Lake Oroville State Recreation Area
GENERAL PLAN

Public Review Draft

California State Parks
November 2004

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Public Review Draft

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California State Parks

GENERAL PLAN INQUIRIES

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Attention: Lake Oroville State Recreation Area General Plan Team

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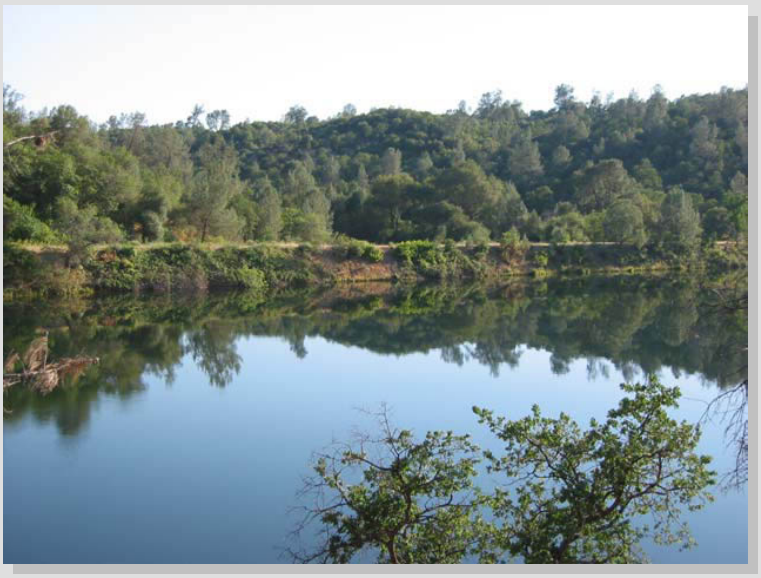
Acronyms and Abbreviations

ADA	Americans with Disabilities Act
AQI	Air Quality Index
BCAG	Butte County Association of Governments
BCT	Butte County Transit
BIA	Bureau of Indian Affairs
BIC	Boat-in Campground/ Campsite
BLM	U.S. Bureau of Land Management
BOR	Bureau of Reclamation
BR	Boat Ramp
Caltrans	California Department of Transportation
CDF	California Department of Forestry and Fire Protection
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CORP	California Outdoor Recreation Plan
CSP	California State Parks
CTC	California Transportation Commission
CVRWQCB	Central Valley Regional Water Quality Control Board
DBW	California Department of Boating and Waterways
DFG	California Department of Fish and Game
DUA	Day-Use Area
DWR	California Department of Water Resources
FERC	Federal Energy Regulatory Commission
FR-CRM	Feather River Coordinated Resource Management
FRRPD	Feather River Recreation and Parks District
IIP	Initial Information Package
LMRP	Land and Resource Management Plan
LOSRA	Lake Oroville State Recreation Area
MPO	Metropolitan Planning Organization
msl	mean sea level
NEPA	National Environmental Policy Act
NOAA Fisheries	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NPS	National Park Service
OES	California Office of Emergency Services
OHV	Off-highway vehicle
O&M	Operations and Maintenance
OWA	Oroville Wildlife Area
PAOT	People at one time
PCT	Pacific Crest Trail
PRPD	Paradise Recreation and Park District
PWC	Personal Watercraft
RD	Recreation Day
RMP	Resource Management Plan

R&PP	Recreation and Public Purposes Act
RRMP	Redding Resource Management Plan
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
RV	Recreational Vehicle
RWQCB	Regional Water Quality Control Board
SBF	State Board of Forestry
SRA	State Recreation Area
SVRA	State Vehicular Recreation Area
SWP	California State Water Project
TA	Trail Access
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VAOT	Vehicles at one time
WHR	Wildlife Habitat Relationships

EXECUTIVE SUMMARY



Project History & Planning Purpose

Lake Oroville State Recreation Area (LOSRA) was created in 1961 along with other State Recreation Areas by the Davis-Dolwig Act, which was enacted to provide financing for State Water Project (SWP) recreational facilities and fish and wildlife enhancement projects.

The first general planning for LOSRA was conducted in 1973 and resulted in the *Lake Oroville State Recreation Area General Development Plan.* The 1973 plan was amended in 1988 by the *Lake Oroville State Recreation Area General Plan Amendment: Lime Saddle Area* which adjusted the 1973 plan to meet new needs at the Lime Saddle area.

The current general planning process was initiated in 2003 to provide planning input and coordination to the Department of Water Resources' (DWR) Oroville Facilities Relicensing Process, and the Recreation Management Plan that is a major product of that process (see General Plan Purpose, Scope, and Process Section for more information on the Relicensing Process). Both California State Parks (CSP) and DWR recognized that developing a new LOSRA General Plan concurrently with the Relicensing Process provided important benefits. It would help promote and coordinate inter-agency efforts to preserve and enhance recreational, natural, cultural, and educational values in LOSRA and in the Relicensing Study Area and it would take advantage of DWR's new in-depth studies and mapping and the Relicensing Process' extensive public involvement. The updated LOSRA General Plan could also be a supporting document of DWR's Relicensing Application to the Federal Energy Regulatory Commission.

This updated General Plan serves as a long-range management tool that provides guidelines for achieving the vision and purpose of the park.

Key Planning Issues and Opportunities

The following key planning issues of the General Plan describe the primary resource constraints and opportunities at LOSRA that have been identified by CSP's public scoping and planning analysis as warranting future management attention (see the Plan Proposals Section for more details on the location and specifics of the General Plan proposals).

Interagency Recreation Management. An important interagency issue for this general plan is the complex mix of jurisdictions, mandates, and responsibilities of the agencies involved in developing, managing, and maintaining the various facilities and programs of LOSRA and FERC Project Area. The General Plan generally describes the land uses and mandates of these agencies and addresses the need and opportunities that exist to better integrate the recreational management of the Department of Fish and Game's Oroville Wildlife Area (which includes the Afterbay) with LOSRA.

Boating. Increased recreational boating demand and current low lake level operating conditions provide the need and opportunity to improve boating access, facilities, and education in the following ways:

- Provide a new boat ramp and widen, extend, and improve some existing boat ramps.
- Improve and add car-top boat launching facilities.
- Expand marina and boat ramp parking.
- Improve marina facilities.
- Expand and improve the Aquatic Center.

Swimming, Fishing, and Shoreline Access. Water level fluctuations, cold water conditions, summer bacteria levels at certain swim areas, and limited shoreline access and facilities are concerns that were expressed by park visitors and were addressed by the General Plan in the following ways:

- Provide new shoreline access and recreation areas.
- Consider adding a swim beach, swimming or wading pools, and evaluating options for warming water for swimming.
- Provide more ADA-compliant fishing piers or platforms.
- Add more fish cleaning stations.
- Provide temporary event grandstands for events such as fishing tournaments.

Day-use Facilities. Inadequate day-use recreation facilities were identified in the plan for expansion or improvement:

- Provide additional day use areas and facilities.
- Improve existing day use areas by adding new facilities such as picnic tables, grills, and shade structures.

Trail Facilities. Some trail connections are missing, trail access is inadequate in some locations, and some trail users experience conflict with different recreational uses on some trails. The LOSRA trail system and management can be improved in the following ways:

Coordinate with other agencies and trail advisory groups to evaluate trail conditions, survey user needs and concerns, and solicit recommendations for trail improvements.

- Develop a Comprehensive Non-Motorized Trails Program to guide the improvement of the trail system, its use, and its management.
- Improve some existing trailhead facilities.
- Construct new trails and trail connections.

Camping Facilities. By 2050, it is estimated that approximately 75-100 new campsites may be needed in the Lake Oroville area to meet demand for camping. Primary areas to consider for expanded camping facilities include the Loafer Creek and Lime Saddle Areas. Camping facilities can be improved in the following ways:

- Improve existing camping facilities for individuals, families, groups, RV users, en-route campers, and equestrians.
- Provide new types of camping opportunities such as environmental camping and rental cabins, yurts, or tent cabins.
- Provide or improve existing campground activity centers and campfire centers.

Land Use. Almost all areas suitable for recreational development and with easy access at LOSRA have already been developed, therefore:

- Recreational enhancements to meet increased demand and to improve visitor services and opportunities should build upon the existing development footprint to minimize environmental impacts and to maximize efficiency.
- Multiple land ownerships within and adjacent to the park complicate park management and access. The natural views that exist in some areas of the park, including the Diversion Pool and the Forebay areas, could be affected by future development on ridgelands overlooking the park.
- Encourage public and private partnerships and cooperative agreements to manage or acquire in-holdings, preserve natural views, and promote connectivity between various public recreation properties.

Cultural Resources. Cultural issues include the loss of cultural resources caused by looting, by recreation impacts, and by the effects of reservoir level fluctuations. Preservation of cultural resources can be promoted in the following way:

- Establish two cultural preserves in LOSRA

Interpretation and Education. Interpretative programs and facilities help improve visitor enjoyment and safety and help minimize the natural and cultural impacts of recreational use. Interpretation can be improved in the following ways:

- Add new and improve existing interpretive trails, panels, and campfire centers.
- If current visitors center is relocated then adapt existing building as a new environmental education center.

For further details on these planning issues and opportunities, see the Planning Issues and Analysis and the Plan Proposals sections. *Map 10* provides an overview of the locations of the General Plan's major proposals and how they relate to existing recreation facilities in the LOSRA area.

INTRODUCTION

LOCATION AND PLANNING AREAS

Lake Oroville State Recreation Area (LOSRA) is located on the Feather River in Butte County near the City of Oroville, about 75 miles north of Sacramento (see *Map 1: Lake Oroville Region* and Map 2: *Lake Oroville Area*). Presenting about 15,810 surface when full acres this reservoir was formed by the tallest earth-filled dam in the country. Lake Oroville is the second largest reservoir in California.

The recreation, resource, and interpretive planning assessments and proposals presented in this General Plan will focus on the existing recreation sites in the park. General Plan mapping and proposals are presented in the following six groupings. (Note: see the Map Section at end of plan for plan maps).

Thermalito Forebay Areas (Map 3)

1. South Thermalito Forebay Boat Ramp and Day-Use Area
2. North Thermalito Forebay Boat Ramp, Day-Use Area, En-route Camping, and Aquatic Center

Diversion Pool Areas (Map 4)

1. The Diversion Pool Day-Use Area (North Shore)
2. Powerhouse Road Trailhead (South Shore)

Spillway to Craig Saddle Areas (Map 5)

1. Spillway Boat Ramp, Day-Use Area, and En-route Camping
2. Lake Oroville Visitors Center
3. Bidwell Canyon Campground, Marina, and Boat Ramp
4. Saddle Dam DUA and Trailhead
5. Loafer Creek Campgrounds, Day-Use Area, and Boat Ramp
6. Craig Saddle Boat-in Campground

Craig Saddle to Enterprise Areas (Map 6)

1. Stringtown Car-top Boat Ramp
2. Enterprise Boat Ramp and Day-Use Area

Bloomer and Foreman Creek Areas (Map 7)

1. Foreman Creek Car-top Boat Ramp
2. Foreman Creek Boat-in Campground
3. Bloomer Boat-in Campgrounds

Goat Ranch to Nelson Bar Areas (Map 8)

1. Goat Ranch Boat-in Campground
2. Dark Canyon Car-top Boat Ramp
3. Vinton Gulch Car-top Boat Ramp
4. Lime Saddle Campgrounds, Marina, Boat Ramp, and Day-Use Areas
5. Nelson Bar Car-top Boat Ramp

LOSRA AND THE DEPARTMENT OF WATER RESOURCES

THE DAVIS-DOLWIG ACT

Lake Oroville State Recreation Area (LOSRA) was created in 1961 along with other State Recreation Areas by the Davis-Dolwig Act, which was enacted to provide financing for State Water Project (SWP) recreational facilities and fish and wildlife enhancement projects. Selected sections of the Davis-Dolwig Act (California Water Code, Sections 11900-11925) that relate to California State Parks' responsibilities follow:

Section 11900. The Legislature further finds and declares it to be the policy of this State that recreation and the enhancement of fish and wildlife resources are among the purposes of State water projects; that the acquisition of real property for such purposes be planned and initiated concurrently with and as a part of the land acquisition program for other purposes of State water projects; and that facilities for such purposes be ready and available for public use when each State water project having a potential for such uses is completed.

11901. In enacting this chapter, however, it is not the intent of the Legislature to diminish any existing powers of the Department of Water Resources, California State Parks, or the Department of Fish and Game, but rather to provide specifically for the preservation and enhancement of fish and wildlife resources and for a system of public recreation facilities at State water projects as part of a coordinated plan for multipurpose use of these projects.

11910. It is the intent of the Legislature that there shall be full and close coordination of all planning for the preservation and enhancement of fish and wildlife and for recreation in connection with State water projects by and between the Department of Water Resources, California State Parks, the Department of Boating and Waterways, the Department of Fish and Game, and all appropriate federal and local agencies.

11910.5. Such recreational purposes include, but are not limited to, those recreational pursuits generally associated with the out-of-doors, such as camping, picnicking, fishing, hunting, water contact sports, boating, and sightseeing, and the associated facilities of campgrounds, picnic areas, water and sanitary facilities, parking areas, view points, boat launching ramps, and any others necessary to make project land and water areas available for use by the public.

11918. California State Parks is authorized to design, construct, operate, and maintain public recreation facilities at State water projects, with the exception of the planning, design, and construction of boating facilities, which shall be the responsibility of the Department of Navigation and Ocean Development pursuant to subdivision (c) of Section 50 of the Harbors and Navigation Code. Before commencing the construction of any such facilities, California State Parks shall submit its plans and designs to the local governmental agencies having jurisdiction over the area involved. California State

Parks shall make every effort to fulfill its responsibilities under this section by entering into contracts with the United States, local public agencies, or other entities, to the end that maximum development of the recreational potential of State water projects shall be realized. California State Parks shall have the authority to establish and enforce standards for the development, operation, and maintenance of such public recreation areas.

The design, construction, operation, and maintenance of public recreation facilities at State water projects, and the management of project lands and water surfaces for recreational use, shall be subject to the approval of the Department of Water Resources to ensure that they shall not defeat or impair the orderly operation of any State water project for its other authorized purposes and the accomplishment of such purposes.

11919. Public recreation facilities in connection with State water projects are recreational areas.

Under the Davis-Dolwig Act, California State Parks (CSP), the Department of Water Resources (DWR), and the Department of Boating and Waterways work together to plan, design, fund, and construct recreation facility improvements. DWR holds fee title to most of the lands that form LOSRA. DWR's license for operating the Oroville Facilities is issued under the authority of the Federal Energy Regulatory Commission (FERC). CSP management must be consistent with the operation of the Oroville Facilities. CSP has jurisdiction over the water surface of Lake Oroville as well as most of the shoreline areas. DWR and CSP work together to provide interpretive exhibits and staffing for the Lake Oroville Visitors Center at Kelly Ridge.

In order to meet the goals of each agency involved, to facilitate the most efficient and effective management, and to provide the greatest public good, California State Parks cooperates with, consults with, and coordinates with the Department of Water Resources, the Department of Boating and Waterways, the Department of Fish and Game, and other pertinent agencies as needed and as required in managing the Lake Oroville State Recreation Area.

THE LAKE OROVILLE FACILITIES OF THE STATE WATER PROJECT

Oroville Dam and Lake Oroville lie in the foothills on the western slope of the Sierra Nevada, one mile downstream of the confluence of the Feather River's major forks. Lake Oroville was created by the Oroville Dam, which the California Department of Water Resources completed in 1967 after five years of construction. Lake Oroville conserves water for distribution by the State Water Project to homes, farms, and industries in the San Francisco Bay area, the San Joaquin Valley, and Southern California. Substantial reservoir water is released to meet local irrigation needs. The Oroville Facilities of the SWP also serve to provide flood control and pollution-free generation of electric power in addition to recreation. When the lake is at its maximum elevation, it includes some 15,800 surface acres for recreation and 167 miles of shoreline (at maximum operating level).

Lake Oroville and Oroville Dam are part of a complex which includes Hyatt Powerplant, Thermalito Diversion Dam and Powerplant, the Feather River Hatchery, Thermalito Power Canal, Thermalito Forebay, Thermalito Pumping Generating Plant, Thermalito Afterbay, and the Lake Oroville Visitors Center.

Water released from Lake Oroville is used to produce electricity at Hyatt Powerplant, located in the bedrock beneath Oroville Dam. From there, water can either enter the Feather River or be diverted by the Thermalito Diversion Dam. Feather River releases are used to generate power by the one-unit Thermalito Diversion Dam Powerplant. Diverted water enters the Thermalito Power Canal and flows into Thermalito Forebay. At the end of the forebay, water enters the Thermalito Afterbay and is used by the Thermalito Pumping-Generating Plant to produce electricity. The plant can also pump water back to Lake Oroville to be reused for power generation at Hyatt Powerplant.

A special fish barrier dam was built to lead salmon and steelhead, returning to spawn, into the Feather River Fish Hatchery. The Hatchery and the Fish Barrier Pool are located along the Feather River below Lake Oroville.

GENERAL PLAN PURPOSE, SCOPE, AND PROCESS

The first General Plan for LOSRA was completed in 1973 as the *Lake Oroville State Recreation Area General Development Plan.* The 1973 plan was amended in 1988 by the *Lake Oroville State Recreation Area General Plan Amendment: Lime Saddle Area* which adjusted the 1973 plan to meet new needs at the Lime Saddle area.

The current general planning process was initiated in 2003 to provide planning input and coordination to DWR's Oroville Facilities Relicensing Process and the Recreation Management Plan that is a major product of that process. Both CSP and DWR recognized that developing a new LOSRA General Plan concurrently with the Relicensing Process had important benefits. It would help promote and coordinate inter-agency efforts to preserve and enhance recreational, natural, cultural, and educational values in LOSRA and in the Relicensing Study Area and it would take advantage of DWR's new in-depth studies and mapping and the Relicensing Process' extensive public involvement. The updated LOSRA General Plan could also be a supporting document to DWR's Relicensing Application to the Federal Energy Regulatory Commission.

PLAN PURPOSE AND NEED

This updated General Plan serves as a long-range management tool that provides guidelines for achieving the vision and purpose of the park. This document does not attempt to provide detailed management recommendations, but rather provides conceptual parameters for future management actions. The Public Resources Code (Sec. 5002.2) requires that a General Plan be prepared prior to the development of permanent facilities.

A General Plan:

- Establishes the unit's purpose, vision, and long-term goals;
- Becomes the primary document and framework for a unit's development, management, and public use;
- Serves as the basis for developing focused management plans and project plans;
- Serves as a Programmatic Environmental Impact Report with the inclusion of an environmental analysis.

SOURCES OF PLAN INFORMATION

This General Plan is based on an analysis of existing park resources information and additional information gathered during the planning effort . Much of the text and many of the maps in this General Plan were adapted, summarized, or extracted from DWR's many studies and background information prepared for the Oroville Facilities Relicensing (FERC Project No. 2100). DWR studies are listed in the References section. The General Plan is also based on systemwide planning and policies and input received from the public and other agencies through the public involvement process.

PLAN SCOPE

A General Plan considers the park unit within the larger context of the State Park System and the region and provides general direction for the unit. Specific management details and facility designs are provided in future management plans and in specific project development plans. General Plans have no specific life span. General plans are amended when changing park conditions and requirements necessitate substantial changes to park management direction.

The General Plan is a tool for meeting the following broad objectives:

- Protect and perpetuate the park's natural and cultural resources;
- Provide necessary facilities for visitor use to help meet current and future recreational demand;
- Determine appropriate interpretive services and facilities for educational and recreational purposes;
- Promote positive, safe, and enjoyable visitor experiences;
- Provide State Parks, federal, state, and county agencies, private organizations, and individuals with tools for coordinating their efforts to meet these objectives.

Specific details, such as the exact location and design of a trailhead or how a vegetation management goal is met, will be determined by DWR's Recreation Management Plan or future CSP management and project plans. These subsequent management or project plans will require additional data collection and CSP and public reviews to ensure adherence to the goals and guidelines established within this General Plan, as well as compliance with a suite of environmental protection laws.

When combined with the environmental analysis, the General Plan will serve as a first-tier Environmental Impact Report (EIR), as defined in Section 15166 of the California

Environmental Quality Act (CEQA) Guidelines. The analysis of broad potential environmental impacts discussed in the environmental analysis (scheduled to be provided by summer 2005) will provide the basis for future second level environmental review, which will provide more detailed information and analysis for site-specific developments and projects.

