the Foreman Creek area, the HPMP developed for the project area would assist in both redirecting and improving recreational usage to specific areas of Foreman Creek to prevent future damage to historic properties and culturally sensitive areas. The Proposed Project includes redirection of recreational use as recommended in the HPMP and installation of a vault toilet, trash receptacle, and five to ten picnic tables with shade ramadas. Educational measures designed to provide information regarding the protection and preservation of cultural and other sensitive resources at Foreman Creek and other areas within the FERC Project boundary are included in the Proposed Project.

The SA also allows for DWR to seek removal of a small amount of acreage from the Foreman Creek Unit of the LOSRA from the FERC Project boundary for the purpose of making land available to Native American tribes for the purpose of reburial of repatriated human remains.

Lake Oroville Visitors Center

The Proposed Project includes existing visitors center facility enhancements and consideration of potential future facility functions, activities, and uses within the I&E Program as defined in the RMP.

Saddle Dam Trailhead Access

The Proposed Project includes the development of a short trail to provide shoreline access, ten new picnic tables, and a new horse-watering trough and hand-washing sink at this site.

Boat-in Campgrounds

The Proposed Project includes periodic updates of the interpretive materials at these locations. The Foreman Creek boat-in campground may see increased informal day use and overnight walk-in camping during low-water conditions due to proposed modifications to the Foreman Creek Car-top BR and day use facility. Boat-in campgrounds may include periodic closures to boat traffic due to low-water conditions that result in the exposure of cultural resources within the fluctuation zone.

Lake Oroville Scenic Overlook (SR 162 at bridge)

The Proposed Project includes minor trail enhancements along the old construction road and placement of a new trash receptacle and trash pick-up service coordinated with the Berry Creek Citizens Association.

Floating Campsites

The Proposed Project would deploy two new floating campsites in the Lime Saddle area and one new floating campsite in the West or North Fork areas of Lake Oroville. The existing floating campsites would remain at or near their current locations.

**Recreation Facilities—Specific Actions at the Diversion Pool**

Diversion Pool DUA (Northwest Side of Diversion Pool)

The Proposed Project would provide additional day use facilities, including ten new picnic sites with pole grills along the Diversion Pool. The Proposed Project also includes construction of an ADA-accessible fishing pier or platform at a suitable Diversion Pool location and enhancement of the existing gravel car-top boat access along Burma Road.

Lakeland Boulevard Trailhead Access (Southeast Side of Diversion Pool)

Vehicle access, day use facilities, and parking would be added near the trailhead at Lakeland Boulevard. This includes a gravel car-top boat ramp that would create new access on the south side of the Diversion Pool. Limited day use facilities would include gravel parking area, restroom, ten picnic tables, pole stoves, a non-potable stock-watering trough, and trail access to the water for hikers. Fencing would be installed as appropriate to separate the new access road and proposed day use facilities from the railroad tracks.

**Recreation Facilities—Specific Actions at the Low Flow Channel/Feather River**

Feather River Fish Hatchery

The Proposed Project includes consideration of a fish-viewing platform in the I&E Program. Additional interpretive signs and/or kiosks and additional interpretive paths would be added consistent with the I&E Program.

Feather River Whitewater Boating Opportunity Feasibility Study (SA Section B101)

As a non-license commitment under the SA, the Proposed Project includes a Whitewater Boating Opportunity and Recreation Feasibility Study to be conducted by DWR to assist the Project Supplemental Benefits Fund Steering Committee in determining whether to fund the construction and operation of such a project or cost share such a project somewhere in the region, pursuant to their funding criteria. The Feasibility Study was designed to build from the results of SP-R16, Whitewater and River Boating Report (DWR 2004b), and includes a scoping process, a review of potential whitewater opportunities within the area including park and non-park options locally and regionally, and constraints including physical, operational, environmental, costs, and permitting. Whitewater demand trends, market feasibility, ownership and management options, and potential direct and indirect economic activity potentially generated by such a facility would also be examined.