This General Plan aims to restore, maintain and interpret Lake Oroville State Recreation Area's natural and cultural resources, while providing opportunities for continued public use and enjoyment of this well-loved park. To help management find the appropriate balance of development, use, and preservation of park resources, the General Plan identifies an "Adaptive Management Process" that will help park staff monitor and evaluate changes to resources or visitor experiences and propose and implement needed actions. The General Plan is a strategic framework for creatively responding to the park's major issues in order to preserve the park's recreational, natural, and cultural values to benefit all Californians.

THE PLAN AND DWR'S OROVILLE FACILITIES RELICENSING PROCESS

On February 11, 1957, the Federal Power Commission, predecessor to the Federal Energy Regulatory Commission (FERC), issued a 50-year license, effective February 1, 1957, to DWR to construct and operate the Oroville Facilities (FERC Project No. 2100) in Butte County, California. The existing license for Project No. 2100 expires on January 31, 2007. DWR will file its application for a new license by January 31, 2005.

The extensive public involvement of DWR's Oroville Facilities Relicensing Process, which began before and will extend beyond this LOSRA General Plan process, has been considered in the findings of this plan and appropriate proposals for recreational development and cultural and natural resource preservation have been included. State Parks' Northern Buttes District resources, planning, interpretive, and administrative staff (who are also General Plan Team members) have attended Oroville Facilities Relicensing Work Groups from the outset of that process, facilitating coordination of the CSP and DWR planning processes.

The *LOSRA General Plan* is a long-range "big picture" document that guides future park management and development without providing any priorities, implementation schedules, funding sources, or detailed plans. DWR's *Recreation Management Plan* (RMP) differs from this General Plan in that the RMP provides commitments for scheduled implementation, funding, and relatively specific development concepts. In this sense, the *LOSRA General Plan* is an "umbrella" document that offers more conceptual guidance and rationale for the findings of DWR's RMP. These two documents are planned to be mutually-supportive and consistent with each other while respecting the different intents and purposes behind each planning effort.

Because the relicensing of the Oroville Facilities falls under the approval authority of FERC, a federal agency, the agency must comply with the National Environmental Policy Act (NEPA). DWR will prepare a draft NEPA document to be filed with FERC in

January, 2005. As a state agency proposing the project of relicensing the Oroville Facilities, DWR must comply with the California Environmental Quality Act (CEQA) and is expected to have a draft Environmental Impact Report prepared during the summer of 2005.

THE PLAN AND THE CEQA PROCESS

The Draft LOSRA General Plan is both an independent General Plan as required by Public Resources Code 5002.2 and a supplemental attachment to DWR's application to FERC for the relicensing of the Oroville Facilities. A General Plan proposed by CSP would normally be accompanied by an Environmental Impact Report (EIR), which allows CSP to shape the plan, policies and mitigation measures in the General Plan in an iterative process to make sure that impacts are mitigated to a level of less than significant to the greatest extent possible. However, FERC's review of DWR's application (scheduled for submittal in January 2005) will begin and continue beyond that date so the final picture of recreation, environmental, cultural, and other Protection, Mitigation, and Enhancement measures (PM&Es) will not be known when the Draft LOSRA General Plan is completed in December 2004. The separate CEQA and NEPA documents that DWR is preparing for the relicensing process will also not be completed by December of 2004. Since the LOSRA General Plan and its Environmental Impact Report must be consistent with both the Relicensing PM&Es and the CEQA and NEPA findings, and these will not be finalized by December 2004, the December 2004 Draft LOSRA General Plan will not include the usual Environmental Analysis section and will therefore not be considered a Draft Environmental Impact Report. As of November 2004, the environmental analysis for the LOSRA General Plan is being prepared and expected to be completed by summer 2005, at which time the Preliminary General Plan/Draft EIR would be circulated for public review and comment. Subsequent approval of the General Plan and Final EIR is required by the State Park and Recreation Commission. CSP is not preparing an environmental document under NEPA because there are no pending federal approvals associated with the CSP General Plan. No activities proposed in the General Plan occur on federal land or require federal permits or approvals at this time. It is possible that in the future, federal approvals may be required for specific activities. However, CSP is not aware of the need for any such approvals at this time. When subsequent plans and activities are proposed, appropriate environmental compliance and permits will be obtained at that time.

PUBLIC INVOLVEMENT

Public involvement is important to the general plan process. It helps identify significant issues that need to be resolved, provides ideas on how they can best be resolved, gathers information and perspectives, identifies public needs and concerns, and builds partnerships and support to implement the plan's proposals.

The LOSRA General Plan has benefited from the extensive public involvement of DWR's Oroville Facilities Relicensing Process. Northern Buttes District staff, who are

part of the LOSRA General Plan team, participated in the Relicensing Process from the beginning of that process to the end. This early public input contributed much to the definition of the LOSRA General Plan issues and its proposals. After the initiation of the LOSRA General Plan further public input was gathered and stakeholders were informed and involved in a number of ways, including a planning website, a public scoping meeting, and a newsletter. Future opportunities for public involvement include further public meetings during the public's review of the plan and a public hearing for plan consideration by the California State Parks and Recreation Commission.

General Planning Website

A "General Plans in Progress" website for the LOSRA General Plan was established on the California State Parks Internet site (http://www.parks.ca.gov/). This website contains planning information and opportunities for public input such as public comments, newsletters, planning maps, and draft planning documents, park purpose and vision statements, area management and visitor experience goals, and preliminary resource management and recreational development proposals.

Public Scoping Meeting

A Public Scoping Meeting was held on April 14, 2004 at the Oroville Municipal Auditorium. The purpose of this meeting was to introduce the planning process and team and to hear the public's perspectives on planning issues and concerns and recreation and educational opportunities. Twenty-four people participated and a variety of issues were presented, discussed, and transcribed.

EXISTING LOSRA CONDITIONS

LOSRA RECREATIONAL ENVIRONMENT AND FACILITIES

Existing land use at the Lake Oroville State Recreation Area has been shaped by the geologic, environmental, historic, and social influences that formed present-day Butte County. The lake's topography, Lake Oroville itself, regional microclimates, vegetation diversity, and public demand for recreation and resource conservation contribute to the variety of visitor experiences and land uses within the park.

Butte County is divided into two distinct natural environments: a valley area in the northeastern reaches of the Sacramento Valley and a foothill/mountain region located east of the Valley. LOSRA includes some physiographic elements of the Valley floor in the far west areas of the Thermalito Forebay and the Diversion Pool; however, most of LOSRA is located in the foothill region. The majority of the park's acreage (other than the lake itself) is open space dedicated to resource conservation, watershed preservation, and wildlife habitat, with its developed recreation sites occupying a relatively small percentage of park land.

The desire for water access and water-based activities has been the major force affecting land use and recreation development at Lake Oroville. Water-related recreation, such as fishing, waterskiing, pleasure boating, swimming, and houseboating dominates recreational use at Lake Oroville. Other popular activities such as sightseeing, picnicking, and camping are most popular when situated within view of the lake.

The gentler topography of the southern park area (Bidwell Canyon, Oroville Dam, and the flat area below the dam) has most of the park's recreational facilities. With the exception of the facilities in the Lime Saddle Area, the more remote and steeper terrain of the northern parts of the park have relatively little recreational development. Access is the key to most recreational development in and around the Lake Oroville area.

The Bidwell Canyon area, the area around Oroville Dam, the Spillway area, the Saddle Dam area, the Lake Oroville Visitors Center, and Loafer Creek are the significant developments along the South Shore area of Lake Oroville. Due to the presence of public water and sewer utilities in some locations as well as good road access, these recreation developments provide the greatest concentration of recreational facilities at Lake Oroville. These facilities offer visitors a variety of day and overnight experiences including trail hiking, picnicking, camping, boating, and nature watching. With summertime temperatures frequently climbing above 100°F, providing visitors access to the cool waters of the lake is one of the most important functions of these facilities.

Steep terrain, oak woodlands and conifer forests, and a few locations where roads access the lake characterize the west and north shore areas of Lake Oroville. Within this area, the Middle and the North Fork canyons extend the lake's surface into remote areas where the reservoir itself is the primary evidence of civilization. Due to the steep terrain throughout most of this area, there are few locations where road access allows for recreation development. In the South Fork area road access is provided to the

Stringtown and Enterprise car-top boat ramps. The Craig Saddle boat-in campground is accessible only by water. The Middle Fork canyon has virtually no recreation development. Boat access and recreation development along the North Fork includes several recreation developments, including the Bloomer and Goat Ranch boat-in campgrounds and the well-developed marina and campgrounds at Lime Saddle. Other recreation facilities along the North Fork include the small car-top boat ramps at Dark Canyon and Nelson Bar.

The two remaining LOSRA recreational areas, the Diversion Pool and Thermalito Forebay, lie below the dam where the terrain opens up into the valley and access is improved. Minimal recreational facilities occur at the Diversion Pool but the North and South Thermalito Forebay areas are relatively well developed.

RECREATION FACILITY INVENTORY AND CONDITIONS

(Note: Main source of information: Relicensing Study R-10 - *Recreation Facility and Condition Inventory.* Refer to Study R-10 for more detailed information on this topic. See Regional Recreation and Interpretation Section of this General Plan for the regional context of LOSRA recreational facilities).

Overall, most of the developed recreation facilities in the study area are in good condition. However, Lime Saddle Marina was severely damaged by a winter storm in 2002. Repairs are the responsibility of the concessionaire; a new concession contract is being solicited/negotiated.

When Lake Oroville is at its maximum elevation (900 feet above msl), its surface area is approximately 15,810 acres and it has 167 miles of shoreline. As the pool level decreases during the progressing recreation season, the ease of access to facilities (such as boat ramps, car-top boat ramps, and boat-in camps) is increasingly affected, preventing or discouraging the use of some recreational facilities during low water and making shoreline exploration difficult.

Lake Oroville State Recreation Area offers a wide range of overnight and day-use facilities that provide park visitors with a variety of recreational opportunities. *Table 1* lists the locations, types and numbers of developed facilities at the park.

Note: See Tables 5.1–1 through 5.1–6 of Oroville Facilities Relicensing Report R-10: Recreation Facility Inventory and Condition (Sept. 2003) for more details on LOSRA recreation facilities.

Table 1. LOSRA Recreation Site Capacities
Campgrounds • North Thermalito Forebay "En Route" RV Campground (15 RV parking sites) • Spillway "En Route" RV Campground (40 RV parking sites) • Bidwell Canyon Campground (75 campsites/Recreational Vehicle (RV) sites) • Loafer Creek Campground (137 campsites of which 6 are ADA) • Loafer Creek Group Campground (6 campsites with each serving 25 people) • Loafer Creek Horse Campground (15 campsites) • Lime Saddle Campground (28 campsites, 16 RV sites) • Lime Saddle Group Campground (6 campsites of which 3 are ADA)
Boat-in Campsites (BIC) and Floating Campsites • Craig Saddle BIC (18 campsites) • Foreman Creek BIC (30 campsites) • Bloomer Cove BIC (5 campsites) • Bloomer Knoll BIC (6 campsites) • Bloomer Point BIC (25 campsites) • Bloomer Group BIC (10 campsites) • Goat Ranch BIC (6 campsites) • Floating Campsites (10 campsites)
Day-use Areas (DUA) • Diversion Pool DUA - North Shore (road parking) • Lake Oroville Visitors Center (90 car and 17 car/trailer spaces) • Saddle Dam DUA (approx. 40 car/trailer spaces shared with trailhead)
Boat Ramps with Day-use Areas (BR/DUA) • North Thermalito Forebay BR/DUA (251 car spaces of which 3 are ADA, 25 car/trailer spaces of which 1 is ADA, and overflow spaces) • North Thermalito Forebay Aquatic Center (unknown number of spaces) • South Thermalito Forebay BR/DUA (unknown number of spaces) • Spillway BR/DUA (895 upper and 200 lower car/trailer spaces) • Bidwell Canyon BR/DUA (168 car spaces, 283 car/trailer spaces, and overflow) • Loafer Creek BR/DUA (429 car/trailer spaces of which 5 are ADA) • Enterprise BR/DUA (40 car/trailer spaces) • Lime Saddle BR/DUA (111 car spaces of which 12 are ADA, 127 car/trailer spaces of which 7 are ADA, and 100 overflow car/trailer spaces)
Boat Ramps (BR) • Foreman Creek Car-top BR (low-water: 15-30 and high-water: 7 car/trailer spaces) • Stringtown Car-top BR (approx. 6 undefined car/trailer spaces) • Dark Canyon Car-top BR (15-30 undefined car/trailer spaces) • Vinton Gulch Car-top BR (approx. 10 undefined car/trailer spaces) • Nelson Bar Car-top BR (30-50 undefined car/trailer spaces)
Marinas • Bidwell Canyon Marina • Lime Saddle Marina
Formal Trailheads • Powerhouse Road Trailhead (unknown number of spaces) • Saddle Dam Trailhead (approx. 40 car/trailer spaces shared with DUA)
Source: EDAW 2003.

Campgrounds

Bidwell Canyon Campground
The Bidwell Canyon Campground has 75 campsites that can be used for either tents or recreational vehicles (RVs), all with full utility hookups.

Lime Saddle Campground
This campground has 44 individual campsites, 28 individual car/tent sites, 16 sites that are available for RVs with full utility hookups, and a group site. The group campground has 16 single-vehicle parking sites (two are ADA accessible). The group campground is split into two areas, Pinecone and Acorn. Each has a shade structure with three tables underneath, a large barbecue, and a water fountain/spigot. Between the Pinecone and Acorn group campsites there are six tent sites (three are ADA accessible).

Loafer Creek Campground
The Loafer Creek Campground includes 137 campsites (6 ADA accessible) for tents and RVs.

Loafer Creek Group Campground
This area is adjacent to the Loafer Creek Campground. There are six separate group sites, each able to accommodate 25 people. Each unit has several tables, a sink with running water, shade trees, five large tent pads, nearby water spigots, and parking spaces for eight vehicles.

Loafer Creek Horse Campground
This special-use area is located away from the main campground and group camp. The equestrian campground has 15 sites, each with trailer parking, a fire ring with cooking grill, and a table. Additionally, each campsite has a corral to feed and secures. There is a horse washing area that can accommodate two horses at a time. In 2002, there were several upgrades to the site including an equestrian exercise ring and corrals with feeders, and the entrance road was paved. The Roy Rogers Trail and Loafer Creek Loop Trail can be accessed directly from this site.

North Thermalito Forebay RV En-Route Campground
There are 15 “en route” RV parking spaces located in the parking lot; they do not have utility hookups.

Spillway RV En-Route Campground
These spaces are located in the upper parking lot at Spillway. There are no utility hook-ups for these spaces.

Boat-in Campsites

The boat-in campgrounds (BICs) are generally sited adjacent to the lake high-water line and are most usable when the lake levels are high. At low lake levels, accessing the BICs usually requires walking up steep hillsides, sometimes for long distances. There

are no established pathways from the lake to the BICs; most BICs do not have much use when the reservoir is below 850 feet above mean sea level (msl).

Bloomer Cove Boat-in Campground
Bloomer Cove is located on the North Fork of Lake Oroville. There are five individual campsites in this area with tables, fire rings with cooking grills. The site has shade trees and two pit toilets.

Bloomer Knoll Boat-in Campground
This camp is adjacent to Bloomer Cove on the North Fork of Lake Oroville. There are six individual campsites in this area with tables and fire rings with cooking grills. The site has shade trees and two pit toilets.

Bloomer Point Boat-in Campground
This campground is adjacent to Bloomer Cove on the North Fork of Lake Oroville. There are 25 individual campsites in this area with tables and fire rings with cooking grills. The site has shade trees, two vault toilets and two pit toilets.

Bloomer Group Boat-in Campground
This camp is adjacent to Bloomer Cove on the North Fork of Lake Oroville. There is one group campsite with a 75-person capacity. There are also several shared group barbecue cooking grills. The site has shade trees and two pit toilets.

Craig Saddle Boat-in Campground
This campground is located between the Middle and South Forks of Lake Oroville. There are 18 individual campsites in this area with tables and fire rings with cooking grills. The site has shade trees, two vault toilets and two pit toilets, potable water, and a self-registration pay station.

Foreman Creek Boat-in Campground
This campground is located near the Foreman Creek day-use area and boat ramp on the north side of Lake Oroville. There are 26 individual campsites in this area with tables and fire rings with cooking grills. The site has shade trees, two vault toilets and two pit toilets, potable water, and a self-registration pay station.

Goat Ranch Boat-in Campground
This campground is located on the North Fork of Lake Oroville between the Bloomer campgrounds, where the West Branch splits off the North Fork. The area has five individual campsites with tables and fire rings with cooking grills. The site has shade trees, two vault toilets and two pit toilets.

Floating Campsites

Lake Oroville has 10 floating campsites anchored in different areas of the reservoir, such as at the Potter's Ravine area. Each is a two-story structure that can accommodate up to 15 people, with living space and amenities such as a cooking grill,

camp table, restroom, shelves, storage room, cabinets, and a sleeping area. The user must bring potable water, although sink water is provided.

Boat Ramps with Day-Use Facilities

Bidwell Canyon Day-Use Area and Boat Ramp
Located along the southern shore of the reservoir, near the Oroville Dam, the Bidwell Canyon Marina and day-use area is the most popular area at Lake Oroville. The major facilities in the Bidwell Canyon area include the marina, the launch ramp and the campgrounds.

The seven-lane boat ramp was recently extended in 2003 to an elevation of 700 feet above msl. There is parking for a total of 451 vehicles (283 car/boat, 168 single car) in the lower lot. The Bidwell Bar Historical Suspension Bridge and Bidwell Bridge Toll House are located adjacent to the boat ramp parking lot. The concessionaire-run marina offers boat rentals, groceries, fishing supplies, a snack bar, 500 berths and 300 mooring anchors, a fuel dock, and a pumping station for boat holding tanks.

Lime Saddle Boat Ramp and Marina
These facilities are located on the North Fork of Lake Oroville. Facilities include an entrance kiosk, a four-lane boat ramp, 43 single-vehicle parking spaces (11 are ADA accessible) and 127 car/trailer spaces (seven are ADA accessible). Additionally there is parking above the main level in an overflow lot presently used as the marina service yard. The overflow lot could accommodate 100 car/trailer combination spaces, and another 64 single-vehicle parking spaces are available near the entrance kiosk. The boat ramp was recently extended down to an elevation of 702 feet. In December 2002 the marina was severely damaged by a storm. In February 2004, CSP approved the assignment of the existing concession agreement to a new concessionaire who is operating on a month-to-month basis. The current concessionaire is repairing the marina's storm-damaged fuel services, boat repair and supply shop, general store, and pump-out station. The marina offers rental houseboats, patio boats, fishing boats, and ski boats. Also available are short- and long-term overnight moorage, docks, and boat slips.

Loafer Creek Boat Ramp and Day-Use Area
The Loafer Creek Day-Use Area shares the same visitor information and fee collection booth as the other facilities at Loafer Creek. There is an eight-lane boat ramp and a large parking area for 178 car/trailer combinations. All eight lanes of the boat ramp are accessible to a lake level of 800 feet above msl. Two lanes are available to elevation 775. Adjacent to the other Loafer Creek facilities is a day-use area that offers opportunities for swimming, picnicking, and fishing when the lake level is high. There are 80 picnic tables and parking for 251 vehicles, five of which are ADA-accessible spaces.

North Thermalito Forebay Boat Ramp and Day-Use Area
The North Thermalito Forebay covers 300 surface acres and hosts non-motorized boating and other recreational activities. There is a staffed entrance kiosk, two paved boat ramps, one with two lanes and one with three lanes, a swimming beach, and a large picnic area with 117 tables.

South Thermalito Forebay Boat Ramp and Day-Use Area
Located at the southern end of the Forebay, this recreational site has a self-registration pay station, a two-lane boat ramp, and 10 picnic tables. Power boating is permitted here.

Spillway Day-Use Area and Boat Ramp
This is the largest boat ramp facility at Lake Oroville, adjacent to the right abutment of Oroville Dam. Development at the Spillway consists of two sets of multi-lane boat ramps. One of the ramps has eight lanes and can be used during low to medium water levels while the other has 12 lanes and can be used during medium to high water. The eight-lane ramp is separate from the twelve-lane ramp and has its own accompanying parking lot. During high water, both the lower eight-lane ramp and its parking lot are submerged. The lower eight-lane boat ramp was recently extended with a lane to 700 feet above msl. The site has 895 car/trailer parking spaces. The lower lot can accommodate 200 vehicles (car/trailer). Shoreline access allows for fishing at all reservoir levels.

Boat Ramps with No Associated Day-Use Facilities

Lake Oroville has several boat ramps that have been developed with no adjacent day-use facilities.