**Recreation Facilities—Specific Actions at Thermalito Forebay**

North Thermalito Forebay Boat Ramp, DUA, Aquatic Center, and "En Route" RV Campground

Under the Proposed Project, DWR would conduct a feasibility study to evaluate warmer water swimming options at this site and at other locations within the FERC Project boundary. It would also consider new non-motorized trail opportunities in Thermalito Forebay as a component of the proposed trails program included in the RMP. The Proposed Project would provide additional limited shoreline access consistent with FESA and CESA species protection and would include installation of a fish cleaning station.

South Thermalito Forebay BR and DUA

The Proposed Project includes the installation of an ADA-accessible fishing pier and additional day use and swimming facilities, a sandy swim beach, additional landscaping and shade trees, and five to ten additional picnic tables with pole grills. The Proposed Project also includes the provision of new trail opportunities in the area as recommended in the RMP.

**Recreation Facilities—Specific Actions at Thermalito Afterbay**

Wilbur Road BR

Improved directional signage at this location is included in the Proposed Project as a component of the proposed I&E Program.

Larkin Road Car-top BR

The Proposed Project includes installation of 5–10 new picnic tables with pole stoves and shade structures, and a swim beach area with a new swimming buoy line located

approximately 100–200 feet from the shoreline. Directional signs would be posted at key locations along the route to Larkin Road Car-top BR as a component of the proposed I&E Program.

Monument Hill BR and DUA

No additional measures are included in the Proposed Project at this location.

Model Aircraft Flying Facility

No additional measures are included in the Proposed Project at this location.

**Recreation Facilities—Specific Actions Within the Oroville Wildlife Area**

OWA—Afterbay Outlet BR, DUA, and Campground

The Proposed Project includes construction of an organized designated primitive RV/tent camping facility at the Thermalito Afterbay Outlet within approximately 40 acres adjacent to existing parking and day use areas near the outlet to discourage unauthorized, dispersed camping. Day use facilities, including five to ten picnic tables, vault toilet buildings, and gravel spurs with vehicle barriers would be added near the river but at some distance from the camping facilities. The existing gravel boat ramp would be upgraded to concrete, with paved parking provided. Existing access roads would be regraveled and disturbed areas would be revegetated with native arid landscaping for shade and aesthetics, consistent with wildlife habitat goals. Increased visitor management and enforcement would be implemented to enforce fishing regulations and other use restrictions within the OWA related to project operations. A Wildland Fire Evacuation Plan would be developed and implemented for the OWA.

Directional signs would also be posted at key locations along the route to the Afterbay Outlet BR and campground as a component of the proposed I&E Program. Appropriate boat ramp use restrictions that are necessary for boater safety due to flow conditions at this location would be posted and enforced through access gate closures.

OWA Dispersed River and Pond Access Sites

To improve the aesthetic appearance of the area, the Proposed Project would provide additional trash receptacles and trash pick-up at locations where trash accumulation is an issue within the OWA. Regulatory and educational signage detailing illegal fishing and consequences would be posted at Feather River locations within the OWA. These measures would be coupled with increased enforcement of regulations within the OWA and would include the use of vehicle barriers to further limit illegal access to selected areas within the OWA. The dispersed sites would be monitored for use and effects consistent with the RMP. DWR would coordinate with DFG to maintain and enhance existing access opportunities for traditional uses (hunting, fishing) within the OWA.

Two ADA-accessible Watchable Wildlife sites would be constructed and operated within the OWA to increase wildlife viewing opportunities.

Dispersed Use Sites Outside the OWA

The Proposed Project would include periodic monitoring for new dispersed use sites within the project area but outside of the OWA. New sites would be identified with the goal of managing the sites before degradation or damage occurs.

**Operations for the Protection of Cultural Resources**

Historic Properties Management Plan (SA Article A128)

Under the Proposed Project, measures for the protection of or mitigation for the ongoing project effects on cultural resources are proposed within the draft HPMP. The draft HPMP was developed in compliance with the requirements of Section 106 of the National Historic Preservation Act (NHPA) and in consultation with Native American Tribes, USFS, BLM, and other applicable agencies and communities. The draft HPMP defines the area of potential effects (including effects of implementing USFS Section 4[e] conditions), includes measures to address ongoing effects including those on or affecting NFS lands, protocols for proposed future actions including inadvertent discoveries and emergency situations, programs for future inventory and resource evaluation, a public education and information program, roles, responsibilities, and reporting requirements, and procedures for review and update of the draft HPMP. In accordance with FERC practices, the Final HPMP would be adopted as an attachment to a Programmatic Agreement under Section 106 of the NHPA. FERC, the California State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation (ACHP), and other applicable parties are expected to sign the Programmatic Agreement for compliance with Section 106 consultation requirements prior to issuance of a new license.

The draft HPMP also includes the consideration of opportunities within the project area to set aside, enhance, or develop areas suitable for the collection of traditionally used plant materials. Ethnobotanical studies are under way to identify the types and locations for these activities within the project area; areas set aside for these purposes would be managed in a manner equivalent to NRHP-eligible cultural resources.

The draft HPMP provides specific actions to be taken to address ongoing impacts at McCabe Creek, and notes that Foreman Creek, Enterprise, and the Boat-in Campgrounds are also of high priority. These locations are identified as high-priority areas in need of specific activities to address ongoing project-related effects from reservoir water level fluctuations, recreational use by the public, and operational uses associated with the project. DWR would conduct resource evaluations to assess NRHP eligibility of involved resources, institute available management measures at these locations to avoid or reduce ongoing impacts, and coordinate with the signatory and concurring parties to the Programmatic Agreement, federally recognized and unrecognized local Maidu Tribes, DPR, and federal land management agencies as appropriate on the development of site-specific treatment plans to address unavoidable adverse effects on historic properties at these locations.

Cultural Resources Administrator/Coordinator. Under the Proposed Project, DWR would establish a Cultural Resources Administrator position and a Cultural Resources Coordinator position to work in coordination with the LCU at the Oroville Field Division to implement the draft HPMP and provide specialized as-needed expertise and critical support staff on technical issues.

Data Recovery Program. A Data Recovery Program would be implemented at McCabe Creek and public access may be restricted at certain times to protect this site.

Fluctuation Zone Vehicle Restriction. Motorized vehicles would be prohibited from using the reservoir fluctuation zone, on-site monitors would be employed, and signs informing the public of sensitive resource values and warnings of criminal penalties associated with State law violations would be posted.

Cultural Resources Consultation Group. The Cultural Resources Consultation Group (CRCG) is intended to meet DWR's goal for continued coordination with parties responsible for cultural resources management in the project area. It will provide enhanced opportunities for participation in resource stewardship and provide a mechanism for conducting an annual review of proposed future actions and other HPMP activities. The CRCG will meet annually for the first 10 years after license issuance and on an as-needed basis after that.

Plan to Improve and Redirect Recreation Usage at Foreman Creek Boat Ramp (SA Article A129)

The Proposed Project includes development of a plan within 1 year of license issuance to redirect recreation usage at Foreman Creek to protect cultural resources during the development of planned recreation enhancements at this location.

**Land Use, Management, and Aesthetics Operations**

Screening of Material Storage Area (SA Article A132)

In addition to the continuation of measures described in the No-Project Alternative, the Proposed Project includes a measure to improve the aesthetic appearance of the area by planting appropriate vegetation to screen the material storage/staging area located northwest of the Oroville Dam emergency spillway from view from Oroville Dam Boulevard. To the extent feasible, native plants would be used.