Enterprise Boat Ramp
This boat ramp is located on the South Fork of Lake Oroville. It is a two-lane boat ramp that is only used during medium and high water levels. The ramp ends at 830 feet above msl. When the reservoir is below 830 feet, the site closes completely to vehicles to protect sensitive resources which may be exposed below this elevation. Fishing and swimming also take place along the shoreline. There are 40 car/trailer parking spaces. There is a vault toilet at the site.

Stringtown Car-Top Boat Ramp
This car-top boat ramp is located on the south side of the canyon about midway up the South Fork of Lake Oroville. There is space to park approximately six vehicles near the end of the boat ramp and there are various other spillover parking areas. Visitors fish and swim at this site. There is a vault toilet (non-ADA accessible). Below the concrete boat ramp is a former county road, now in poor condition, which is used as a boat ramp extension at lower reservoir levels.

Dark Canyon Car-Top Boat Ramp
This boat ramp is located on the West Branch of the North Fork of Lake Oroville. The single-lane boat ramp is used at low to medium reservoir levels. There is a paved parking lot (approximately 20 by 20 yards with a capacity of approximately 15-30 vehicles). There are three pull-out areas between the parking lot and the end of the boat ramp, which is helpful because the road is narrow. There is one vault toilet. The ramp pavement is in good condition.

Foreman Creek Car-Top Boat Ramp
The boat ramp is on a peninsula between the middle and north forks of the lake. The two-lane boat ramp can be used at all reservoir levels. Boating, fishing, and swimming take place at this site. When reservoir levels fall below 800 feet, the site is closed at night and additional security is present during the day to protect sensitive resources. Roped off parking areas can accommodate approximately 15-30 vehicles. At high reservoir elevations there is only roadside parking, which will accommodate approximately seven vehicles. There are no restrooms at this location.

Nelson Bar Car-Top Boat Ramp
This boat ramp is located on the West Branch of the North Fork of Lake Oroville. The shoulder of the lower section of the boat ramp below the improved concrete surface is passable only on foot due to a rough surface, so many people carry their boats to the water. This ramp can only be used at higher reservoir levels. The site has a gravel parking lot (approximately 60 by 60 yards and will accommodate approximately 30-50 vehicles) at elevation 894 feet above msl. There are three pull-out areas between the parking lot and the end of the boat ramp, which is helpful because the road is narrow. There is one vault toilet (not ADA accessible).

Vinton Gulch Car-Top Boat Ramp
The Vinton Gulch Car-top Boat Ramp is located on the West Branch of the North Fork of Lake Oroville. The single-lane boat ramp is not used at low or medium reservoir levels due to rough terrain below the end of the ramp. In addition to boat launching, shoreline fishing also takes place at Vinton Gulch. There is no designated parking area; however, roadside parking can accommodate approximately 10 vehicles. The site has one vault toilet (not ADA accessible).

Trails

The trail system at Lake Oroville provides over 55 miles of trails, which accommodate diverse recreation uses including mountain biking, horseback riding, walking and hiking. In recent years, several trails have been upgraded to meet the Federal Access Board trail standards for slope and surface.

See *Map 9: Trails* for an orientation to the LOSRA Trail System.

Kelly Ridge/Bidwell Canyon Trail
The 4.9 mile, Bidwell Canyon Trail can be accessed from the Bidwell Canyon Boat Ramp parking area. The Bidwell Canyon Trail Is maintained and managed by CSP. The trail is considered to be in good condition and is located in a foothill setting.

Brad P. Freeman Trail
The Brad P. Freeman Trail provides 41 miles of scenic off-road recreation, primarily used by riders on all-terrain bikes. The trail circles the North and South Thermalito Forebays, the Thermalito Afterbay, the Diversion Pool and the crest of Oroville Dam. About 30 miles of the trail are flat but include some rolling terrain. Steep grades can be found on either side of the dam within a few miles of Lake Oroville. Although the trail is designated multi-use, it is primarily used for mountain biking, with some downhill and cross country bike races also occurring on the trail.

Chaparral Interpretive Trail
The Chaparral Interpretive Trail can be accessed from the Lake Oroville Visitors Center. The 0.20 mile trail was recently improved by CSP for to meet the Federal Access Board standards.

Dan Beebe Trail
The Dan Beebe Trail is a 14.3-mile loop trail that can be accessed at the Loafer Creek Horse Campground or near the dam off of Oro-Dam Boulevard and rises from an elevation of 200 to 1,000 feet. Much of the trail winds above the reservoir and provides scenic vistas and an opportunity to access undeveloped areas. The vast majority of the trail is not paved, making it ideal for joggers seeking a softer surface on which to run.

Lime Saddle Trail
The partially-completed Lime Saddle Trail connects the Lime Saddle Campground and Marina.

Loafer Creek Day-use/Campground Trail
The Loafer Creek Day-use/Campground Trail is 1.7 miles in length. The 1.2 miles of the Loafer Creek Day-use/Campground Trail is managed by CSP. The trail is in a foothill setting and provides a rural experience.

Loafer Creek Loop Trail
The Loafer Creek Loop Trail is a 3.2-mile trail which CSP currently manages for equestrians or hikers. The trail is in a foothill setting and provides a rural trail experience.

Trailheads

Saddle Dam Trailhead
The Saddle Dam Trailhead provides access to the Dan Beebe Trail, Bidwell Canyon Trail and the Loafer Creek trail system. Located on the southeast side of Kelly Ridge, the Saddle Dam Trailhead has an unpaved parking area that can accommodate

car/trailer combinations. In addition to trail access, the parking area provides access to the reservoir's shoreline during high water for swimmers and anglers. Year-round, the trailhead provides a place to off-load horses and access the equestrian trail. There is a vault toilet at the trailhead.

Lakeland Boulevard Trailhead

The Lakeland Boulevard Trailhead, currently operated and maintained by DWR, is located east of Diversion Pool. The site is unpaved and provides parking for car/trailer combinations. There is no shoreline access at the site. Chemical toilets are provided at the trailhead. The gate to the site is locked from sunset to dawn.

Boating Facilities, Use, and Perceptions

(Main source of information: Relicensing Study R-7 - Reservoir Boating. *Refer to Study R-10 for more detailed information on this topic.)*

Condition of Boating Facilities

The boat ramps and associated facilities on Lake Oroville and the downstream reservoirs are generally in good condition and meet most established standards for the design of such facilities. Features assessed include number and size of vehicle and vehicle-trailer parking spaces, number of ADA accessible parking spaces, ramp slope and lane width, low water usability, and restrooms. Parking, restrooms, and other amenities were reconstructed during 2002 at the Spillway Boat Ramp (BR), the largest boat launching facility on the lake.

The Bidwell Canyon and Loafer Creek Boat Ramps do not meet standards for single-vehicle parking spaces (no designated regular-sized spaces are provided). The conventional standard recommends a number of vehicle parking spaces equal to 10 percent of the number of vehicle-trailer spaces. At Loafer Creek, there were usually several unoccupied vehicle-trailer spaces, each of which provides space for two cars, with additional unoccupied vehicle-trailer spaces remaining for arriving boaters. Parking is more problematic at Bidwell Canyon. Vehicles parked in vehicle-trailer spaces contributed to the frequent turning away of boaters from the site during peak season weekends due to lack of parking. Boaters who are turned away at Bidwell would most likely go to the Spillway ramp, about two miles away, which has ample parking.

The other standard not met at several major boat ramps is for the number and length of floating boarding docks. Although the Spillway ramp does not meet the standard, the current amount of use of the ramp did not appear to cause the existing three docks to be severely inadequate. However, the single docks at Bidwell Canyon and Loafer Creek are in high demand, and often make launching and retrieval more difficult and reduce launch and retrieval efficiency.

The Spillway, Lime Saddle, and Bidwell Canyon BRs meet the standard for low-water usability during both the peak boating season (Memorial Day weekend through Labor Day weekend) and the non-peak season. The standard suggests that the ramp should

be usable 90 percent of days over the previous 10 years for the season of interest. Each of those ramps was extended by DWR in December 2002 and now provides boaters year-round access to the water during most years.

The Loafer Creek and Enterprise BRs do not reach as low and do not meet the standard as applied to the peak season, having been usable 67 and 47 percent, respectively, of peak season days over the last 10 years. While launch opportunities are still provided relatively nearby when the Loafer Creek BR is dry (at Bidwell Canyon or Spillway), boaters wishing to launch on the east side of the lake (Middle Fork and South Fork arms) often do not have a developed ramp readily available. This suggests that special consideration should be given to extending the ramp (thus the use season) at Enterprise or providing new access in the area.

Boating Use Levels

Counts of boats on the FERC Project Area reservoirs were conducted during the 2002 and 2003 peak boating seasons, and the late winter and spring portion of the 2003 non-peak season. Lake levels were low much of the 2002 peak season, but were high to moderate the entire 2003 peak season. The counts indicated that boating use levels are relatively light on Lake Oroville given the size of reservoir.

The highest use levels were observed on peak season holiday weekends when approximately 700 to 1,050 boats were in use on the water. Because a high percentage of these were beached or moored on or near shore, the density of boat traffic was much less than if most boats were active. The Middle and South Fork zones generally receive the greatest amount of boating use, both in terms of numbers of boats and boat traffic density. The types of boats using the lake are diverse during the peak season, with runabouts/ski boats and houseboats most prominent.

Non-peak season use was much lower on Lake Oroville, averaging about one-quarter to one-third of peak season use levels. Fishing boats are the dominant boat type during the non-peak season.

Use levels can be characterized as low on the Diversion Pool, Thermalito Forebay, and Thermalito Afterbay during both the peak season and non-peak season.

Boating Perceptions

Overall, boating conditions appear safe on the FERC Project Area reservoirs. Nevertheless, about 10 percent of boaters did experience behaviors that they felt put them at risk. This underscores the concerns of law enforcement personnel and the need for continued attention to boater safety on the water. The presence of patrol boats on the water during the peak season is particularly valuable toward maintaining safe boating conditions.

Boaters' primary concerns regarding water conditions are related to Lake Oroville fluctuations and exposed land and shallow areas at low pool levels. Lake levels below 850 feet, which commonly occur during the peak use season, eliminate water access to

certain coves popular with houseboaters and other boaters. Lake levels below 800 feet substantially reduce the number of launch lanes available lake-wide, considerably reduce the surface area available for boating, and arguably increase navigation hazards. These concerns are particularly prominent in the study results due to conditions during the 2002 season, when lake levels were below 850 feet during the entirety of the peak boating season and below 800 feet for the last seven weeks of the season. Law enforcement personnel also identified safety issues related to seasonal water level changes at Lake Oroville. CSP maintains buoys marking major underwater obstructions.

Water level fluctuations at Lake Oroville are and will remain a fact of normal operations of the Oroville Facilities. As such, efforts to minimize (to the extent possible) the effects of water level fluctuations on boater access, safety, and enjoyment will likely continue. This specifically includes provision of adequate boat access during low water periods, marking of underwater hazards, and collection of the floating debris on Lake Oroville that accumulates as the reservoir fills during the spring of each year.

Boating Carrying Capacity

Due to the diversity of boating use, the wide range of boating conditions at various locations and time of year, and the complexity of physical, facility, social and ecological factors, no attempt was made by the authors of Relicensing Study R-7 to calculate a maximum boating use limit (boats at one time) for Lake Oroville or the downstream reservoirs. Rather, this study determined whether current use levels and character of use appear to be approaching or exceeding acceptable levels based on physical/spatial, facility, social, and ecological considerations (see Carrying Capacity Section for more information).

Results of a joint pilot project being conducted by CSP and the Bureau of Reclamation (BOR) at the FERC Project Area reservoirs (and at other California reservoirs) will provide information classifying each zone of Lake Oroville and the other project reservoirs. The classifications will be based on the existing recreation setting within a range of setting types using the water recreation opportunity spectrum (WROS) concept. The objective of WROS is to recognize and preserve a range of recreation opportunity choices for visitors. Lake managers may want to consider applying this information in future recreation planning to define the conditions to be managed for on each reservoir or reservoir zone. A clear statement of desired future conditions is a prerequisite for defining recreation carrying capacity for the reservoirs. The WROS information for Lake Oroville and the other SWP reservoirs can assist in meeting the need for such a statement, which would contain three elements: (1) goals defining the recreation experience or experiences that are to be sustained over time in each area, (2) goals describing the resource conditions that are to be sustained over time in each area, and (3) definitions of the appropriate amount and type of use for each area.

Park Concessions and Operating Agreements

Several concessionaires currently operate under agreements with California State Parks (CSP) and provide a variety of specialized, commercial-oriented services and activities which are not normally provided by CSP or the Department of Water Resources (DWR). Most of the commercially-oriented facilities at Lake Oroville State Recreation Area (LOSRA) are fully operated and managed by concessionaires.

The two largest concession-operated facilities at Lake Oroville are Bidwell Canyon Marina and Lime Saddle Marina. Each marina is operated by a separate concessionaire under a separate agreement with CSP. Some of the major elements of these agreements are described in more detail below.

Bidwell Canyon Marina
The current concessionaire is operating under a 40-year contract due to expire in December 2009. Services provided at the full-service Bidwell Canyon Marina include boat and houseboat rentals, mooring docks, slip and buoy rentals, dry boat storage, boat repair service, gasoline, houseboat holding tank pump-out, snack bar/restaurant serving hard liquor, boating supplies, sundries, and souvenirs.

Lime Saddle Marina
In February 2004, CSP approved the assignment of the existing concession agreement to a new concessionaire who is operating on a month-to-month basis under the expired contract while new proposals are developed. Lime Saddle Marina is a full-service marina providing boat and houseboat rentals, mooring docks, slip and buoy rentals, shuttle service, dry boat storage, boat repair service, gasoline, houseboat pump-out, boating supplies, sundries and souvenirs. The following are additional concessions operating out of the Lime Saddle Marina:

Advanced Diving Services and North State Diving, Inc. are boat hull cleaning and salvage service concessions, and include deep water diving services. Advanced Diving Services is operating on a five-year agreement which will expire in 2009, and North State Diving is operating on a one-year concession expiring in 2005. These services operate out of both Lime Saddle and Bidwell Canyon marinas.

The North Valley Guide Service, a fishing guide concession with a two-year agreement expiring in 2006, offers guided fishing trips on Lake Oroville. The guide service typically meets clients at the Spillway parking lot.

North Forebay Aquatic Center
The North Forebay Aquatic Center is operated by the Associated Students of California State University, Chico, and is staffed by university students and several professional staff. The Aquatic Center offers kayak, canoe, sailboat and other non-motorized vessel rentals and instruction classes are also open to members of the public. The aquatic center periodically provides day camp activities for underprivileged children of Butte County and special events including paddle-powered boat and sailboat races. The

Center is currently operated under a temporary Special Event Permit for the summer of 2004, and is in a process of negotiation with CSP for a continuation of services.

LOSRA INTERPRETATION

Interpretation helps visitors gain understanding and appreciation of the significant stories of the park's natural, cultural and recreational features.

(Note: See Regional Recreation and Interpretation Section of this General Plan for the regional context of LOSRA interpretation).

The Lake Oroville Visitors Center

The Lake Oroville Visitors Center serves as the main hub of interpretive activity at Lake Oroville State Recreation Area. State Parks shares this facility with the Department of Water Resources, which funds two of their own interpretive staff positions and augments the funding of CSP interpretive staff.

The visitors center building is divided into two interpretive stories. The Water Resources section focuses on the Lake Oroville Dam, its history, and its water uses. The CSP section features a Maidu village diorama, an exhibit on the well-known Native American Ishi, and a gold rush-era display. On-demand films related to Lake Oroville and its resources are offered for visitors. An entrance lobby with gift shop ties the area together.

Outside the Visitors Center, a viewing tower with stairs provides a view of the park and surrounding lands and waters. A nearby picnic spot also serves as the gold panning demonstration area. A clearing in the adjacent blue oak/chaparral habitat is used for staging outdoor natural history school programs.

Self-Guided Nature Trail/ Accessible Trails

Self-guided nature trails weave their way throughout LOSRA. Potter's Ravine Trail has interpretive panels identifying areas where bald eagles nest and native plants grow. A section of *Potter's Ravine Trail* is wheelchair-accessible. *The Chaparral Trail* is wheelchair-accessible and has four interpretive panels focusing on the native uses of plants and natural history. The Wyk Island Trail is wheelchair-accessible.

Wayside Exhibits

Approximately 17 interpretive panels are strategically placed throughout the park presenting topics such as bald eagle nesting, mountain lions, and park orientation. Some are CSP generic panels and others are custom-made for the park. Many panels and shelters have been replaced and adjusted to comply with ADA guidelines.

Interpretive Programs

The park's popular school group presentations offer programs year-round. These programs conform to the California Social Science/History Educational Standards and function as an extension and enrichment of the classroom learning of social studies of California's rich heritage. The program, *Maidu: Native People of the Feather River* is presented to school groups and as a campfire program to visitors. It highlights the lifeways of local Maidu people and teaches a cultural resource preservation ethic. The interpretive program, *Gold Panning from 1850*, offers children the opportunity to pan for gold in gravel "salted" with real gold nuggets. Wildflower and butterfly programs are offered to schools and are presented in the blue oak/chaparral area adjacent to the Visitors Center.

The program, *Lake Watcher Nature Hike Series* is offered every spring and is presented by staff and volunteers. *Bidwell Bar Day* is an annual late spring living history event that features music, games, and activities geared towards the 1850s. Visitors step back in time and are encouraged to participate in dozens of hands-on activities. The *Wednesday Summer Speaker Series* features experts sharing their knowledge through video and lecture. Subjects include Maidu medicinal plants, the Bicentennial journey of Lewis and Clark, the Maidu Singers, and 19th century California. The Gold Panning Program is offered for visitors every Sunday during summer months. The annual *Frontier Christmas* features events geared towards the 1850s with a Christmas theme. Summer campfire programs with varying themes are presented every Saturday by ranger staff. Junior Rangers and Junior Cubs programs are offered twice weekly during the summer. Kayak and canoe tours are offered spring, summer, and fall at North Thermalito Forebay and the Diversion Pool.

Campfire programs are presented at the Loafer Creek Campground amphitheater. During summer and spring LOSRA offers the "Famcamp" program that provides camping equipment to low-income families and inner city youth groups so they can experience camping at LOSRA.

North Thermalito Forebay and the Diversion Pool are staging areas for aquatic rescue camps and other aquatic-associated programs.

The Bidwell Canyon Toll House, Bidwell Bar Bridge, and Wyk Island serve as a staging area for Bidwell Bar Day, a "living history" event at the park. The Toll House is a replicated store with museum (currently being developed). When the dam was built, the original historic bridge was relocated. It connects the Toll House area with Wyk Island.

Outreach Programs

Rangers, volunteers and other interpretive staff present off-site natural history interpretive programs at local schools and organizations. *Exploring the Past* is a children's activity guide for presentation to third and fifth grade classrooms teaching children about prehistoric Maidu people, the role of archaeologists and the importance

of protecting cultural resources. State Parks also operates an interpretive booth at the annual Oroville Salmon Festival.

State Parks and DWR run the yearly aquatic rescue camp with the Feather River Recreation and Parks District and the Chico Area Parks and Recreation Department.

Interpreting the California State Water Project

LOSRA is a popular destination for many groups interested in the engineering marvel that is Lake Oroville. The story of the California State Water Project (SWP) is presented often by DWR interpretive staff associated with the Visitors Center. This program is popular with water districts throughout the nation and the world. Tours of the dam were very popular with many groups before the terrorist attacks of September 11, 2001. Due to security concerns those tours have been discontinued.

Interpretive Publications

Printed interpretive information about the park is limited to the park brochure, a trail map, and various publications by DWR. A learning packet developed by DWR is given to each school class visiting the Visitors Center. *Protecting the Past for the Future* is a brochure for visitor outreach. It was written for seventh grade to adult level to educate visitors about protecting cultural resources. Rangers and site stewards hand them out in the field. They are also available at various locations in and around the community. Brochures are offered in large print font for disabled visitors. A cassette recording narrative of the museum is available with a tape player.

The Department of Boating and Waterways provides public water recreation and safety information for dissemination to the public. They also provide water bottles, keychain floaters, water safety flags, etc. for visitors during boating safety campfire programs.

Interpretive Collections

Reproduction artifacts are used in the hands-on portion of the Maidu program offered in the park. These include items such as furs, an acorn woodpecker trap, a winnowing tray, bone awls, a pump drill, soap root brushes, a clapper stick, basketry materials, a mortar and pestle and other small pieces. Eight contemporary Maidu baskets woven in the traditional way by local Maidu people are in the Visitors Center Maidu diorama. A display case with artifact baskets is also in this area. A large trough is used in the gold panning program with contemporary gold pans. A gold rocker and other display items are in the exhibit areas. Natural history specimens are displayed in the exhibit and some are stored in the basement. A collection of live fish from the lake is displayed in a large aquarium at the Visitors Center lobby/gift shop. Many reproduction items were used to furnish the James Beckwourth cabin trading post exhibit which is part of the gold rush exhibit.