Project Boundary Modifications (SA Article A133)

Under the Proposed Project, within 2 years following license issuance DWR would file with FERC a revised License Application Exhibit G and narrative statement as an application to amend its license for purposes of re-defining the FERC Project boundary. The revised Exhibit G would include all project works, including environmental and recreation measures, access roads, transmission lines, and any other lands necessary for project purposes in the FERC Project boundary. The narrative statement would explain any changes to the proposed FERC Project boundary, the amount of federal

land occupied by the project, and how the proposed FERC Project boundary includes those lands necessary for project purposes.

Area Access

The Proposed Project acknowledges the USFS right to use any road over which DWR has control of within the project area for purposes deemed necessary and desirable in connection with the protection, administration, management and utilization of NFS lands and resources. USFS would control such use so as not to unreasonably interfere with safety or security uses or cause DWR to bear a share of the costs of maintenance disproportionate to DWR's use in comparison to the use of the road extended by USFS to others.

Fuel Load Management Plan (SA Section B102)

As a non-license SA commitment, under the Proposed Project, within 1 year of license issuance DWR would develop a Fuel Load Management Plan for project lands. The proposed measure is not mutually exclusive of the USFS Final 4(e) conditions and will include USFS lands consistent with USFS Final 4(e) conditions. The plan would be developed in coordination with USFS, BLM, the California Department of Forestry and Fire Protection, DPR, DFG, the Paradise Fire Department, the Butte County Fire Safe Council, the Butte County Resource Conservation District, the SWC, Native American Tribes, and other appropriate agencies and associated public processes. The plan would be prepared to be consistent with the plans adopted by the above entities for non-project lands, to the extent permitted by the FERC license and operational constraints of the project. The Plan would also be prepared to be consistent with the Oroville Wildlife Area Management Plan. The Fuel Load Management Plan would identify fuel management issues, prioritization, and recommended actions to address them.

**Public Health and Safety**

Risks and Hazards

The Proposed Project acknowledges the responsibility of DWR to identify and report all known or observed hazardous conditions on or affecting NFS lands that would affect the improvements, resources, or pose a risk of injury to individuals. Any non-emergency actions to abate such hazards on NFS lands would be performed after consultation with USFS. In emergency situations, DWR would notify USFS of its actions as soon as possible, but not more than 48 hours after such actions have been taken.

**Operations and Maintenance Programs**

Under the Proposed Project, DWR would continue routine operations and maintenance activities currently performed under the existing FERC license. Existing maintenance programs would be expanded to include any new features and facilities constructed as part of the Proposed Project as appropriate.

### 3.3.3 FERC Staff Alternative

After evaluating DWR's Proposed Action (the SA), including mandatory conditions filed pursuant to Section 4(e) and 18 of the Federal Power Act (FPA), and other recommendations from resource agencies and interested entities under Sections 10(a) and 10(j) of the FPA, FERC staff identified additional measures FERC considers necessary or appropriate for continued operation of the project (FERC 2006). The measures are, for the most part, revisions to articles contained within the SA. However, sufficient differences between DWR's Proposed Project and the FERC Staff Alternative warrant an evaluation as a separate alternative in this DEIR.

The FERC Staff Alternative includes nearly all of the measures described in the Proposed Project, including the SA RMP and the draft HPMP. However, the FERC Staff Alternative does not include the Appendix B actions because they are considered outside of FERC jurisdiction and/or suggest actions with no nexus to the Project. The FERC Staff Alternative does not include the HEA, nor does the FERC DEIS analyze this agreement as part of the Proposed Project. The FERC Staff Alternative does not recommend that DWR provide funding associated with the July 4th fireworks displays at Lake Oroville as described in the RMP because the measure does not appear to have a clear project nexus. In addition, the FERC Staff Alternative does not analyze the proposed 50-year license term. Additional measures proposed by FERC staff are described below. Unless noted, the FERC Staff Alternative is otherwise the same as the Proposed Project.