Interpretive Associations and Park Volunteer Programs

The Bidwell Bar Interpretive Association at LOSRA provides funding and outreach to help support the park's interpretive efforts. All interpretive services conducted at LOSRA are provided by a Northern Buttes District interpretive specialist, a park interpretive specialist, State park rangers, volunteers, and two DWR staff. Volunteers augment park staff at the Visitors Center, disseminate information, and help run the gift shop.

California State University at Chico currently runs the Aquatic Center at the North Forebay. They offer water education programs for local schools and organizations.

The Maidu exhibit team consists of local volunteer Maidu Native Americans providing input for the ongoing enhancement of the LOSRA Visitors Center Maidu exhibit. The baskets of some of the Maidu members of the exhibit team are part of the exhibit. The team meets as needed and offers valuable feedback on the interpretation of their culture.

California State Parks works with the Oroville Chamber of Commerce and the Butte County Historical Society to prepare and present some interpretive events and programs at LOSRA.

The Mounted Assistance Unit patrols park trails and Camp Hosts live in the park at various locations where they help run the campgrounds.

The California Archaeological Site Stewardship Program trains and certifies the volunteer archaeological site stewards to monitor the cultural sites in and around LOSRA.

VEHICULAR ACCESS TO RECREATION AREAS

(Main source of information: Relicensing Study R-1 - *Vehicular Access Study.* Refer to Study R-1 for more detailed information on this topic.)

There are no major constraints to vehicular access within the FERC Project Area.

Traffic Circulation

Highway 70 is the primary access route to the Oroville area, with Highway 162 (The Oroville-Quincy Highway) providing the primary access route to the south shore of Lake Oroville. As it extends to the north of Oroville, Highway 70 also provides the primary access route to Lake Oroville's North Fork area including the Lime Saddle Marina and other boat ramps, campgrounds and related facilities found along the North Fork of the lake. Most of the high-use facilities located on the south shore of the main basin of Lake Oroville can be accessed along Kelly Ridge Road and Miners Ranch Road, which connects to Highway 162. These facilities include the Bidwell Canyon Marina and

campground, the Lake Oroville Visitors Center and the Saddle Dam day-use area. The Loafer Creek area can also be accessed from Highway 162 along Loafer Creek Road. Along the north fork of the lake, the Lime Saddle Marina and campground is accessed via Lime Saddle Road which connects to the Pentz-Magalia Highway and to Highway 70.

Road access to the moderately-used and lower-use recreation facilities at Lake Oroville often entails driving on marginally-improved or unimproved roads in relatively remote areas. Along the north fork of the lake, nearly all local roads providing access to lake facilities connect with Highway 70. The Vinton Gulch car-top boat ramp is accessed from Vinton Gulch Road which connects with Cherokee Road and Highway 70, while the Nelson Bar car-top boat launch is located on Lime Saddle Road.

The recreation facilities located along the Middle Fork and the South Fork canyons of Lake Oroville are served primarily by Highway 162. Along the South Fork, Forbestown Road provides access from Highway 162 to the Stringtown and Enterprise car-top boat ramps, while the Foreman Creek car-top boat ramp is accessed from Foreman Creek Road.

Butte County and the Butte County Area Governments regularly update their projections for average daily traffic (ADT) on LOSRA-serving roads. The estimated ADTs (from the Butte County Circulation Element of the Butte County General Plan) for roads in the LOSRA area are below in *Table 2*.

Table 2. Estimated ADTs on LOSRA-Serving Roads

Road-Highway Segment	CalTrans Forecast (2000)	Butte County Forecast (2005)
State Route 162 East- Junction w/ Hwy 99	11,400	12,900
State Route 162 East- Junction w/ Olive Hwy.	17,500	27,900
State Route 162 East- Junction w/ Kelly Ridge Rd.	6,200	6,200
State Route 162 East- Junction w/ Forbestown Rd	1,700	3,000
State Route 70- Junction w/ State Route 162	12,200	16,000

Assessment of Relative Traffic Contributions for LOSRA Facilities

As part of the FERC relicensing process for Lake Oroville, DWR commissioned additional studies for assessment of the use levels of recreation facilities at Lake Oroville. One of these studies identified the average number of vehicles present at each major recreation facility location. The relative vehicle traffic attributed to visitor use of the various recreation facilities can be inferred from this information (i.e. one vehicle at one time (VAOT) equals approximately one vehicle round trip on the roads serving the recreation facility location).

Table 3 identifies the VAOT for the various recreation areas within LOSRA, from which the relative contribution to average daily traffic (ADT) for the roads and highways serving LOSRA facilities can be determined. As an example, the VAOT for the Bidwell Canyon Marina was identified at 296 for an average holiday period. Assuming that a conservative ADT count would be twice this number, the ADT contribution to Kelly Ridge Road and Miners Ranch Roads, attributed to the recreation development at Bidwell Canyon, would be about 592.

Table 3. Summary VAOT for Peak Season, Off-Season and Holiday Periods

Site Name/Location	Recreation Season				Off-Season				Avg. Holiday	Max. Holiday
	Weekday		Weekend		Weekday		Weekend			
	Avg	Max	Avg	Max	Avg	Max	Avg	Max		
Bidwell Canyon BR/ Marina	83	213	189	228	10	17	54	161	296	367
Loafer Creek BR	112	17	82	126	NA	2	16	44	77	84
Loafer Creek DUA	4	8	4	8	1	1	2	7	6	10
Lime Saddle Marina/DUA	52	76	126	183	19	30	38	79	195	319
Spillway BR/DUA	32	46	106	184	9	9	90	130	119	235
Oroville Dam/Overlook DUA	4	8	7	16	4	6	11	20	8	11
Foreman Creek Car-top	4	9	15	19	1	2	6	22	19	26
Dark Canyon Car-top BR	4	6	2	2	1	2	3	5	NA	9
Vinton Gulch Car-top BR	1	4	1	1	0*	0*	3	6	NA	1
Nelson Bar Car-top BR	11	17	3	3	1	2	3	9	9	19
Stringtown Car-top BR	6	12	15	25	NA	0*	5	6	13	15
Saddle Dam TA	2	4	1	3	0	1	3	10	3	6
Enterprise BR	3	6	6	9	NA	0*	6	18	NA	27
Diversion Pool DUA	2	5	2	4	2	4	4	10	3	3
Lakeland Boulevard TH	0*	3	0*	2	1	2	3	11	3	6
Powerhouse Road TH	2	3	1	1	1	2	2	5	0*	0*
North Thermalito Forebay BR/DUA	11	20	143	192	5	12	12	37	302	481
South Thermalito Forebay BR/DUA	6	11	6	10	4	5	5	11	15	25

At the time of observations, there were no vehicles at the site. This does not indicate no use at the site.
Note: NA means "not available." If only one observational count was done, an average was not calculated.
(Source: EDAW, Inc. 2003)

ADA ACCESSIBILITY

(Main source of information: Relicensing Study R-6 - ADA Accessibility Assessment. Refer to Study R-6 for more detailed information on this topic.)

Most recreational facilities within the Project study area are in compliance with the ADA. Most of the sites which are not ADA accessible meet the ADA requirements because

another suitable site within the same program is accessible creating “programmatic accessibility.” CSP completed the majority of planned ADA-related construction by the end of FY 03/04.

Potential ADA compliance issues exist within the FERC Project study area. While currently planned upgrades to facilities are projected to meet future accessibility needs, certain experiences may not be available to disabled users, including boat-in camping and some day-use activities and programs.

Several types of camping experiences are not currently available to disabled users. None of the boat-in-campsites or floating campsites are ADA accessible. Boat ramps and boat-in-campsites have not been considered for ADA upgrades because of the difficulty presented by lake level fluctuations. The feasibility of making boat-in-campsites or boat ramps accessible has not been investigated. Below 800 feet msl, most of the boat-in-campsites are not in use by the public. Accessibility improvements at any facilities could also be enjoyed by the public in general.

AREAS SUITABLE FOR NEW RECREATIONAL DEVELOPMENT

(Main source of information: Relicensing Study R-15-Recreation Sustainability Study. Refer to Study R-15 for more detailed information on this topic.)

Study R-15: Recreation Suitability Analysis, identified (and described through extensive mapping) the following locations that may be considered for potential recreation site development in the Lake Oroville resource area, if needed:

- Lands near Lime Saddle Boat Ramp (BR) and Lime Saddle Campground (see Figures 5.3-1, 5.3-5 in Study R-15);
- Lands near the Bloomer Area Boat-In Campsites (BIC) (Figure 5.3-1 in Study R-15);
- Lands near Spillway Day-Use Area (DUA) and Boat Launch and Oroville Dam Overlook DUAs (Figures 5.3-2 and 5.3-4 in Study R-15);
- Lands adjacent to the Loafer Creek and Bidwell Canyon facilities (Figures 5.3-2 and 5.3-4 in Study R-15);
- A thin strip of land near the Bald Rock Canyon Access (Figure 5.3-2 in Study R-15);
- And a large inland area to the east of Craig Area Saddle BICs (Figure 5.3-2 in Study R-15). This site can be accessed via the Craig Access Road; however, part of the road is currently gated.

Most areas of high suitability for potential recreation site development in the study area are found near or immediately adjacent to existing recreation sites and are relatively small in size. It therefore follows that most efficient future recreation development in the study area would be through the infill or expansion of existing recreation sites, rather than through the creation of new ones where no facilities currently exist. Some lands near the Foreman Creek Car-top BR (Figure 5.3-2 and 5.3-7 in Study R-15) appear as

highly suitable, but a review of the archaeological resources map indicates that there are concerns related to cultural resources near this site that may preclude such use. A large area east of the Craig Saddle BICs provides the most suitable area for a large, new recreation site in the study area. This large area of land is shown as being of "high suitability" along the existing, unpaved access road to this area. Shoreline access from this site, however, is limited by steep slope and some sensitive environmental resource issues.

Areas deemed suitable for potential future recreation site development in LOSRA below Oroville Dam, if needed, include: lands near the west end of the Diversion Pool, close to the Lakeland Boulevard Trail Access (Figures 5.3-3 and 5.3-6 in Study R-15) and lands adjacent to the North and South Thermalito Forebay recreation facilities (Figure 5.3-3 in Study R-15). As most of these areas are near or adjacent to existing recreation sites, it seems most appropriate that they be used for expansion or infill of existing facilities. These sites may be accessed by existing roads. Slope is generally less of an issue below the Oroville Dam compared to the Lake Oroville area, as these lands comprise the edges of the Sacramento Valley.

VISITOR USE AND RECREATION DEMAND

Existing Recreation Use Patterns

(Main source of information: Relicensing Study R-9 - *Existing Recreation Use.* Refer to Study R-9 for more detailed information on this topic.)

Lake Oroville State Recreation Area offers its many visitors more recreational variety than any other lake or reservoir in California. The lake offers 15,810 surface acres of water and 167 miles of shoreline at maximum water storage level. Visitor activities in and around the park include boating, picnicking, fishing, hiking, overnight stays on floating and boat-in campsites as well as at drive-in campsites, wildlife viewing, photography, swimming, mountain bicycling, limited hunting, horseback riding, visiting historical sites, and viewing interpretive exhibits around the park and in the Visitors Center.

Park Visitation

Current attendance at the park is approximately 1 million visitors per year based on Department of Park and Recreation visitor use statistics. Attendance records from the past six years show an increasing number of visitors each year, from approximately 460,000 in 1997/98 to 1.3 million in 2002/03. Department visitor attendance records report that the majority of the total visitors to the park are from northern California (49%), with 23% from southern California, and 28% from out-of-state.

Attendance at the park during the spring, summer, and fall averages 94% of total visitor use. Summer attendance shows the highest visitor use, at an average of approximately

66% of total annual use. Approximately 6% of total visitor use occurs during the winter (December-February).

Table 4. Key Origination Points of Park Visitation		
Visitor Origination	**Area**	**Miles Distant**
Local	Butte County	12 miles
Regional	Sacramento Area	75 miles
Distant	San Francisco Bay Area	130 miles

LOSRA has numerous facilities which enhance and create opportunities for boating, camping, and other shore-based activities (see Maps 3A to 3F). The majority of LOSRA recreation facilities are oriented to water recreation and camping, with other types of specialized recreation development occurring in other locations.

Most Popular Activities within the FERC Project Area

As *Table 5* shows, boating access was the activity with the most recreation days (RDs). Boating access accounted for more than 500,000 RDs, equaling about 30 percent of the total activity use within the FERC Project Area. This demonstrates that boating was the most popular activity in the FERC Project Area, and includes boat fishing, personal watercraft use, motorboating, houseboating, and water skiing. There are boat ramps at 16 of the 36 recreation sites, and a few other sites have undeveloped boat ramps, allowing for boating access at every geographical area within the FERC Project Area.

Sightseeing was the second most popular activity with more than 400,000 RDs and 26 percent of the total use within the FERC Project Area. There was some sightseeing activity at every geographic area within the FERC Project Area; however, it was at sites such as the Lake OrovilleVisitors Center, Oroville Dam/Overlook DUA, and the Feather River Fish Hatchery (where sightseeing is the main use) that gave this activity such a high number of RDs.

Table 5. Ranking of activities in the FERC Project Area based on percent contribution to total use in FERC Project Area		
Activity	**Percent contribution to total use in FERC Project Area**	**Number of RDs**
1. Boating access	30.4	505,004
2. Sightseeing	26.5	439,179
3. Bank fishing	18.3	304,100
4. Picnicking	9.3	155,007
5. Swimming	6.1	100,896
6. Camping	3.8	62,339
7. Other	3.7	62,173
8. Trail use	1.0	15,984
9. Hunting	0.8	13,861
Total	100	1,658,540
Sources: CSP 2003; DWR 2003; EDAW, Inc. 2003.		

Bank fishing was the third most popular activity with about 300,000 RDs, equaling about 18 percent of total use in the FERC Project Area. Bank fishing was especially popular at the car-top boat ramps and in the Oroville Wildlife Area (OWA). Picnicking was fourth in terms of percent contribution to total use, with about nine percent (155,000 RDs). There was some picnicking use at every geographic area in the FERC Project Area. Swimming, which occurred most at Loafer Creek DUA on Lake Oroville and at Thermalito Forebay and Thermalito Afterbay, was the fifth most popular activity, contributing about six percent of total use in the FERC Project Area. Camping was the sixth most popular activity with just under four percent of total use, followed closely by "other" use, which consists mainly of walking on top of Oroville Dam and around North Thermalito Forebay BR/DUA. Trail use and hunting had the lowest percentage contribution to total use in the FERC Project Area (about 1 percent each).

Boating

There are several types of watercraft and boating activities that occur at LOSRA: houseboating, water-skiing, using personal watercraft (PWC), small motorized fishing boats, large powerboats, and non-motorized boats such as sailboats/windsurfers, canoes, and kayaks. In a Chico State University "Recreation Use Study" (1987), boat fishing was the number one recreation activity at LOSRA, waterskiing was second, pleasure boating was third, houseboating was seventh, and PWC use was eighth. Boating is clearly one of the main reasons that visitors come to LOSRA. There are two concessionaire-run marinas that support the needs of boaters, including rentals of many types of boats. The Bidwell Canyon Area is the primary marina on Lake Oroville and has the largest boat ramp with campgrounds that are located nearby. On summer days, large groups of pleasure boats and water skiers can often be observed in and around the Bidwell Canyon Marina. Another popular boating spot is the South Fork of the lake between the Stringtown and Enterprise car-top boat launch ramps. Lime Saddle Marina is on the less-crowded northwest arm of the lake and is preferred by many boaters because it affords easy access to the upper arms of the lake. Lake Oroville also frequently hosts a substantial number of boaters who camp in one of the LOSRA campsites.

Most Popular Boating Access Sites

The five most popular boating access sites are listed in *Table 6*. Use at the marinas at Lime Saddle and Bidwell Canyon was included with use at the BR/DUAs at these sites; the marinas share parking with the BR and DUA, making it impossible to separate the number of marina users from the number of BR/DUA users. Four of the top five boating access sites are located on Lake Oroville; the fifth most popular site, Monument Hill BR/DUA, is located on Thermalito Afterbay.

Bidwell Canyon BR/DUA/Marina was the most popular, accounting for almost one-third of the boating access use within the study area. At this location, both the boat ramp and the adjacent marina received heavy use (500 houseboats are moored at the marina). Lime Saddle BR/DUA/Marina was the second most popular site for launching boats, accounting for 27 percent of the boating access use within the study area. Like Bidwell Canyon, this site also has both boat ramp and marina use, but there was not as

much marina use at Lime Saddle as there is at Bidwell Canyon. Spillway BR/DUA, which does not have a marina, was the third most popular boating access site. Loafer Creek BR was the fourth most popular boating access site, followed by Monument Hill BR/DUA.

Table 6. Most popular Boating Access Sites		
Site	**Percent of Activity Across Study Area**	**Recreation Days During Study Period**
Bidwell Canyon BR/DUA/Marina	31	156,366
Lime Saddle BR/DUA/Marina	27	138,186
Spillway BR/DUA	14	68,347
Loafer Creek BR	6	29,246
Monument Hill BR/DUA	6	28,384
Source: EDAW, Inc. 2003.		

Most Popular Sightseeing Sites

The five most popular sites for sightseeing are listed in *Table 7*. The Feather River Fish Hatchery ranked first with 35 percent of the total sightseeing use across the study area. The fish hatchery received a large amount of use from people driving through the site as well as visitors who tour the facility and view the fish ladder. The Oroville Dam/Overlook DUA accounted for 24 percent of the total sightseeing use within the study area. The majority of use of the Oroville Dam/ Overlook DUA consisted of visitors driving across the dam and back, viewing the immense dam and spectacular view of Lake Oroville. The Lake OrovilleVisitors Center was the third most popular site for sightseeing with 21 percent of the sightseeing use within the study area. The main use of the visitors' center is touring the center, which includes a lookout tower that provides a view of the reservoir. The top three sites accounted for almost 80 percent of the sightseeing use within the study area. The fourth most popular sightseeing site was the Thermalito Afterbay outlet with 4 percent of the total activity use. The Bidwell Canyon BR/DUA/Marina was the fifth most popular sightseeing site with 2 percent of the total activity use.

Table 7. Most popular Sightseeing Sites		
Site	**Percent of Activity Across Study Area**	**Recreation Days During Study Period**
Feather River Fish Hatchery	35	152,375
Oroville Dam/Overlook DUA	24	104,371
Lake OrovilleVisitors Center	21	93,553
Thermalito Afterbay Outlet	4	16,993
Bidwell Canyon BR/DUA/Marina	2	9,773
Source: EDAW, Inc. 2003.		

Fishing

LOSRA hosts a wide variety of fishing opportunities for almost every type of angler. Lake Oroville is commonly known as a two-story fishery because there are warm water

varieties near the surface and colder-water varieties deeper in the lake. The warm-water fishery typically includes spotted bass, largemouth bass, smallmouth bass, redeye bass, bluegill, green sunfish, black crappie, white crappie, channel catfish, and white catfish. Spotted bass are among the most commonly caught fish in Lake Oroville. The cold-water fish include brown trout and Chinook salmon with rainbow trout being caught less frequently. The salmon population has increased in the last few years because of the highest sustained water levels in Lake Oroville's history. Many of the cold-water fish are caught from boats and the lake shore, but they are also caught in the river and creek tributaries of Lake Oroville, as well as in sections of the Feather River below the dam. Anglers are often interested in the quieter coves of the lake not used by water skiers. Anglers also seek the quieter tips of the reservoir's branches, which are generally too remote for most of the social boaters. In recent years, there have been over 40 annual bass fishing tournaments at Lake Oroville with private businesses, organizations, or clubs sponsoring tournaments. Anglers compete in these events every month of the year with some of the tournaments having hundreds of competitors.

Most Popular Picnicking Sites

Table 8 shows the most popular picnicking sites. North Thermalito Forebay BR/DUA was the most popular site, with 19 percent of the total activity use throughout the study area. This site is very close to the city of Oroville and provides a picnicking area that is capable of handling large groups. The Oroville Dam/Overlook DUA was the second most popular site, with 12 percent of the total picnicking use in the study area. A limited amount of picnicking remained available after the portion of the DUA nearest to the dam spillway was closed in the fall of 2002 because of security concerns. Loafer Creek DUA was the third most popular site for picnicking, accounting for eight percent of the picnicking use within the study area. The fourth most popular site was the South Thermalito Forebay BR/DUA, also accounting for eight percent of the picnicking use within the study area, but it also supported fewer RDs than Loafer Creek DUA. The fifth most popular picnicking site was the Bidwell Canyon BR/DUA/Marina.

Table 8. Most popular Picnicking Sites

Site	Percent of Activity Across Study Area	Recreation Days During Study Period
North Thermalito Forebay BR/DUA	19	30,084
Oroville Dam/Overlook DUA	12	18,977
Loafer Creek DUA	8	13,059
South Thermalito Forebay BR/DUA	8	12,414
Bidwell Canyon BR/DUA/Marina	6	9,773

Source: EDAW, Inc. 2003.

Most Popular Swimming Sites

Table 9 lists the most popular swimming sites. The most popular site was the North Thermalito Forebay BR/DUA, which accounted for 21 percent of the study area's swimming use. Monument Hill BR/DUA was the second most popular area, with 14 percent of the total activity use across the study area. Monument Hill, located on

Thermalito Afterbay, has a small beach area used by swimmers and personal watercraft users. Loafer Creek DUA, the only designated swimming area on Lake Oroville, was the third most popular area with 13 percent of the total swimming use in the study area. The fourth most popular swimming site was the South Thermalito Forebay BR/DUA and the fifth was Bidwell Canyon BR/DUA/Marina.

Table 9. Most popular Swimming Sites

Site	Percent of Activity Across Study Area	Recreation Days During Study Period
North Thermalito Forebay BR/DUA	21	21,516
Monument Hill BR/DUA	14	14,192
Loafer Creek DUA	13	13,059
South Thermalito Forebay BR/DUA	10	9,931
Bidwell Canyon BR/DUA/Marina	10	9,773

Source: EDAW, Inc. 2003.

Camping

There are four types of camping opportunities at Lake Oroville: recreational vehicle (RV) campsites, car campsites, boat-in campsites, and floating campsites. Individuals or families with RVs can utilize RV campsites within several of the developed campgrounds or they can camp in a self-contained manner (without utility hookups) at several of the boat launch ramps; for example, at the Spillway. Car camping is available at several of the developed LOSRA campgrounds. Many of the car campers have boats in tow and launch on the lake.

Lake Oroville hosts several unique camping facilities, with the floating campsites accessed by boats being the most unusual. Typical users of the floating camps are family groups of 5-10 people who have more than one boat. Boat-in campsites located around the shoreline of Lake Oroville are used mostly during high water levels because of ease of lake access at those times. At low lake levels campers must walk a much longer way to and from the water. Such conditions are a major deterrent to full use of these campgrounds, especially late in the season when the lake levels are typically low.

Most Popular Camping Sites

Table 10 shows the five most popular camping sites. The two most popular camping locations, Loafer Creek Campground and Bidwell Canyon Campground, accounted for almost 75 percent of the camping use within the study area. The Loafer Creek Campground is the largest campground within the study area, and both campgrounds have central locations; they are close to the city of Oroville and many of the other project facilities. Lime Saddle Campground was the third most popular camping location. Although this campground is newly constructed, it is farther away from other project facilities and the city of Oroville, which may contribute to lower usage at the site. The Loafer Creek Group Campground and Loafer Creek Equestrian Campground were the fourth and fifth most popular camping sites, respectively. These campgrounds have far fewer campsites and therefore cannot accommodate as many people as the larger Loafer Creek Campground and Bidwell Canyon Campground.

Table 10. Most popular Camping Sites		
Site	**Percent of Activity Across Study Area**	**Recreation Days During Study Period**
Loafer Creek Campground	38	23,531
Bidwell Canyon Campground	36	22,252
Lime Saddle Campground	12	7,760
Loafer Creek Group Campground	9	5,820
Loafer Creek Equestrian CG	3	1,926
Source: EDAW, Inc. 2003.		

Most Popular Trail Use Sites

Table 11 shows the five most popular trail use sites, which include all four Trail Access points (TAs) within the study area and the Diversion Pool DUA. As discussed here, trail use includes day-use trailheads only and does not include campground-based use. Saddle Dam TA was the most popular trail use site, accounting for almost 30 percent of the total trail use within the study area. The Diversion Pool DUA, which accesses both the Dan Beebe Trail and the Brad Freeman Trail, was the second most popular site with 27 percent of the total trail use within the study area. Lakeland Boulevard TA was the third most popular site with 4,004 RDs, accounting for 25 percent of the trail use in the study area. Powerhouse Road TA was the fourth most popular trail use site, followed by East Hamilton Road TA.

Table 11. Most popular Trail Use Sites		
Site	**Percent of Activity Across Study Area**	**Recreation Days During Study Period**
Saddle Dam TA	29	4,690
Diversion Pool DUA	27	4,371
Lakeland Boulevard TA	25	4,004
Powerhouse Road TA	13	2,028
East Hamilton Road TA	6	891
Source: EDAW, Inc. 2003.		

Most Popular Hunting Sites

There are two geographic areas where most hunting occurs within the study area: the Thermalito Afterbay and the Oroville Wildlife Area (OWA). While hunting is allowed in many parts of LOSRA, hunting use is generally limited to two sites within the study area. These two sites, outside LOSRA, are listed in *Table 12*. Hunters used some of the known dispersed sites to access hunting areas (sites used include Tres Vias Road TA, Toland Road TA, and South Wilbur Road TA). The known dispersed sites account for the most hunting use within the study area, with 36 percent of the total hunting use. The second and third most popular hunting sites were the South OWA West Levee Road and the South OWA East Levee Road, respectively. These two sites together accounted for 64 percent of the hunting use within the study area.

Table 12. Most popular Hunting Sites		
Site	**Percent of Activity Across Study Area**	**Recreation Days During Study Period**
Dispersed Sites	36	4,995
South OWA West Levee Road	33	4,572
South OWA East Levee Road	31	4,294
Note: "Dispersed sites" includes the South Wilbur Road TA, the Toland Road TA, and the Tres Vias Road TA. *Source: EDAW, Inc. 2003.*		

Use Distribution

Table 14 gives a summary of the existing recreation use within the FERC Project Area and the percent of the total use that occurs at each site. The sites that contributed the most to total use were the Bidwell Canyon BR/DUA/Marina, Lime Saddle BR/DUA/Marina, and Oroville Dam/Overlook DUA. These three sites accounted for about 30 percent of the total use in the FERC Project Area and about 60 percent of the use at Lake Oroville. Bidwell Canyon BR/DUA/Marina and Lime Saddle BR/DUA/Marina contributed more use in the four-month recreation season than in the eight-month off-season; the opposite was true for Oroville Dam/Overlook DUA. The Lake OrovilleVisitors Center had twice as much use in the off-season as in the recreation season; as a result, this site was the third most used Lake Oroville site. Lime Saddle BR/DUA/Marina had about one-half the use during the off-season as it had during the recreation season. Generally, at similar reservoir-based recreation areas, 70 percent or more of the total use occurs during the recreation season (pers. comm., Wegge 2003). However, the Oroville Facilities are very close to the cities of Oroville, Chico, and Paradise and therefore receive a substantial amount of local use in the off-season.

There were a few sites that contributed relatively few recreation days (RDs) to total use: the Lime Saddle Group Campground, Loafer Creek Equestrian Campground, the trailhead accesses, and other dispersed use sites. The aforementioned campgrounds are fairly small and therefore cannot accommodate the amount of use that the larger campgrounds receive. In addition, the Lime Saddle Group Campground was closed for the entire off-season, reducing the amount of potential use at this site. The trailhead accesses are generally low-use sites. There was very little dispersed use because access to areas within the project boundary away from developed sites is difficult due to steep topography and private ownership. It is difficult to access remote parts of the FERC Project Area where dispersed use could occur, and therefore there was little of this type of use; most use occurs at developed or designated sites.

Not all geographic areas within the FERC Project Area received the same level of use. *Table 13* shows how the different areas rank in terms of their percent contribution to total use, recreation season use, and off-season use. Lake Oroville sites around account for 55 percent of the total use within the FERC Project Area year-round. The area with the second greatest contribution to use is the Oroville Wildlife Area, which contributes about 20 percent of use within the FERC Project Area. Although this area is

undeveloped, it is a very popular area for bank fishing because of the easy access to the Feather River provided by the levee roads. In combined recreation season and off-season use, the Feather River Fish Hatchery ranks as the third largest contributor; in the recreation season, however, it ranks fourth. This site received a substantial amount of sightseeing use from both individual visitors and tour groups. The hatchery contributed nearly twice the level of use in the off-season as in the recreation season. This is when the salmon runs occurred and thus when most people came to view the fish swimming upstream. The Thermalito Forebay contributed about eight percent of the use within the FERC Project Area, making it the fourth most used area (third during the recreation season). As for the Thermalito Afterbay, it ranked fifth in terms of contribution to use, with slightly more than five percent of the FERC Project Area's total use.

Table 13. Ranking of Areas by Percent Contribution to Existing Uuse

Ranking	Percent Contribution		
	Combined Season Use	**Recreation Season Use**	**Off-Season Use**
1. Lake Oroville	54.9	55.8	53.9
2. OWA	19.2	20.6	17.5
3. Feather River Fish Hatchery*	9.7	7.1	13.0
4. Thermalito Forebay	8.2	8.4	7.9
5. Thermalito Afterbay	5.6	6.7	4.3
6. Diversion Pool	1.2	0.8	1.9
7. Dispersed Use	1.1	0.8	1.6

* In the recreation season, this site is ranked fourth.
Sources: CSP 2003; DWR 2003; EDAW, Inc. 2003.

The Diversion Pool and dispersed use sites only contributed about one percent each to use within the FERC Project Area, and thus rank sixth and seventh out of the seven geographical areas.

Use not only differs by season, but by weekday and weekend. *Table 15* shows the percentage breakdown of weekday and weekend use in both the recreation season and the off-season at each site. Generally, in both seasons there was either the same amount or more total weekday-use than total weekend use, and most sites did not differ in the ratio of weekday/weekend use between the two seasons. In total, the ratio of total weekday use to total weekend use was 60:40 in the recreation season and 64:36 in the off-season in the FERC Project Area. All sites had higher daily averages in the recreation season than in the off-season and most have higher daily averages on weekends than on weekdays (although there were lower daily averages on weekdays, there are more weekdays than weekend days, leading to more total weekday use than total weekend use).

People-at-one-time

Only a few sites fluctuate significantly between everyday use and holiday use based on people at one time (PAOT) observations: North Thermalito Forebay BR/DUA, South

Thermalito Forebay BR/DUA, and Monument Hill BR/DUA. These sites had considerably more use on holidays than on non-holiday days. North Thermalito Forebay BR/DUA had 6–20 times as many people on the holidays (on average) as other sites. On average, North Thermalito Forebay BR/DUA had 8–80 times as many people as other sites on non-holidays.

Vehicles-at-one-time

At most sites, average vehicles at one time (VAOT) on holidays was equivalent to or greater than the average non-holiday VAOT during the recreation season. Two sites—Bidwell Canyon BR/DUA/Marina and North Thermalito Forebay BR/DUA—had a substantial increase in the number of vehicles on holidays compared with non-holidays.

Campground Occupancy

All campgrounds had higher occupancy rates on weekends than on weekdays. Most also had peak occupancy rates in the recreation season and declining use in the off-season; however, the Loafer Creek Equestrian Campground had peak occupancy at the beginning and near the end of the off-season, possibly because of cooler weather or special equestrian events. The Loafer Creek Group Campground had the highest weekend occupancy rates, with every month in the recreation season at more than 65 percent occupancy, including two months with almost 100 percent weekend occupancy. Although both the Loafer Creek Equestrian Campground and Loafer Creek Group Campground reached maximum capacity on a few occasions, the Loafer Creek Campground and Lime Saddle Campgrounds did not reach maximum capacity on any days.

Trail Use

Relicensing Study R-9 indicated that overall use of most trail sections was highest during October, with about 50–60 people using the trails on peak days. Sixty trail users during one 12-hour daily count period is equivalent to an average of five per hour, a relatively low level of use. The highest use on individual days was recorded during parts of November, first during an annual equestrian trail ride event during the first week of the month and later during the Thanksgiving holiday period. From 100 to 160 trail users were recorded using certain trail sections on a single day at those times. Peak daily use during the remainder of November was 25–30 people per day, and slightly less during the first half of December.

The lowest use of the trails was recorded during the three-month period of mid-December through mid-March, with no use recorded on many days and peak use of ten or fewer people. Use increased somewhat during the spring period of mid-March through May, with as many as 30–35 people using the selected trails sections on peak days. Use declined during the summer months of June and July when the typical peak use was 15–30 people per day.

Table 14. Distribution of Existing Use (Recreation Days) by Site and General Area

Sites Grouped by General Area	Combined Seasons Total	% of Total for Study Area	Recreation season Total	% of Total for Study Area	Off-season Total	% of Total for Study Area
LAKE OROVILLE SITES	**911,183**	**54.9**	**518,472**	**55.8**	**392,711**	**53.9**
Bidwell Canyon Complex	217,709	13.1	133,365	14.3	84,344	11.6
Bidwell Canyon BR/DUA/Marina	195,457	11.8	117,209	12.6	78,248	10.7
Bidwell Canyon Campground	22,252	1.3	16,156	1.7	6,096	0.8
Loafer Creek Complex	89,544	5.4	63,741	6.9	25,803	3.5
Loafer Creek BR	29,246	1.8	25,160	2.7	4,086	0.6
Loafer Creek DUA	29,021	1.7	11,051	1.2	17,970	2.5
Loafer Creek Campground	23,531	1.4	21,068	2.3	2,463	0.3
Loafer Creek Group Campground	5,820	0.4	5,445	0.6	375	0.1
Loafer Creek Equestrian Campground	1,926	0.1	1,017	0.1	909	0.1
Lime Saddle Complex	162,220	9.8	113,036	12.2	49,184	6.7
Lime Saddle Campground	7,760	0.5	5,840	0.6	1,920	0.3
Lime Saddle Group Campground	920	0.1	920	0.1	—*	—
Lime Saddle BR/DUA/Marina	153,540	9.3	106,276	11.4	47,264	6.5
Spillway BR/DUA	80,516	4.9	41,018	4.4	39,498	5.4
Oroville Dam/Overlook DUA	189,765	11.4	84,779	9.1	104,986	14.4
Foreman Creek Car-top BR	14,413	0.9	8,657	0.9	5,756	0.8
Dark Canyon Car-top BR	7,009	0.4	4,268	0.5	2,741	0.4
Vinton Gulch Car-top BR	6,733	0.4	3,227	0.3	3,506	0.5
Nelson Bar Car-top BR	23,948	1.4	14,400	1.5	9,548	1.3
Stringtown Car-top BR	11,645	0.7	8,610	0.9	3,035	0.4
Saddle Dam TA	4,690	0.3	920	0.1	3,770	0.5
Enterprise BR	9,438	0.6	6,100	0.7	3,338	0.5
Lake OrovilleVisitor Center	93,553	5.6	36,351	3.9	57,202	7.8
DIVERSION POOL SITES	**20,603**	**1.2**	**7,055**	**0.8**	**13,548**	**1.9**
Diversion Pool DUA	14,571	0.9	5,825	0.6	8,746	1.2
Lakeland Boulevard TA	4,004	0.2	920	0.1	3,084	0.4
Powerhouse Road TA	2,028	0.1	310	0.0	1,718	0.2
THERMALITO FOREBAY SITES	**135,720**	**8.2**	**78,237**	**8.4**	**57,483**	**7.9**
North Thermalito Forebay BR/DUA	86,065	5.2	46,215	5.0	39,850	5.5
South Thermalito Forebay BR/DUA	49,655	3.0	32,022	3.4	17,633	2.4
THERMALITO AFTERBAY SITES	**93,368**	**5.6**	**61,834**	**6.7**	**31,534**	**4.3**
Wilbur Road BR	12,637	0.8	7,901	0.8	4,736	0.6
Monument Hill BR/DUA	56,767	3.4	37,873	4.1	18,894	2.6
Larkin Road Car-top BR	23,073	1.4	15,855	1.7	7,218	1.0
East Hamilton Road TA	891	0.1	205	0.0	686	0.1
OROVILLE WILDLIFE AREA SITES	**318,462**	**19.2**	**191,118**	**20.6**	**127,347**	**17.5**
South OWA West Levee Road	91,437	5.5	60,211	6.5	31,227	4.3
South OWA East Levee Road	85,889	5.2	46,121	5.0	39,768	5.5
Thermalito Afterbay Outlet	84,966	5.1	55,048	5.9	29,918	4.1
Headquarters Entrance	56,170	3.4	29,738	3.2	26,432	3.6
ADDITIONAL SITES	**160,395**	**9.7**	**65,890**	**7.1**	**94,505**	**13.0**
Feather River Fish Hatchery	160,395	9.7	65,890	7.1	94,505	13.0
DISPERSED USE	**18,810**	**1.1**	**7,040**	**0.8**	**11,770**	**1.6**
Dispersed Use Sites	16,650	1.0	6,320	0.7	10,330	1.4
Other Dispersed Use Sites	2,160	0.1	720	0.1	1,440	0.2
TOTAL	**1,658,540**		**929,646**		**728,895**	

*This site was closed during the off-season.Note: Recreation season is from May 15, 2002, to September 15, 2002, and off-season is from September 16, 2002, to May 14, 2003. Dispersed sites include Old Nelson Bar, Parrish Cove, Nelson Avenue Bridge over Thermalito Forebay, Highway 162 Overlook, Canyon Creek Bridge, South Wilbur Road TA, Tres Vias Road TA, and Toland Road TA. "Other Dispersed Use Sites" includes any dispersed use occurring within the study area at sites other than those that are known dispersed sites (which are listed under "Dispersed Use Sites"). All values are in recreation days (RDs). Sources: CSP 2003; DWR 2003; EDAW, Inc. 2003.

Table 15. Percent Use at each site by Weekday and Weekend for the Recreation Season and the Off-season

Sites	Recreation season			Off-season		
	Total RDs for Season	% Weekday Use	% Weekend Use	Total RDs for Season	% Weekday Use	% Weekend Use
LAKE OROVILLE SITES	**518,472**	**60.6**	**39.4**	**392,711**	**65.4**	**34.6**
Bidwell Canyon Complex	133,365	62.7	37.3	84,344	68.9	31.1
Bidwell Canyon BR/DUA/Marina	117,209	63.0	37.0	78,248	69.0	31.0
Bidwell Canyon Campground	16,156	60.2	39.8	6,096	67.6	32.4
Loafer Creek Complex	63,741	53.5	46.5	25,803	71.1	28.9
Loafer Creek BR	25,160	53.2	46.8	4,086	70.4	29.6
Loafer Creek DUA	11,051	52.3	47.7	17,970	73.3	26.7
Loafer Creek Campground	21,068	52.6	47.4	2,463	62.7	37.3
Loafer Creek Group Campground	5,445	60.6	39.4	375	60.0	40.0
Loafer Creek Equestrian Campground	1,017	54.1	45.9	909	58.7	41.3
Lime Saddle Complex	113,036	63.5	36.5	49,184	65.9	34.1
Lime Saddle Campground	5,840	54.1	45.9	1,920	63.6	36.4
Lime Saddle Group Campground	920	53.8	46.2	—*	—	—
Lime Saddle BR/DUA/Marina	106,276	64.1	35.9	47,264	66.0	34.0
Spillway BR/DUA	41,018	47.5	52.5	39,498	52.9	47.1
Oroville Dam/Overlook DUA	84,779	69.0	31.0	104,986	67.8	32.2
Foreman Creek Car-top BR	8,657	57.5	42.5	5,756	65.9	34.1
Dark Canyon Car-top BR	4,268	56.4	43.6	2,741	56.4	43.6
Vinton Gulch Car-top BR	3,227	60.7	39.3	3,506	54.8	45.2
Nelson Bar Car-top BR	14,400	58.3	41.7	9,548	68.0	32.0
Stringtown Car-top BR	8,610	48.8	51.2	3,035	55.1	44.9
Saddle Dam TA	920	45.7	54.3	3,770	45.9	54.1
Enterprise BR	6,100	34.4	65.6	3,338	38.9	61.1
Lake OrovilleVisitor Center	36,351	60.8	39.2	57,202	65.2	34.8
DIVERSION POOL SITES	**7,055**	**61.1**	**38.9**	**13,548**	**60.9**	**39.1**
Diversion Pool DUA	5,825	63.2	36.8	8,746	66.6	33.4
Lakeland Boulevard TA	920	45.7	54.3	3,084	44.9	55.1
Powerhouse Road TA	310	67.7	32.3	1,718	60.4	39.6
THERMALITO FOREBAY SITES	**78,237**	**47.4**	**52.6**	**57,483**	**63.9**	**36.1**
North Thermalito Forebay BR/DUA	46,215	39.4	60.6	39,850	67.1	32.9
South Thermalito Forebay BR/DUA	32,022	59.0	41.0	17,633	56.7	43.3
THERMALITO AFTERBAY SITES	**61,834**	**54.2**	**45.8**	**31,534**	**62.0**	**38.0**
Wilbur Road BR	7,901	53.4	46.6	4,736	63.9	36.1
Monument Hill BR/DUA	37,873	55.4	44.6	18,894	62.9	37.1
Larkin Road Car-top BR	15,855	51.7	48.3	7,218	59.6	40.4
East Hamilton Road TA	205	51.2	48.8	686	50.4	49.6
OROVILLE WILDLIFE AREA SITES	**191,118**	**57.8**	**42.2**	**127,344**	**58.1**	**41.9**
South OWA West Levee Road	60,211	59.1	40.9	31,226	58.4	41.6
South OWA East Levee Road	46,121	61.1	38.9	39,768	60.0	40.0
Thermalito Afterbay Outlet	55,048	61.1	38.9	29,918	68.5	31.5
Headquarters Entrance	29,738	44.2	55.8	26,432	43.1	56.9
ADDITIONAL SITES	**65,890**	**67.5**	**32.5**	**94,505**	**72.3**	**27.7**
Feather River Fish Hatchery	65,890	67.5	32.5	94,505	72.3	27.7
DISPERSED USE	**7,040**	**43.2**	**56.8**	**11,770**	**39.3**	**60.7**
Dispersed Use Sites	6,320	43.0	57.0	10,330	38.5	61.5
Other Dispersed Use Sites	720	44.4	55.6	1,440	44.4	55.6
TOTAL	**929,646**	**58.8**	**41.2**	**728,895**	**64.2**	**35.8**

* Site closed during the off-season. Note: Recreation season is from May 15, 2002, to September 15, 2002, and off-season is from September 16, 2002, to May 14, 2003.All values are in recreation days (RDs).
Sources: CSP 2003; DWR 2003; EDAW, Inc. 2003.