#### *3.3.3.1 Impoundments and Power Facilities*

No new facilities designed to increase or enhance power production are planned under the FERC Staff Alternative.

#### *3.3.3.2 Coordinated Operations*

No changes to general reservoir operations, scheduling, or power transactions are proposed under the FERC Staff Alternative. No changes to water supply entitlements or contracts, or changes to the role the Oroville Facilities plays in the SWP, are proposed under this alternative.

#### *3.3.3.3 Environmental Facilities and Operations*

**Instream Flow and Temperature Improvement for Anadromous Fish (SA Article A108)**

Under the FERC Staff Alternative, DWR would obtain Commission approval prior to implementing any modification to the minimum instream flow regime or water temperature objectives under SA Article A108.

**Gravel Supplementation and Improvement Program (SA Article A102)**

The FERC Staff Alternative would revise SA Article A102 to include a provision to monitor 10 riffles every 5 years or after a high-flow event, assess the adequacy of the volume of gravel used, and replace gravel as necessary. If monitoring of 10 sites, as proposed, reveals that objectives are not being met, the monitoring effort would be expanded to include all 15 sites and replace gravel as necessary.

**Riparian and Floodplain Improvement Program (SA Article 106)**

The FERC Staff Alternative would revise SA Article A106 to include a provision to implement 50 percent of the selected measures within 10 years and the remaining measures within 12 years of the issuance of any license for the project.

#### *3.3.3.4 Recreation Facilities and Operations*

**Recreation Management Plan (SA Article A127)—Programmatic Elements**

The FERC Staff Alternative would revise the RMP to include the establishment of standards for maintaining developed recreation facilities, including trails, and incorporate these into the RMP.

**Recreation Facilities—Equestrian, Bicycle, and Hiking Trails**

The FERC Staff Alternative would revise SA Article A127 to include a provision to conduct baseline inventory of trail conditions using established standards developed for project trails prior to proposing any changes to trail use designation. Trail conditions would be monitored and reported on through the term of any license issued. The recreation monitoring program would be expanded to include non-trail users to detect latent demand and unmet user needs related to trails. The non-motorized trails program would be revised based on the trail condition inventory, analysis of the survey and trail use data, and results of the feasibility studies for new trails. Recommendations, if appropriate, for changing trail use designations and a proposed implementation schedule would be included.

**Recreation Facilities—Specific Actions at Lake Oroville**

Foreman Creek Area

Under the FERC Staff Alternative, the Foreman Creek boat launch would be closed to recreational use while DWR develops a plan for protecting cultural resources that considers a spectrum of possible actions, including installing recreational facilities to redirect recreational use away from cultural resources (as described in SA Article A129) and discontinuing recreational use at the site. Within 6 months of license issuance, DWR would prepare a plan, in consultation with local Native American Tribes, for protecting cultural resources at Foreman Creek.

The FERC Staff Alternative also revises SA Article A127 to include the development of a plan to install a vault restroom, 5 to 10 picnic tables with shade ramadas, and interpretive signs, and possibly install pole stoves at the Foreman Creek boat launch.

Boat-in Campgrounds

The FERC Staff Alternative revises SA Article A127 to include a provision to develop site plans and reconstruct the boat-in campgrounds at Bloomer, Goat Ranch, and Craig Saddle within the first 10 years after license issuance.

#### *3.3.3.5 Operations for the Protection of Cultural Resources*

Under the FERC Staff Alternative, DWR would revise and resubmit the draft HPMP for Commission approval. The revision would provide rationale for proposing to evaluate only 20 percent of the sites and provide for evaluating all sites within the fluctuation zone.

#### *3.3.3.6 Land Use, Land Management, and Aesthetics Operations*

**Fuel Load Management Plan (SA Section B102)**

The Fuel Load Management Plan described under Section B102 of the SA would become an Appendix A, FERC jurisdictional action under the FERC Staff Alternative.