The sections of trails receiving the highest use were those in the Saddle Dam and Bidwell Canyon areas, where trail users can access the trails from several locations. Use was low to moderate most of the year at most other locations on the trail system, including trails in the Loafer Creek area and on the north and south sides of the Diversion Pool. Use was very low on the Brad Freeman Trail at the north end of the Thermalito Afterbay area, the only location in that general portion of the FERC Project Area where a counter was installed.

Recreation Safety

(Main source of information: Relicensing Study R-2- *Recreation Safety Assessment.* Refer to Study R-2 for more detailed information on this topic.)

Representatives of the primary agencies responsible for day-to-day recreation safety in the study area were interviewed by the authors of Relicensing Study R-2 to identify issues related to recreation safety from the point of view of law enforcement and land and resource managers. Representatives from the following responsible agencies were interviewed: CSP, California Department of Fish and Game, Butte County Sheriff's Office, the City of Oroville Police Department, and First Responder (the local ambulance service). The following issues (related directly to LOSRA) were reported (listed in no particular priority):

- Boaters often exceeding the 5 miles per hour (mph) limit in designated zones;
- Personal watercraft (PWC) users jumping wakes and following other boats too closely;
- Alcohol use while boating;
- Lack of adequate numbers of enforcement officers to deal with boating safety issues;
- Boaters not wearing personal floatation device (PFD).

Recreation Surveys

(Main source of information: Relicensing Study R-13- *Recreation Surveys.* Refer to Study R-13 for more detailed information on this topic.)

During 2002 and 2003 the authors of Relicensing Study R-13 conducted several surveys to better understand the recreational users of the study area. This information included visitors' activities, trip characteristics, and socio-demographic characteristics, user preferences for facility and area development, perceptions of crowding, levels of satisfaction, reasons for visiting the area, and reasons for not visiting the area.

Several surveys were administered for this study:

- A Lake Oroville Area Recreation Visitor Survey, consisting of an On-Site Survey (2,583 respondents) with some optional activity-specific sections and a follow-up Mail Back Survey (1,071 respondents);
- A Hunter Survey (also consisting of both an On-Site Survey and a follow-up Mail back Survey (106 total surveys completed);

- A Similar Site Survey, administered at three reservoirs in Northern California deemed similar to the Lake Oroville area in terms of recreational opportunities (293 surveys completed); and
- A Household Survey, consisting of telephone interviews with residents of Butte County, as well as three other Northern California and Nevada market areas (100 respondents for each area completed).

The main results of these surveys as they relate to LOSRA planning include the following:

Frequency and Seasonality of Use
Most study area visitors were regular visitors to the area, recreating there several times per year. Though summer is the peak use season in most resource areas, most areas received considerable fall and spring use and a limited amount of winter use. Non-summer visitors tended to be more local residents, while more distant areas contributed a larger part of summer visitors.

Factors in Choosing to Visit
Proximity to home was a dominant reason why most study area visitors recreate there rather than at one of many other similar options on the region. However, features such as desirable natural resource conditions like high water quality and scenery, as well as good facilities and good fishing opportunities, were also important for many.

Crowding
With the exception of the Oroville Wildlife Area where anglers may compete for prime fishing spots, few study area visitors were concerned about crowding or considered the areas they used to be crowded to any significant degree. This was true of both the peak season and non-peak season and of both local and non-local ("tourist") visitors.

Scenery
Visitors rated the natural scenery of the Diversion Pool resource area very highly ("extremely appealing") but typically rated the scenery of other areas as only "moderately appealing."

Need for Special Events or New Types of Facilities
Few visitors expressed a desire to see more new activities or the facilities to support them made available or for more special events in the area. The greatest interest was expressed for more beach and swim areas. For those that had never visited the park, boat and water events, food festivals, and fishing events, among other special events of lower priority, would motivate them to visit the park for the first time. For the same group, facilities such as campgrounds, hiking and bicycling opportunities, boating/warm water swimming/water-related activity opportunities, and an expanded interpretation center would encourage them to visit the park for the first time.

Setting Preferences
Study area visitors were interested in enjoying both solitude (being away from other groups) and in having other visitors nearby, although interest in solitude appeared to be stronger. Visitors also expressed a preference for recreation experiences in the Lake

Oroville area that provided some degree of risk and challenge and opportunities to use outdoor skills. They expressed a preference for settings in which human-associated sights and sounds are "rare" or "unusual," although some preferred they be "common," as well as a preference for natural appearing landscapes.

Trail Facilities

Most visitors considered the existing system of hiking, biking, and equestrian trails to be adequate, although there was strong interest in more equestrian trails and better trail signage near the Diversion Pool. For people who had never visited the park, trail/hiking/bicycling opportunities were among the top priorities that would encourage them to visit the park.

Camping Facilities

Many visitors felt that developed camping facilities are needed in areas besides Lake Oroville (the Afterbay, Forebay, and OWA). Lake Oroville visitors were most interested in more floating campsites, with a moderate desire for more RV sites, showers, and site screening. For those who had never been to the park, the surveys indicated that campgrounds were a high priority and would encourage park visits.

Boating Facilities

Although some interest was expressed in more boat ramps (primarily related to low summer pool level issues), and less so in marinas, many visitors were interested in having more boarding docks at Lake Oroville and in the availability of fuel for purchase at the Afterbay.

Fishing and Other Facilities

Diversion Pool, Forebay, and OWA anglers would like fish cleaning stations where none are currently provided. Other prominent perceptions of facility needs include developed day-use and shoreline picnic sites at Lake Oroville, Afterbay, and Diversion Pool; swimming areas at Lake Oroville and Afterbay; interpretive facilities at the Forebay and Afterbay; and equestrian facilities at the Diversion Pool. People who had never been to the park listed fishing events and living history demonstrations as relatively high motivators for potential visits to LOSRA.

Management Concerns

The management issue of most concern to Lake Oroville visitors was lack of access to the shoreline.

Water Condition Concerns

Lake Oroville visitors were concerned about low water levels and shallow areas resulting from reservoir drawdown. Similar concerns were expressed about the Afterbay.

User Interactions

In general, there was a low level of concern about user interaction issues. Lake Oroville visitors were most concerned about interactions with personal water craft on the water. OWA visitors were concerned about unsafe behavior, use of alcohol, and overuse of recreation sites.

Overall Satisfaction

Generally, visitor satisfaction was high, with most visitors indicating that they were "satisfied" or "very satisfied" with the last visit. The Diversion Pool, in particular, stood out as the area where visitors were "very" or "extremely satisfied."

Anglers' Use Patterns, Experiences, and Preferences

Nearly all study area anglers surveyed were repeat visitors. Many fished in the study area very frequently (more than 10 visits in the past year), but more were infrequent visitors who fished in the area only a few times per year or who had not fished in the area at all in the past year. With the exception of anglers in the OWA, anglers were not concerned about crowding while fishing, and considered crowding to be slight or non-existent. In the OWA, however, many anglers considered the areas where they fished to be at least "moderately crowded." Very few study area anglers used the services of fishing guides in the area, and relatively few (generally less than 10 percent) participated in fishing tournaments. Overall, most anglers (75-90 percent, depending on area) were satisfied with their fishing experience. Those who were not satisfied generally complained of not catching any (or enough) fish or about low reservoir pool levels.

Trail Users' Use Patterns, Experiences, and Preferences

A high percentage of trail users surveyed (70-80 percent) were repeat trail users. In most resource areas, hiking or walking was the primary type of trail use of most trail users surveyed. In the Diversion Pool area, most were equestrian users. Bike riders were 10-25 percent of users in most areas.

Nearly all trail users considered crowding to be slight or non-existent in all parts of the study area. Generally, less than eight percent of trail users in any resource area reported having had an encounter with other trail users that they felt put them at risk that day. However, many of these were described as relating more to animal encounters and motorized use on trails (illegal) or at road crossings, rather than with other hikers or riders. Equestrians using trails in the Diversion Pool area primarily described encounters with bike riders. Other encounters involved equestrians or hikers equally often.

Trail users' satisfaction with the condition of trails was high, with 90 percent or more generally satisfied in each resource area. Those who were not satisfied most often complained about difficulty in reaching shorelines, trailside vegetation, and user conflict issues rather than actual trail conditions. A few users were concerned about related needs of signage, water for horses, and litter removal. Some Diversion Pool users felt the machinery used to grade or maintain trails caused dust and mud problems.

Reservoir Boaters' Use Patterns, Experiences, and Preferences

Most Lake Oroville, Forebay, and Afterbay boaters considered the areas where they boated to be "not at all crowded" or, at most, "slightly crowded." A minority group of Lake Oroville and Afterbay boaters considered those water areas to be "moderately crowded."

Runabouts, ski boats, and similar powercraft were the predominant types of boats used by boaters surveyed at Lake Oroville and the Afterbay. PWC were the primary watercraft of nearly 30 percent of Afterbay boaters, but were relatively less common on the other resource areas. Forebay boaters were more diverse, with the largest number of boaters using a runabouts/ski boats, but sailboats, canoes and kayaks, and fishing boats also present. A very high percentage of study area boaters own the boat they use in the area, and most others use a friend's or family member's boat.

Most Lake Oroville boaters focused their activity on the Main Basin and the South Fork arm of the reservoir. Few boated on the Forebay, Afterbay, or Diversion Pool during the visit. Similarly, most Forebay and Afterbay boaters limited their boating to those areas during the current visit, although a few appeared to take their boat to Lake Oroville also. (Too few Diversion Pool boaters were surveyed to obtain usable data for this section.)

Nearly all boaters surveyed use boat ramps in the study area, with the four primary developed ramps at Lake Oroville being most popular with both Lake Oroville and Forebay boaters.

More than half of the Lake Oroville boaters surveyed said they typically have to wait to use the ramp they use most often, while most Forebay and Afterbay boaters said they did not typically have to wait. Nearly all of those who said they had to wait reported wait times of 15 minutes or less. Average wait times ranged from nine to 13 minutes, depending on resource area.

Less than seven percent of Lake Oroville boaters, less than 13 percent of Afterbay boaters, and less than three percent of Forebay boaters personally had an encounter on the water during their trip that they felt put them at risk. Those who had generally described three types of encounters: boats coming too close or following too closely, boaters not observing passing or right-of-way rules or speed restrictions, and PWC behaving recklessly. Boaters occasionally reported observing unsafe boating activity that they felt put others at risk. The types of behaviors described were similar to those listed above.

From 88 to 91 percent of boaters in each resource area said, overall, they were satisfied with their boating experience during their trip. Those who were not satisfied at Lake Oroville and the Afterbay primarily blamed low water conditions and problems with launching related to low water levels. Forebay boaters had some complaints about ramps, and pointed to a need for more or better facilities.

Visitor Preferences for New Activities

Table 16 indicates responses from visitor surveys taken between May 2002 – May 2003 regarding public preferences for new activities in the FERC study area:

Table 16. Visitor Preference for New Activities in the Study Area	
Activity	**Percent of Respondents**
Beach access/swimming area	25.7
Paddleboat, canoe and kayak rental	6.9
Athletic competition	5.9
Parasailing	5.9
Shoreline/waterside camping	5.0
Water-ski/wakeboard competition	5.0
Equestrian events	4.0
High speed boat races	4.0
Water-ski slalom course	4.0
Note: There were 101 respondents. Additional activities were listed, but only by 3% of respondents or less. *Source: EDAW 2003b (Recreation Visitor Mail-Back Survey).*	

Projected Recreation Use

(Main source of information: Relicensing Study R-12- *Projected Recreation Use.* Refer to Study R-12 for more detailed information on this topic.)

The projections for future recreation use in the greater Lake Oroville area show a steady increase in demand for recreation possibly resulting in 3.5 million Recreation Days (RDs) by 2050, doubling current recreation use. (Note: the greater Lake Oroville area includes not only LOSRA but also non-LOSRA sites such as the Thermalito Afterbay, Oroville Wildlife Area, the Feather River Fish Hatchery, Riverbend Park, Clay Pit SVRA, the Rabe Rd. Shooting Range, and dispersed use sites).

All sites are projected to increase in use, especially sites with substantial high-growth activities such as boating or sightseeing. Lake Oroville is expected to remain the dominant destination within the study area by continuing to contribute over 50 percent of the use within the entire study area. Although projections show 3.5 million RDs by 2050, this is an unconstrained projection of demand which may or may not be realized due to spatial, facility, social, and ecological constraints that could limit use. Ongoing monitoring is necessary to updating projections and better understanding which potential trends are occurring in the study area. The population of Butte County is expected to grow 16–26 percent for each of the next four decades. This relocation is expected to continue in the future and could increase demand for recreation opportunities and facilities in more rural areas, such as the study area.

<u>Projected Use at Lake Oroville Recreation Sites</u>
Total use at recreation sites located on the shores of Lake Oroville (all but the Oroville Dam DUA are within LOSRA) is projected to more than double to 2 million RDs by 2050 (see *Table 17).* At Lake Oroville, sites with large amounts of sightseeing and boating use are projected to have the most growth through 2050 because these activities are forecasted to have high growth. These sites include Bidwell BR/DUA/Marina, Nelson Bar Car-Top BR, Lime Saddle BR/DUA/Marina, Loafer Creek BR, Spillway BR/DUA, Oroville Dam/Overlook DUA, Foreman Creek Car-top BR, Dark Canyon Car-Top BR,

Enterprise BR, and the Lake Oroville Visitors Center. Assuming no constraints, use at these sites is projected to at least double by 2050.

Between 2010 and 2020, Oroville Dam/Overlook DUA is projected to overcome Bidwell BR/DUA/Marina as the site contributing the most to use. By 2050, Oroville Dam/Overlook DUA is projected to receive 466,000 RDs, followed by Bidwell BR/DUA/Marina with 423,000 RDs. Lime Saddle BR/DUA/Marina and the Lake Oroville Visitors Center would continue to contribute the high amounts of use at Lake Oroville with an estimated 332,000 and 241,000 RDs in 2050, respectively. The sites projected to remain lowest in overall use are facilities with smaller capacities such as Loafer Creek Equestrian Campground, Loafer Creek Group Campground, Lime Saddle Campground, Lime Saddle Group Campground, Dark Canyon Car-Top BR, Vinton Gulch Car-Top BR, and Saddle Dam TA. The other campgrounds and Car-top boat ramps are projected to have a moderate amount of use over the next 48 years.

In terms of overnight visitation, which primarily occurs at the campgrounds located on Lake Oroville, use is projected to increase. Loafer Creek CG is projected to continue to have the most use of all six campgrounds with 43,000 RDs by 2050, followed closely by Bidwell Canyon Campground with 41,000 RDs. Though there is some camping use at Spillway BR/DUA and North Thermalito Forebay BR/DUA "en route" camping areas, it is projected to continue to be relatively minor compared to developed campground use.

Table 17. Projected Recreation Days at Lake Oroville Sites

Site	2002*	2010	2020	2030	2040	2050
Bidwell Canyon Complex	217,709	266,080	304,830	350,030	402,830	464,600
Bidwell Cyn BR/DUA/Marina	195,457	239,410	275,080	316,840	365,810	423,300
Bidwell Canyon Campground	22,252	26,670	29,750	33,190	37,030	41,310
Loafer Creek Complex	89,544	108,270	122,260	138,230	156,490	177,380
Loafer Creek BR	29,246	35,960	41,520	48,060	55,760	64,850
Loafer Creek DUA	29,021	34,830	38,920	43,520	48,680	54,470
Loafer Creek Campground	23,531	28,200	31,460	35,100	39,160	43,680
Loafer Creek Group CG	5,820	6,970	7,780	8,680	9,680	10,800
Loafer Creek Equestrian CG	1,926	2,310	2,580	2,870	3,210	3,580
Lime Saddle Complex	162,220	198,420	227,610	261,730	301,700	348,580
Lime Saddle CG	7,760	9,300	10,370	11,570	12,910	14,400
Lime Saddle Group CG	920	1,100	1,230	1,370	1,530	1,710
Lime Saddle BR/DUA/Marina	153,540	188,020	216,000	248,780	287,250	332,470
Spillway BR/DUA	80,516	98,900	114,010	131,750	152,580	177,090
Oroville Dam/Overlook DUA	189,765	238,040	281,360	332,830	394,020	466,790
Foreman Creek Car-Top BR	14,413	17,480	19,810	22,500	25,610	29,200
Dark Canyon Car-Top BR	7,009	8,550	9,780	11,210	12,870	14,820
Vinton Gulch Car-Top BR	6,733	7,980	8,800	9,720	10,760	11,930
Nelson Bar Car-Top BR	23,948	28,910	32,610	36,870	41,790	47,480
Stringtown Car-Top BR	11,645	14,060	15,850	17,910	20,270	22,980
Saddle Dam TA	4,690	5,650	6,350	7,150	8,040	9,050
Enterprise BR	9,438	11,460	13,010	14,800	16,870	19,270
Lake Oroville Visitors Center	93,553	118,480	141,620	169,280	202,340	241,850
Total	*911,183*	*1,122,280*	*1,297,890*	*1,504,000*	*1,746,170*	*2,031,030*

** The 2002 baseline RDs were adjusted upward by 9.8 percent to better reflect average reservoir levels and projections are based on the increased baseline numbers. However, unadjusted numbers are presented to correspond with existing use numbers from Study R9 – Existing Recreation Use. Source: EDAW 2004.*

Projected Use at the Diversion Pool, Thermalito Forebay, Thermalito Afterbay,
(Note: Recreation use data is included for non-LOSRA sites within the FERC Boundary to provide the larger recreation use picture).

Use at the Diversion Pool area is forecast to increase 82 percent to 37,000 RDs in 2050 (*Table 18*). The Diversion Pool DUA is projected to remain the largest contributor to use in this area, with a relatively moderate amount of use at 26,000 RDs by 2050. The two Diversion Pool trailheads (THs) are projected to remain relatively low use sites. The Thermalito Forebay is projected to increase in total use by 75 percent from 2002 to 2050. The North Thermalito Forebay BR/DUA is forecast to continue to have more use than the South Thermalito Forebay BR/DUA.

Table 18. Projected RDs at the Diversion Pool, Thermalito Forebay, Thermalito Afterbay, OWA and additional sites within the FERC boundary

Site	2002	2010	2020	2030	2040	2050
Diversion Pool						
Diversion Pool DUA	14,571	16,040	18,120	20,510	23,260	26,430
Lakeland Boulevard TH	4,004	4,420	5,000	5,670	6,430	7,300
Powerhouse Road TH	2,028	2,260	2,580	2,950	3,380	3,880
Total	*20,603*	*22,720*	*25,700*	*29,130*	*33,070*	*37,610*
Thermalito Forebay						
North Thermalito Forebay BR/DUA	86,065	94,330	105,910	119,070	134,030	151,070
South Thermalito Forebay BR/DUA	49,655	54,270	60,730	68,060	76,410	85,930
Total	*135,720*	*148,600*	*166,640*	*187,130*	*210,440*	*237,000*
Thermalito Afterbay						
Wilbur Road BR	12,637	14,330	16,800	19,730	23,210	27,340
Monument Hill BR/DUA	56,767	63,250	72,520	83,290	95,830	110,440
Larkin Road Car-Top BR	23,073	25,710	29,480	33,860	38,950	44,890
East Hamilton Road TA	891	1,000	1,160	1,340	1,550	1,800
Total	*93,368*	*104,290*	*119,960*	*138,220*	*159,540*	*184,470*
OWA						
South OWA W. Levee Rd	91,437	98,660	108,770	120,280	133,410	148,420
South OWA E. Levee Rd	85,889	91,700	99,690	108,580	118,500	129,580
Thermalito Afterbay Outlet	84,966	92,500	103,080	115,160	128,970	144,820
Headquarters Entrance	56,170	60,000	65,230	70,990	77,370	84,440
Total	*318,462*	*342,860*	*376,770*	*415,010*	*458,250*	*507,260*
Other Sites within the FERC boundary						
Feather River Fish Hatchery	160,395	184,010	218,550	259,680	308,660	367,000
Dispersed Sites[1]	16,650	17,790	19,460	21,450	23,800	26,580
Other Dispersed Sites[2]	2,160	2,470	2,910	3,440	4,080	4,830
Total	*179,205*	*204,270*	*240,920*	*284,570*	*336,540*	*398,410*

[1] Includes: Old Nelson Bar, Parrish Cove, Nelson Avenue Bridge over Thermalito Forebay, Highway 162 Overlook, Canyon Creek Bridge, South Wilbur Road TA, Tres Vias Road TA, and Toland Road TA.
[2] Includes any dispersed use occurring within the study area at sites other than those that are known dispersed sites.
Source: EDAW 2004.

(Note: For more information regarding future recreation use and management at LOSRA see the *Recreation Carrying Capacity* section of the General Plan).

EXISTING RECREATION MANAGEMENT AND INFLUENCES

Management of Recreation Areas

(Main source of information: Relicensing Study R-5 - Recreation Areas Management. Refer to Study R-5 for more detailed information on this topic.)

Background

Land ownership, land and recreation management, recreation program funding, and existing recreational uses throughout the study area involve a complex network of federal, State, local, and private stakeholders. Recreational uses consist of both day-use and overnight use, and both land-based and water-oriented activities. Additionally, there are multiple sources of recreation funding and several responsible parties.

In 1961, the California Legislature passed the Davis–Dolwig Act (California Water Code Sections 11900–11925), which made DWR responsible for acquiring land and planning for recreation and fish and wildlife enhancement as part of the State Water Project (SWP). The Davis–Dolwig Act identifies four responsible State agencies: DWR, CSP, California Department of Fish and Game (DFG), and California Department of Boating and Waterways (DBW). DWR is charged with planning for public recreation and fish and wildlife preservation and enhancement in connection with the development of SWP facilities. This duty involves acquiring all lands and locating and constructing all works and Project features so as to allow for fish and wildlife enhancement and recreational uses following construction of the Project. CSP designs, constructs, operates, and maintains public recreation facilities at State Water Project facilities. DFG has responsibility for managing fish and wildlife resources at State Water Project facilities. DBW, in turn, is charged with planning, designing, and constructing boating-related facilities such as launch ramps, parking, and floating restrooms at LOSRA. These State agencies normally work together to provide recreational facilities in the area.

Managing Agencies and Coordinated Plans

Lands, facilities, and recreational interests in the study area are owned and managed by a number of State, local and federal agencies, including DWR, CSP, DFG, DBW, FRRPD, USFS, and BLM. The properties and management responsibilities of each agency are detailed in a series of deeds, agreements, and transfers between the agencies involved. Under FERC regulations, DWR is ultimately responsible for public access, recreational opportunities, and associated recreation development within the Project 2100 boundary. Each of these agency's ownership and management responsibilities and current management practices throughout the study area are detailed in this study.

The variety of management jurisdictions within the study area has led to an overlay of management plans, goals, responsibilities and actions. Current planning efforts are being coordinated by CSP and DWR in concert, so that each agency's management plan within their jurisdictions is consistent. This LOSRA General Plan addresses CSP's

broad mission and recreation management goals for LOSRA. In contrast, DWR's new Recreation Management Plan (RMP) for its new license defines specific actions related to the Oroville Facilities.

In general, recreation management in the study area has been operating fairly effectively; however, there is room for improvement in several areas. The current management structure has led to some problems because of the multiple layers of jurisdiction.

Day-to-day coordination among DWR, CSP, DFG, and DBW is limited, but field staffs from the four agencies meet monthly to discuss recreation-related management issues throughout the study area. Otherwise, interagency coordination in LOSRA, OWA, and throughout the study area is primarily project-specific. For example, DWR and CSP normally work with DBW for funding and construction of boating-related recreational facilities. In addition, a number of other agencies and organizations play a variety of roles in recreation planning and management throughout the study area.

Due to the various roles and responsibilities of the State agencies, communication between staff members among each of the managing agencies is essential for recreation opportunities in the study area to be adequately provided to the public. Interagency coordination is important for recreation management issues that may arise around timing of events and changes in time of facility conditions and reservoir levels. Scheduling of events and hunting seasons requires communication for safety reasons. Clear divisions of responsibility are important for efficiency of Operations and Maintenance (O&M) and for recreation managers to be prepared to manage the unexpected.

DWR (as FERC Licensee) is ultimately responsible for providing recreation facilities and opportunities within the FERC Project Area. Although recreation is a component of DWR's mission to manage water resources for the State Water Project (SWP), one of CSP's primary missions is provision of recreational facilities and experiences, and it has experience managing large recreation facilities.

Landscape and Maintenance

Landscaping at facilities can help communicate to visitors where to park and where entrances are located at buildings. Some landscaping, such as turf, significantly enhances some day-use activities. Trees provide shade and cooling during hot weather. Attractive landscapes can also affect attitude and increase visitor expectations regarding quality and type of experience. In general, survey results indicate that the landscaping provided is adequate for most areas. However, sensitivity to the adequacy of landscaping and its maintenance varies among those surveyed and some places could be better landscaped. Future management plans should consider plans for improving and developing additional landscaping for some key locations.

Shoreline Access and Water Level

Adequate public access to the State Water Project area is not only mandated by FERC, but access to shoreline and water is fundamental to providing water-based recreation. This topic is discussed in detail in Relicensing Study R-3 – Assessment of the

Relationship of Project Operations and Recreation. Also, on the following pages please see section titled: Effects of DWR's Oroville Facilities Operations on Recreation for discussion on effects of reservoir water levels.

Operational Facilities and Utilities

The major center for operations and maintenance facilities for LOSRA is currently located at CSP's Northern Buttes District headquarters at 400 Glen Drive in Oroville. This facility includes the 11,400 sq. ft. administrative center for the Northern Buttes District as well as the primary maintenance yard and shop facilities for LOSRA. The Oroville field headquarters complex for DWR is located adjacent to CSP's headquarters on Glen Drive. The service yard covers approximately 3-4 acres. There is storage for heavy equipment including trucks, vehicles, boats, and other miscellaneous items including recycle and garbage bins. The maintenance area also includes the following specialized facilities: a 3,300 sq. ft. auto shop; a 5,200 sq. ft. maintenance warehouse; a 1,900 sq. ft. carpenter shop; a 1,300 sq. ft. trails shop; and approx. 750 sq. ft. total of miscellaneous sheds used for storage of supplies and materials.

Utilities

Very few of the more remote lake access sites at LOSRA, such as the Enterprise and Stringtown car-top boat ramps and the Foreman Creek areas, are served by any utilities. Most of the trailhead locations also are not provided with utility connections. In a few locations, CSP and/or DWR have installed vault-type toilets. The few areas within LOSRA where all of these utilities exist are described below.

Bidwell Canyon Marina, Campground and Day-use Area

Electrical service is provided by PG&E; sewer is provided via CSP sewer lift stations which export to the Lake Oroville Area Public Utilities District (LOAPUD) sewer main collection system. Public water is provided by the South Feather Water and Power Agency.

Loafer Creek

Electrical services are provided by PG&E; sewer service is provided from the public restrooms which export to a LOAPUD local wastewater collection system. Public water is provided by the South Feather Water and Power Agency.

Lime Saddle Marina, Campground and Day-use Area

A local sewer collection system is operated by CSP and exports sewage to a local treatment pond. Facilities connected to this system include public restrooms at the entrance station, a public sewer dump station and 16 campsites with full utility hookups. The marina has its own sewer collection system which exports to a local treatment pond. The marina area and campground entrance station is provided with electrical power.

Spillway Ramp Area

Sewer service for this area is provided by a local DWR sewer collection system; public/potable water is provided by the South Feather Water and Power Agency; electrical service is provided by PG&E and there are no public telephones in this area.

North Thermalito Forebay

The two public restrooms in this area are tied into the Thermalito Irrigation District's wastewater collection system and exported out of the Thermalito Forebay area for treatment. Electrical service is provided by PG&E; public/potable water is provided by the Thermalito Irrigation District.

Effects of DWR's Oroville Facilities Operations on Recreation

(Main source of information: Relicensing Study R-3 - Recreation and Project Operations. Refer to Study R-3 for more detailed information on this topic.)

Reservoir elevation is the primary operations issue for Lake Oroville, especially during the summer. The water level has historically varied greatly from year to year, depending on inflow into the reservoir and the amount of water released to meet downstream demands and regulatory requirements. From 1990 to 2002, the reservoir pool was below 800 feet for the entirety of four of those years and was above 800 feet for most of six of those years. In the remaining three years, reservoir pool level ranged both above and below 800 feet. The effects of water level on recreation and accessibility to the SRA vary greatly from year to year.

Recreation modeling conducted for Study R-12 – Projected Recreation Use has identified water level as a significant factor in overall visitation to Lake Oroville. However, high pool levels have not always resulted in high attendance and low pool levels have not always resulted in low attendance.

<u>Effects on Boat Ramps</u>
Effects on boat ramps are among the most visible and important effects of low water at Lake Oroville. However, with the December, 2002 extension of the major boat ramps at Lime Saddle, Spillway, and Bidwell Canyon, boat access will likely be available during all but the lowest water periods (until the pool level drops below 695 feet). Pool elevations below 700 feet are an uncommon occurrence; prior to 2002, when the lake was below 700 feet for about 30 days during November and December, this had not occurred since March, 1991.

As the reservoir elevation falls, the number of ramp facilities and the total number of ramp lanes available decreases. A total of 33 launch lanes are available lake-wide when the reservoir pool level is high (within about 50 feet of the full pool elevation of 900 feet). At moderate pool levels (between 850 and 800 feet) there are 25 to 31 lanes available. From 12 to 17 lanes are open at low pool elevations, down to about 725 feet. Below 725 feet, there are only seven remaining lanes, and all lanes are closed when the pool drops below 695 feet. In terms of the percentage of peak season days that boat

ramps were unusable due to low pool elevation, two boat ramps had particularly high rates from 1990 to 2002: Enterprise (53 percent) and Loafer Creek (33 percent).

Access to parking areas from most of the ramps becomes increasingly difficult for boaters as the reservoir pool level drops and the steep walk up the ramp from the boat to the vehicle lengthens. The Spillway boat ramp is unique in that it provides a large, seasonally inundated, paved parking area adjacent to the low-water ramp. Though originally constructed with asphalt, resurfacing this ramp will be problematic because of DFG and federal EPA concerns about asphalt construction in inundated areas.

Effects on Car-Top Boat Ramps

Car-top boat ramps are also affected by low water, most significantly below 800 feet, when the water becomes too distant and the shoreline too steep for most car-top boaters, bank anglers, and other shoreline users at some sites. Dark Canyon Car-Top BR is primarily used by boaters rather than shoreline users, and launching of boats is possible well below 800 feet. At Vinton Gulch Car-Top BR, conditions for shoreline use and car-top boat launching are good until the reservoir level falls below about 830 feet. Small boats may be trailer-launched down to about 850 feet. Nelson Bar Car-Top BR is more severely affected by low water, with most boat launching and shoreline use becoming undesirable or infeasible below about 840 feet.

Foreman Creek Car-Top BR and Stringtown Car-Top BR provide more opportunities for shoreline recreation as the reservoir level falls than do other facilities of this type. Foreman Creek provides a large area of flat to gently-sloped land that becomes exposed as the reservoir pool level drops below 850 feet. A gently-sloping paved roadbed extends far out into the inundation zone. Shoreline activity and boat launching are possible well below 800 feet but become less desirable or difficult below 775 feet. The Stringtown Car-Top BR also provides a large area of exposed shoreline as the reservoir level falls, although it is steeper than at Foreman Creek. The roadbed that is exposed as the water recedes allows launching of small boats below 800 feet. Steep and muddy shorelines make shoreline use less desirable below 800 feet. However, much of each car-top boat ramp alignment, especially at lower elevations, is in fact an old railroad bed that will deteriorate over time.

Effects on Boat-in Campsites, Swimming Facilities and Opportunities

The boat-in campsites are usable at any reservoir elevation, but become progressively less desirable to boaters (who have to carry their camping equipment and supplies farther) as the reservoir pool level falls. For this reason, use of the boat-in campsites, which is usually low at all elevations, is very low when the lake elevation falls below approximately 830 feet.

The only developed swimming beach at Lake Oroville is at the Loafer Creek DUA. The facility is unusable as designed at reservoir elevations below about 850 feet. The small cove on which the facility sits becomes dewatered below that pool elevation. This condition occurs most summers at Lake Oroville with the facility being unusable by about mid-June most years. Swimming also occurs at car-top boat ramps but, as described above, is made more difficult and less desirable (as is other shoreline use) at reservoir levels below about 800 feet. Some visitors to Lake Oroville go to the North

Forebay DUA swim beach when swimming opportunities on the lake (for non-boaters) are limited by low-water conditions.

Visitor Survey Data Related to Effects of Project Operations

About half of the Lake Oroville visitors surveyed considered water level fluctuations and exposed land and shallow areas during low water to be a “moderate” or “big problem.” About one-third considered access to the shoreline to be a “moderate” or “big problem.” A high percentage of Lake Oroville boaters indicated they were satisfied with their boating experience. However, many of those who were not satisfied mentioned low water conditions as a direct or indirect cause of their dissatisfaction. Satisfaction with fishing experiences was somewhat lower, but fewer anglers pointed to low water as the cause of dissatisfaction. (The best fishing conditions, and most fishing tournaments, occur at Lake Oroville during the fall and winter, when reservoir pool levels are usually lowest.) Bank anglers who were confronted with the low water levels of summer 2002 were more likely to express dissatisfaction with those conditions.

Numerous written comments were received by boaters, anglers, and other lake users that provided specific observations and opinions of the negative effects of the low water levels they experienced during the 2002 summer and fall season. The most common comments related to aesthetic effects, effects on boating facilities, safety and enjoyment, and a lack of shoreline areas to use for swimming and other uses when the lake is low. These comments may provide some guidance for future management of Lake Oroville recreation facilities during the expected low-water periods that are likely to occur most years.

Thermalito Diversion Pool, Thermalito Forebay and Thermalito Afterbay Issues and Effects of Project Operations

Water levels are essentially stable in the Diversion Pool and Forebay, and stay within a 5–6 foot range during a weekly fluctuation cycle at Thermalito Afterbay. As a result, water level changes have little effect on boating, swimming, or other shore-based activities at these areas. The main issue is water temperature, which during the summer months ranges from the 50s (°F) in the Diversion Pool and Forebay to the 60s in most of Thermalito Afterbay.

The cold water temperatures in the Diversion Pool, Forebay, and Afterbay are a result of the water being released from Lake Oroville into the Diversion Pool at a consistent temperature of about 45–50°F. The purpose of maintaining low water temperature downstream is to meet the requirements of the Feather River Fish Hatchery, which draws water from the Diversion Pool, and the needs of coldwater fish species (i.e., salmon and steelhead) in the Feather River. Coldwater fish species in all three of these water bodies also benefit. However, temperatures in these water bodies are colder than what most recreationists would desire for water-contact recreation. Agricultural users of water stored in Thermalito Afterbay are also interested in warmer water during the growing season.

The location of the North Forebay DUA swim beach on a shallow embayment, separated from the main flow of colder water coming from the power canal, usually provides warmer water for wading and swimming. The surface water temperature was

found to be in the mid-70s (°F) during the late summer of 2003. The water below 3 feet in depth remained at colder temperatures, similar to those found elsewhere in Thermalito Forebay.

LOSRA NATURAL RESOURCES

Note: The following is a broad overview of LOSRA natural resource conditions. This General Plan does not attempt to reproduce DWR's extensive and detailed geological, plant and animal, and water resources mapping for their Project 2100 Oroville Facilities Relicensing Project studies. ***Please refer to Appendix G for a listing of DWR-produced resource studies and maps and how to access them on the DWR Website.***

The existing natural resource conditions are compiled from the DWR studies as well as CSP resource files for LOSRA, including the Natural Resources Baseline Condition Assessments prepared for the park. A unitwide assessment was prepared and 11 separate resource management units (RMU's) were established in specific areas in the park. For each of the RMU's, data was gathered to assess the conditions of resources in that area of the park, including the presence and extent of roads and trails, vegetation types, geological features, hazardous materials, rare, threatened, or endangered plant and wildlife species, non-native species, water features, and wildfire and prescribed fire history.

CLIMATOLOGY

The climate in the Lake Oroville region follows a Mediterranean pattern, with cool wet winters and hot dry summers. Temperatures range from the 30s to above 100ºF. Winter months are cool to cold, with temperatures ranging from the mid to high 50s down to the 30s, with some occasional fog. Springtime temperatures range from the high 60s to the 70s. Summers are warm to extremely warm, with temperatures in the low 80s up to the low 100s.

Approximately 95 percent of the annual precipitation occurs during the winter months. Oroville receives about 33 inches of rain annually. Precipitation above 5,000 feet occurs primarily as snow, which regularly accumulates in excess of five to ten feet in winter. Summer thunderstorms occur infrequently, predominantly in the eastern third of the watershed. These storms can produce significant rainfall of short duration over a relatively small area (California Department of Water Resources 2001).

In Butte County, prevailing winds are predominantly from the southwest during half of the year and from the northwest the other half. Southerly winds are normally associated with approaching winter storms and are usually moisture-bearing due to their origin over the Pacific Ocean. Northerly winds are usually associated with winter and spring high pressure ridging (fair weather) and occasional summer daytime breezes. North winds tend to be dry (Butte County 2000).

AIR QUALITY

LOSRA is located within the Sacramento Valley Air Basin and is under the jurisdiction of the Butte County Air Quality Management District. Air quality is relatively good in the Sacramento Valley, and excellent in mountain areas. However, Butte County has been classified as a non-attainment area because suspended particulate and photochemical oxidant standards are occasionally exceeded. Because the Sacramento Valley Air Basin is a natural basin acting in synergism with sunlight, wind movements, and high atmospheric stability, air quality may undergo a rapid degradation at any time of the year due to temperature inversions, usually during the summer (Butte County 2000).

Ozone (O3)

Ozone, an unstable form of oxygen, results from a chemical reaction in the atmosphere, where volatile organic compounds (VOCs) plus nitrogen oxides react under the photochemical influence of sunlight, forming smog. Nitrogen oxides are produced by motor vehicles and other fuel-burning engines; VOCs are produced by motor vehicles, solvents, consumer products, and the petroleum industry. On some days, usually during the summer, Butte County does not meet the State ozone standards of 0.095 ppm for 1 hour (Butte County 2004). On those days, the air is considered unhealthy, as indicated by the Air Quality Index (AQI).

Particulate Matter (PM10 and PM2.5)

Particulate matter (PM) refers to particles with an aerodynamic diameter of 10 microns or smaller, such as fine mineral, metal, soot, smoke, and dust particles suspended in the air. For health reasons, we are most concerned with inhalable particulate matter less than 10 micrometers in diameter (PM10), and less than 2.5 micrometers in diameter (PM2.5). Particles of these sizes can permanently lodge in the deepest and most sensitive areas of the lung, and can aggravate many respiratory illnesses including asthma, bronchitis, and emphysema. Sources of directly emitted particulates in Butte County include soil from farming, construction dust, paved road dust, smoke from residential wood combustion, and exhaust from mobile sources such as cars and trucks. 2001 data shows that Butte County PM levels (measured in Chico) were above the State standard for PM10 10 days out of the year (in January, September, and October) and never above the federal standard for PM2.5 (Butte County 2004).