**Aesthetics**

Under the FERC Staff Alternative, the Interim Recreation Project that seeded the downstream face of Oroville Dam with a wildflower mixture dominated by poppies would be continued, as necessary.

## 3.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

The following identifies several alternatives that are not evaluated in detail within the DEIR. With the exception of the alternatives analyzed in the PDEA, in one form or another, these alternatives involve either transferring the operations and maintenance of the Oroville Facilities to another governmental entity or discontinuing power generation. None of these potential scenarios is considered reasonable or even remotely likely. Briefly discussed below are PDEA alternatives, non-power license, decommissioning, Oroville Dam removal and decommissioning, and federal takeover.

### 3.4.1 Alternatives Considered in the PDEA but Eliminated from Further Analysis in the DEIR

DWR filed a license application with FERC in January 2005 for consideration as future license conditions for the Oroville Facilities for the next 50 years. Contained within that application was a PDEA, which presented the analysis and conclusions reached during the evaluation of two action alternatives with supplemental information on relevant studies, data, and methodology included in the appendices.

#### *3.4.1.1 PDEA Proposed Action and Alternative 2*

The PDEA Proposed Action included protection, mitigation, and enhancement measures designed to address ongoing effects of project operations. These measures included those developed by the ALP Collaborative, measures recommended by the results of Study Plan R-17 (SP-R17), Recreation Needs Analysis (DWR 2004), and by USFWS during informal consultation. PDEA Alternative 2 included all measures described in the PDEA Proposed Action as well as a number of measures not preferred by the Licensee because they could adversely affect operational flexibility, do not have an apparent project nexus, would not represent the best balance of project resources, and in many cases are not well supported by the study results. Some of these measures were suggested in the Collaborative by resource agencies; other recreational enhancement measures were supported by some local stakeholder groups to meet their interpretation of what represented an appropriate level of recreation development. While the Proposed Project analyzed in this DEIR contains many of the measures included in the Proposed Action and Alternative 2 analyzed in the PDEA, some measures agreed to in the final SA were not included in the PDEA. Thus, neither alternative from the PDEA is evaluated in detail as a “stand-alone” alternative in this DEIR.

#### *3.4.1.2 Federal Takeover*

A federal department or agency may file a recommendation that the United States exercise its right to take over a hydroelectric power project with a license that is subject to Sections 14 and 15 of the FPA. The recommendation must be filed no earlier than 5 years before the license expires and no later than the end of the comment period specified by FERC. Federal takeover and operation of the Oroville Facilities would

require Congressional approval as provided under Section 14 of the FPA. Furthermore, should a takeover occur, DWR must follow procedures relating to takeover and relicensing as outlined in 18 Code of Federal Regulations (CFR) Part 16.

Although these facts alone would not preclude further consideration of this alternative, there is no evidence showing that a federal takeover should be recommended to Congress. No party has suggested that federal takeover would be appropriate, and no federal agency has expressed interest in operating the Oroville Facilities. Therefore, federal takeover of the Oroville Facilities is not considered further in this DEIR.

#### *3.4.1.3 Non-power License*

The alternative in which FERC would issue a non-power license is not evaluated in detail in the DEIR for several reasons. A non-power license is a temporary license that FERC would terminate whenever it determines that another governmental agency will assume regulatory authority over and supervision of the lands and facilities covered by the non-power license. FERC, under the authority of the FPA, allows licensees to apply for non-power licenses, which permit the licensees to cease operation of their power generation facilities. When a licensee proposes to cease operation of these facilities, FERC regulations require that the licensee prepare an environmental assessment or environmental impact statement in accordance with NEPA, Council on Environmental Quality guidelines, and other applicable laws.

Furthermore, the licensee must provide information required under 18 CFR 16.11 including but not limited to: (1) a proposal that shows the manner in which the licensee plans to remove or otherwise dispose of the project's power facilities; (2) a proposal to repair or rehabilitate any non-power facilities; and (3) a statement of the costs associated with removing the project's power facilities and with any necessary restoration and rehabilitation work.

Under this alternative, the non-power license would continue to cover and address all of the Oroville Facilities, which include Lake Oroville, Oroville Dam, the Hyatt Pumping-Generating Plant, Thermalito Diversion Dam Power Plant, Thermalito Forebay, Thermalito Pumping-Generating Plant, Thermalito Afterbay, and associated recreational and fish and wildlife preservation and enhancement facilities. DWR could be required to maintain the recreational facilities, Feather River Fish Hatchery, and the OWA.

Under a non-power license, the three Oroville power plants (Hyatt Pumping-Generating Plant, Thermalito Diversion Dam Power Plant, and Thermalito Pumping-Generating Plant) would remain in place, continue to operate for a limited amount of time, and eventually become inoperable. The dams and the powerhouse intakes would remain operable. The facilities could no longer be used to generate power, but they would retain their role in flood management, recreation, environmental purposes (fisheries and wildlife habitat enhancement), and water delivery (irrigation, salinity control, conditions in the Delta, etc.).

A termination of facility operations, temporary or otherwise, would have significant effect on power supply for the State's power grid by eliminating 762 MW, or roughly 2 percent, of the State's peak supply. Additionally, ancillary system benefits, including spinning reserves, non-spinning reserves, peaking capacity, and grid stability, would be lost, and the cost of developing replacement power would be considerable.

At this point, no agency has suggested a willingness or ability to assume regulatory authority and supervision over the lands and facilities covered by the non-power license. No party has sought a non-power license, and there is no basis for concluding that the Oroville Facilities should no longer be used to produce power. Additionally, a non-power license would not support the purpose and needs of the Oroville Facilities that relate to producing electric power to provide pumping energy needed for the SWP. Given this and the other factors outlined above, a non-power license for the Oroville Facilities is not considered further in this DEIR.

#### *3.4.1.4 Decommissioning*

Project retirement could result from:

- DWR notifying FERC that it sought to surrender its license; or
- An order of termination issued by FERC based on an implied surrender.

Neither of the foregoing conditions is reasonably foreseeable; nonetheless, to fulfill the intent of the ALP, the DEIR includes the following discussion of project retirement.

The regulations pertaining to non-power licenses under FERC, the FPA, NEPA, and the Code of Federal Regulations as outlined above would also apply to retirement or decommissioning without dam removal. Under the alternative of decommissioning without dam removal, the three Oroville power plants would be removed, the equipment would be salvaged or disposed of, and the powerhouse sites would be graded and/or restored as appropriate. The dams and powerhouse intakes would remain operable. Similar to the arrangement under the non-power alternative, the facilities could no longer be used to generate power, but they would retain their role in water supply, flood management, recreation, and environmental purposes such as releases for water quality enhancements. This alternative differs from the non-power alternative described above in that the generation plants would be removed or become permanently inoperable.

Under 18 CFR 6.2, the licensee may surrender its license if it has satisfied all conditions imposed by FERC to protect the public interest, including those related to disposition of constructed facilities. The licensee would also be required to file a schedule for the submittal of a surrender of license; file a surrender application according to the approved schedule; and provide for disposition of all project facilities. Where project facilities have been constructed on federal lands, the licensee must restore the project lands to a satisfactory condition and continue paying annual charges until the effective date of the order accepting surrender. Once decommissioning has been completed and

the area has been restored to a satisfactory condition, FERC would no longer be involved with the Oroville Facilities.

The purpose of this action would be to decommission while maintaining the impoundment and the critical non-power related roles performed by the Oroville Facilities. If the dams were not removed, they would have to be maintained to prevent dam failures and the attendant threat to public safety. Additionally, the dams would need to be maintained to allow the Oroville Facilities to continue their role in flood management, recreation, environmental purposes, and water delivery.

Decommissioning would have a significant, long-term effect on power supply to the State's power grid (see Chapter 2.0). Additionally, decommissioning would not support the primary purpose and needs of the Oroville Facilities that relate to providing electric power. Therefore, decommissioning of the Oroville Facilities has been eliminated from further consideration.

#### *3.4.1.5 Oroville Dam Removal and Decommissioning*

Under the dam removal and decommissioning alternative, Oroville Dam would be removed and the Hyatt Pumping-Generating Plant would be decommissioned. The Thermalito Diversion Dam Power Plant and Thermalito Pumping-Generating Plant could be removed or remain in place for power generation with unregulated flows from the Feather River. Because Lake Oroville would no longer exist in its current configuration to provide adequate water storage and release, the remaining generating plants, if left in place, could operate similar to run-of-river plants, losing much of their capability to provide reliable energy and ancillary services such as spinning reserves, peaking capacity, and grid stability. Thermalito Diversion Dam would likely remain in place, continuing to divert water to Thermalito Forebay and Thermalito Afterbay, allowing these facilities to continue their role in recreation, environmental resource enhancements, and water delivery for local irrigation. These roles would also continue for the Fish Barrier Dam and the Thermalito Afterbay Dam, which would remain in place.

The primary purpose of this action would be to restore much of the Lake Oroville area to its original natural habitat. This alternative, however, would have significant negative effects. The facilities could still play vital roles in recreation, environmental purposes, and water supply; however, these functions would be diminished significantly with the removal of Oroville Dam and the loss of its capability to store and release 3.5 maf of storage capacity currently available at Lake Oroville. Few, if any, water supply benefits would remain, and flood protection would virtually disappear. Because roughly 85 percent of the power generation would be decommissioned, and pumped-storage peaking operations would be eliminated, this action would have a significant, long-term effect on power supply for the State's power grid.

Dam removal activities would result in short-term increases in downstream turbidity and sedimentation and in short-term increases in noise, dust, exhaust emissions, and traffic in the vicinity of the Oroville Facilities. There could be significant effects on recreation

and property values around the existing Lake Oroville. A lower reservoir level would be established, potentially destroying existing shoreline wetlands and other habitat. A lower reservoir level would expose currently inundated archeological sites to damage from vandalism and illicit collecting. Restoration activities such as revegetation and slope stabilization may be necessary to restore the land previously inundated by approximately 16,000 surface acres of water, comprising Lake Oroville. DWR would also need to decommission the water-related recreation facilities at Lake Oroville, which include boat launches and floating and boat-in camps. Reduced recreational use of these facilities would lead to reduced economic benefits from recreational activities and project spending. Recreation facilities (campgrounds, picnic areas, boat launches, beaches, etc.) would no longer be maintained at Loafer Creek, Bidwell Canyon, the Spillway, and Lime Saddle; however, the Lake Oroville Visitors Center, Thermalito Forebay, Thermalito Afterbay, and the OWA would remain.

Removal of the dam could increase riverine habitat for several dozen miles, benefiting fish, wildlife, and riparian habitats. Recreational opportunities associated with riverine conditions (rafting, kayaking, and fishing) could increase, with related economic benefits to local communities. Fish passage would not be improved, as the Fish Barrier Dam and Thermalito Diversion Dam would remain in place. The Feather River Fish Hatchery would likely continue operations to compensate for fisheries effects. Short-term adverse visual effects during removal activities would give way over the long term to visual benefits from removal of project structures.

The cost to remove the dam and power plants would be significant. Additionally, this alternative would not support the primary purpose and needs of the Oroville Facilities that relate to electric power, water supply, flood management, recreation, and environmental purposes. Removal of all dams associated with the Oroville Facilities would not meet the project purpose and needs, and would generate effects similar to those described for removal of the main dam. Given these considerations, decommissioning facilities and removal of the dams included in the Oroville Facilities is not evaluated further in this DEIR.

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