Carbon Monoxide (CO)

Carbon Monoxide is a colorless and odorless gas that is directly emitted as a product of combustion. Carbon monoxide is highly toxic because it is readily absorbed through the lungs into the blood, where it binds with hemoglobin and reduces the ability of the blood to carry oxygen. As a result, insufficient oxygen reaches the heart, brain, and other tissues. The harm caused by CO can be critical for people with heart disease (angina), chronic lung disease, or anemia, as well as for unborn children (Butte County 2004).

The State CO standards are 20 ppm (parts per million) for 1 hour, and 9.0 ppm for 8 hours, neither to be exceeded. Carbon Monoxide Emission Trends have been declining

in the Sacramento Valley Air Basin and in Butte County since 1991. The federal CO standard has not been exceeded since 1990 and the State standard has not been exceeded since 1991. Much of the decline in ambient carbon monoxide concentrations is attributable to the introduction of cleaner burning gasoline and newer, cleaner engines in motor vehicles (Butte County 2004).

GEOLOGY

The data sources for the geology section, unless otherwise referenced, are from the Department of Water Resources geomorphic studies (DWR 2003a, 2004).

Geologic Setting

Oroville SRA is located in two geomorphic provinces, the Sierra Nevada to the east and the Great Valley to the west. The Sierra Nevada province includes granitic intrusions, volcanic flows, metamorphic rocks, ultramafic rocks, and unconsolidated sedimentary deposits. This westward-tilted fault block has a high, steep scarp face on the east front and a gentle, fault-bound west front which disappears under the sediments of the Sacramento Valley. The Great Valley province is a narrow, elongated, northwest trending depression that is approximately 450 miles long and 40 to 70 miles wide, filled with sedimentary rocks ranging in age from Cretaceous to Recent (Holocene).

Uplift of the Sierra Nevada province, by various mechanisms, started in the early Cenozoic and continues today. The current uplift mechanism, which stems from mantle-thinning, commenced approximately five million years ago in the Pliocene epoch. The geologic units of the area may be grouped into the steeply dipping “bedrock series” and the younger, nearly flat-lying “superjacent series”. The two are separated by a profound angular unconformity. The metamorphism, steep dips, tight folds, and thrust faults of the bedrock series were formed during the Upper Jurassic Nevadan mountain building. This is believed to represent the collision and accretion of an island arc onto the North American plate. The bedrock series are in marked contrast to the low dips and lack of deformation in the superjacent series.

The rocks that occur within Oroville SRA represent a wide range of ultramafic, granitic, metamorphic, sedimentary, and alluvial rocks and deposits. The eastern watershed is composed mainly of Jurassic to Cretaceous granitic rocks emplaced as molten magmas into the overlying rock, forming roughly circular patterns (plutons), ranging from less than five miles to over twenty miles in diameter. Granitic rocks include granite, granodiorite, diorite, and gabbro. Highly weathered or decomposed granite is erodible and prone to landslides and occurs in the eastern watershed and along portions of the Middle Fork Feather River.

The central portion of LOSRA, including the dam area and the Thermalito Diversion Pool, contains mainly Jurassic age metavolcanic and metasedimentary rocks. These rocks were originally located to the west in a volcanic island arc, then moved westward due to plate tectonic processes and were accreted onto the North American continent, along with a slice of oceanic crust - the Smartville Ophiolite sequence.

The northern-most watershed area (North Fork and West Branch) is underlain by the mélange unit of mixed metamorphosed volcanic and sedimentary rocks. Ultramafic rocks consisting mainly of serpentinite, with lesser amounts of other ultramafic rocks, occur in an almost continuous band about 3 miles wide across the watershed from northwest to southeast. Serpentinite is generally associated with fault zones. These rocks are structurally weak and landslide-prone. They may also contain asbestos minerals, which may pose a health risk if exposed during ground disturbing activities.

Rock units that border the Thermalito Forebay include the Tertiary Lovejoy Basalt, Ione Formation, Quaternary gravels, and Holocene alluvial deposits.

Mining History

Mining in the Lake Oroville watershed began in the mid-1800s and continues today, although on a smaller scale. Mineral resources include gold, copper, manganese, silver, chromite, lead, limestone, sand and gravel, and rock. The first miners exploited placer gold deposits in stream gravel. Gravel was dredged and sluiced to separate the gold. Between the 1850s and 1890s, hydraulic mining using high pressure water jets to erode older gold-bearing formations washed large amounts of sediment into the stream system. Mercury, used to amalgamate with the gold in the sluices, is still a significant pollutant in the sediments and in fish tissues (DWR 2004).

Hard rock mining also produced large quantities of pulverized tailings. Many of these tailings now leach sulfides into some of the streams above the lake (DWR, 2004). This acid mine drainage, which lowers stream water pH, contains toxic heavy metals and is harmful to fisheries.

Dredging for placer gold occurred over large areas of what is now the Oroville Wildlife Area. Windrows of gravel still remain although considerable gravel has been harvested for the construction of Oroville Dam and appurtenant facilities. Commercial gravel mining is also occurring in the area.

Geologic Hazards

Faulting and Seismicity

Despite the numerous faults which traverse the Sierra foothills, the county has not experienced the high levels of seismic activity characteristic of many other parts of the State (Butte County 1977). While not located in a highly active seismic zone, earthquake-induced damage resulting from ground shaking, ground surface rupture, liquefaction, lateral spreading, and earthquake-induced water waves (seiches) are possible at LOSRA.

The nearest active faults are within the Foothills Fault System, site of 1975 Oroville Earthquake of Richter Magnitude 5.7. The Foothills Fault System is a series of northwest-trending and east-dipping reverse faults. These faults were formed during the late Jurassic but have been reactivated in the late Cenozoic and are believed active today. Several of these faults pass through the reservoir area (DWR, 2003b).

The 1975 Oroville Earthquake occurred on the Cleveland Hills Fault (Foothills Fault System), located approximately 6 miles east of Oroville. A linear zone of discontinuous ground cracking developed along the fault about 4.3 miles east of the main shock epicenter. The available evidence does not indicate a causal relationship between Lake Oroville and the earthquake, but the possibility cannot be eliminated conclusively at this time.

Other potentially active faults which could result in significant ground motion in LOSRA vicinity include other portions of the Foothill Fault Zone, Sutter's Butte fault, Willows fault, Dunnigan fault, Coast Range thrust zone, Big Bend fault zone, Camel's Peak fault, Melones-Dogwood Peak faults and the Hawkins Valley fault. All of these faults should be considered potentially active due to geologic, historic, or seismic data. Other potentially active faults may also exist within the county (Butte County 1977).

Landslides

Landslides occur in a variety of rock types within LOSRA. DWR has mapped the landslides within Oroville SRA and rated them as active, inactive, or ancient. Large ancient landslides are common around Lake Oroville, mostly in metamorphic rocks. The largest landslide complex is located within the Smartville Ophiolite sequence and associated mélange unit in the North Fork watershed. Another area with several large landslides is in granitic terrain along the South Fork across the lake from the Craig Saddle Boat-in Camp. The combination of steep topography and steeply dipping, highly faulted, thin-bedded and weakly metamorphosed sediments in a seismically active area indicates a serious landslide risk in some areas of the watershed. This potential risk ranges from minor rockfalls to destructive landslides. Evidence indicates a historic landslide temporarily blocked the North Fork of the Feather River (DWR 2003b).

During intense precipitation, numerous landslides are typically activated, resulting in a large increase in the river sediment load. Some landslide toes are now inundated by Lake Oroville. Several smaller failures along the toe of these large landslides occur, indicating that these features may be reactivated. A large dormant landslide (about three square miles in area) occurs on the north slope of Bloomer Hill, in the North Fork arm of Lake Oroville (DWR 1994). Landslides rated as inactive or ancient could become reactivated due to manmade and/or natural causes, such as changing lake levels, high intensity rainfall events, fires that remove vegetation, and disturbances due to manmade facilities.

Erosion Hazards

Parts of the Feather River watershed produce high sediment yields. Historically, cumulative effects of human activity and resource use have destabilized the watershed and promoted accelerated erosion and sedimentation. Accelerated erosion and sedimentation have been observed in the watershed for several generations. A U.S. Soil Conservation Service (SCS) report, The East Branch North Fork Feather River Erosion Inventory Report (1989), estimated that 90 percent of the erosion in a 1,200 square mile study area was accelerated erosion caused by human activities. Accelerated erosion is a soil loss rate greater than soil loss occurring under natural conditions. High sediment yields can reduce the reservoir capacity, degrade water quality, and harm fish and wildlife.

Reservoir Sedimentation

The construction of Lake Almanor in 1913 stopped most of the sediment derived from the upper part of the North Fork Feather River. Post-Almanor bedload material sources have been the East Branch, other tributaries, and bank erosion. Large quantities of sand and silt enter the North Fork from the East Branch. These sediments accumulate in pools, on point bars, and behind dams.

High sediment yields have significantly impaired storage capacity and hydroelectric operations in several PG&E reservoirs upstream of Lake Oroville on the North Fork Feather River. PG&E is working on reservoir and dam modifications to allow the sediment to flow through these reservoirs. The sediment would then move downstream into Lake Oroville. Typical of dammed rivers, stream channels below the reservoirs have become depleted in gravel and sand sizes and armored by cobbles and boulders.

DWR (1994b, 1993-1994 *Lake Oroville Siltation Study*) measured sediment deposition in Lake Oroville and concluded that about 15 feet of sediment deposition has occurred, for a total volume of 18,000 acre-feet of deposition.

Serpentine Rocks

The presence of serpentinite rocks within LOSRA raises the possibility of naturally-occurring asbestos, which can become a health hazard if the material is exposed during ground-disturbing activities. Based upon available data, no known areas of asbestos occur within LOSRA boundaries.

TOPOGRAPHY

The Lake Oroville State Recreation Area is located at the border between two of California's geomorphic provinces. To the east, the Feather River watershed lies on the western slope of the Sierra Nevada Geomorphic Province, a 400-mile long northwest-trending, tilted fault block with a steep eastern escarpment and a gentle western slope that dips under the Sacramento and San Joaquin Valley. Below Lake Oroville, the conjoined branches of the Feather River flow out onto the Great Valley Geomorphic Province, a northwest-trending, relatively flat, alluvial plain extending from the Klamath Mountains in the north to the Tehachapi Mountains in the south, and the Coast Ranges to the west (CGS 2001).

The branches of the Feather River have incised southwest-trending, steep-sloped canyons across the Sierra Nevada foothills, which are now partially flooded by Lake Oroville. The highest elevation in LOSRA is approximately 1,440 feet in the Upper North Fork of the Feather River near Big Bend. The topography becomes subdued below the dam in the alluvial plain of the Sacramento Valley. The lowest elevation of approximately 650 feet occurs below the Thermalito Forebay.

SOILS

The variety of parent rock types in the SRA has resulted in numerous soil units (at least 47) within the park (CSP, 1973). Most of the soils mapped around the boundary of Lake

Oroville are rated moderate to high for erosion. The Department of Water Resources staff has surveyed the Lake Oroville shoreline and measured erosion rates (DWR, 2004). Maps show the erosion rates broken into four categories: (0): less than 0.5 feet; (1): 0.5-2 feet; (2): 2 to 5 feet; and (3): 5 feet or more. Category 2 areas (2-5 feet of erosion) at or adjacent to LOSRA facilities are found at Lime Saddle, Foreman Creek, Bidwell Canyon boat ramp, Craig Saddle boat ramp, and Enterprise boat ramp. Category 3 areas (5 feet or more of erosion) are found at or adjacent to the Bidwell Canyon, Craig Saddle, and Enterprise boat ramps.

Please see *Appendix A* for a glossary of geologic terms and refer to the Department's geologic information data files for erosion hazards for soil types in LOSRA.

HYDROLOGY AND WATER RESOURCES

The data sources for the hydrology section, unless otherwise referenced, are from the Department of Water Resources studies (DWR 2001, 2003). See the References section at the end of this document for more detailed source information.

Watershed

The Feather River watershed is complex, with numerous geologic formations, deeply incised canyons, broad alluvial valleys, many volcanic features, and steep forested slopes. The west-flowing upper Feather River system (3,600 square mile area) is unique because it is the only river which crosses the crest of the Sierra Nevada. The watershed above Lake Oroville can be divided into two areas; west and east of the Sierra Nevada crest. The western slope rises on a 4-degree inclination from the Sacramento Valley to the crest. Maximum elevations along the crest range from about 7,000 to 7,500 feet. The western slope, which includes portions of LOSRA, consists of mountainous terrain incised by south-west trending, steep-sloped canyons with depths exceeding 3,000 feet. Narrow plateaus of moderate relief are located between the canyons. The mean annual discharge of the upper Feather River watershed is in excess of 2.7 million acre-feet.

In the upper one-third of the watershed, streams historically flowed in shallow meandering channels with broad floodplains covered with riparian vegetation. Floodwaters would quickly overtop the banks and deposit sediment on the valley floor. Under current conditions, land use changes have caused many of the headwater streams to lose their meander patterns and form into sharp V-shaped channels devoid of vegetation, with tall alluvial banks that are easily eroded. In the lower two-thirds of the basin, the West Branch, North, Middle, and South Forks flow in deeply incised canyons with little or no floodplain. Approximately 45 miles of the Middle Fork Feather River are designated as a Wild and Scenic River from Sloat, California to within 1.5 miles of Lake Oroville.

Below Lake Oroville, the Feather River joins with the Yuba River and flows across the Sacramento Valley to join the Sacramento River at Verona. Here the stream gradient is less and the topography subdued. The topography is mostly flat, with the exception of overflow channels, multiple channel areas, and both artificial and natural levees.

Elevation of the valley floor varies from about 150 feet at Oroville to about 25 feet at Verona.

Watershed Management

Several major resource issues have been identified in the Feather River watershed by federal, state, and local agencies, as well as the community: 1) water quality and timing of flows have been significantly influenced by 150 years of resource use; 2) the threat of catastrophic forest fire, exemplified by two 40,000+ acre fires in the past two years; and 3) the functional loss of water retention on a watershed scale as the major contributing factor to accelerated erosion/sedimentation, aquatic and terrestrial habitat loss, and chronic flooding.

The water quality and loss of water retention are being addressed through an ongoing program of watershed restoration undertaken by the 15-year old Feather River Coordinated Resource Management Group (FR-CRM), of which DWR is a participating member. The FR-CRM restoration focus has shifted from a reach-long channel stability project in the middle watershed to channel/meadow restoration in the upper watershed. Restoring floodplain function allows for spreading overbank flows onto well-vegetated floodplains, which retards the speed of flows down the watershed, and can have a significant influence on the timing and magnitude of peak flows downstream. The meadow floodplains also absorb and retain a portion of the winter precipitation for augmentation of late season flow through bank recharge. The combination of sediment control through the reduction in on-site erosion, filtering of upper watershed sediments by floodplain vegetation, and the reduction in erosion stress on downstream channels from altered peak flows provides system-wide benefits for all aquatic-dependent biota.

The Quincy Library Group (QLG) effort focuses on USFS-managed lands within the watershed and advocates removing smaller diameter timber from overstocked forests to reduce the occurrence of uncontrollable crown fires.

Water Quantity and Use

Surface Water

The Central Valley basin includes two major river basins – the Sacramento River on the north, and the San Joaquin River on the south. The Feather River is a major tributary to the Sacramento River, making up about 25 percent of Sacramento River water. Originating in the northern Sierra Nevada, the Middle and South Forks formerly joined 5.4 river miles above Oroville Dam and were joined by the North Fork three river miles below their confluence. Their confluence is now Lake Oroville.

Lake Oroville stores winter and spring runoff that is released into the Feather River, as necessary, for project purposes, including flood control, conservation of water for release downstream, water storage for power generation, and recreation opportunities. The reservoir has a storage capacity of 3,538,000 acre-feet and the average annual unimpaired runoff into the lake is about 4.2 million acre-feet (maf). The water surface elevation and water surface area at maximum operating storage are 900 feet and 15,810 acres, respectively. The reservoir elevation can fluctuate more than 100 feet during the course of a normal year, with the greatest fluctuation being 250 feet.

Annually, the lowest levels occur in the fall, the highest in late spring, sometimes continuing into the summer months. The shoreline extends 167 miles at maximum operating storage.

Below the Oroville Dam, Thermalito Forebay which holds a maximum of 11,768 acre-feet of water. The water surface elevation and water surface area at maximum operating storage are 225 feet and 630 acres, respectively. The shoreline covers 10 miles at maximum operating storage. Thermalito Forebay is part of the power generating operation and it also serves as a recreational site, providing day-use, boat launch, and RV camping.

Water Use

The Central Valley Regional Water Quality Control Board, Region 5 (CVRWQCB), lists beneficial uses for Lake Oroville and the Feather River in *Table 19* above.

In the past, substantial irrigation diversions were made from the Feather River in the vicinity of Oroville. These diversions are now made from the Thermalito Afterbay. The maximum monthly diversions from Thermalito Afterbay (approximately 150 thousand acre-feet) are typically made during the May through August irrigation season.

Table 19. Beneficial Uses for Lake Oroville and the Feather River

Beneficial Use	Lake Oroville	Upper Feather River Tributaries
Municipal & Domestic Water Supply (MUN)	■	■
Agricultural Supply – Irrigation or Stock Watering (AGR)	■ (Irrigation)	■ (Stock Watering)
Industrial Supply – Power Generation (POW)	■	■
Water Contact Recreation (REC 1)	■	■
Non-Contact Water Recreation (REC-2)	■	■
Warm Fresh Water Habitat (WARM)	■	■
Cold Fresh Water Habitat (COLD)	■	■
Spawning, Reproduction and/or Early Development for Fish (SPWN)	■ (Cold & Warm)	■ (Cold)
Wildlife Habitat (WILD)	■	■

Table Data Source: CVRWQCB 1998

Surface Water Quality

The Feather River watershed generally contains water of excellent quality. However, localized concentrations of mercury and polychlorinated biphenyls (PCBs) have been identified. Non-point source sediment is considered the primary water quality impairment. The CVRWQCB lists the lower portion of the Feather River, from Oroville Dam to the Sacramento River, as impaired due to Diazinon (an organophosphate pesticide) from agricultural and urban runoff.

The Oroville Field Division (OFD) of DWR monitors water quality in Lake Oroville. Temperature levels near the dam are measured monthly at intervals from the surface to the bottom of the intake structure. Turbidity levels were measured at intervals

throughout the water column during 1997, but only surface measurements for turbidity are available for other years. Other field parameters, including DO (dissolved oxygen), pH, and conductivity, have only been measured from near the surface of the reservoir near the dam. Water samples are collected monthly near the dam from the spring to fall periods for nutrient analyses, which include total and dissolved ammonia, nitrate plus nitrite, ortho-phosphate, and total phosphorus. Periodic analysis of minerals is not conducted at Lake Oroville.

Recreational activities at LOSRA can contribute to contamination of Lake Oroville and the Feather River. Some potential contaminants and their sources are listed in *Table 20*. DWR proposes to collect water samples from various areas and run analyses for potential contaminants (DWR 2002). Summer bacteria levels at certain swim areas in the study area, such as the Forebay, Foreman Creek, and Stringtown Areas, occasionally present swimming water quality concerns.

Table 20. Potential Water Contaminants and Their Sources Around Lake Oroville and the Feather River

ACTIVITY	Sediment from erosion	Petroleum Hydrocarbons	Bacteria/ Organics-Sewage	Metals	Garbage	Pesticides
Bike/Hike/Equestrian Trails	■	■	■			
Power Boats	■	■				
House Boats		■	■			
Boat Launch	■	■				
Campfire Center/Campgrounds	■		■			■
Floating Camping		■	■		■	
Concessions		■		■	■	
Dump Station			■			
Equestrian Camp			■			
Picnicking	■				■	
Restrooms, including floating ones			■			
Swimming			■		■	
Trailhead Parking	■	■	■			

Source: DWR 2002

Groundwater

Construction of Oroville Dam, impoundment of water to form Lake Oroville, and associated facilities of the project have affected the physical, chemical, and biological characteristics of water in the Feather River. Since the Feather River provides recharge to local groundwater, these changes in water quality characteristics in the river may subsequently affect groundwater characteristics. In addition, recharge to groundwater

from the Thermalito Forebay and Afterbay may affect groundwater quality as well as levels (DWR 2004).

Lake Oroville is underlain by relatively impermeable igneous and metamorphic rocks, which should eliminate any groundwater effects from Lake Oroville. Downstream from the dam, the Feather River and the Thermalito Forebay and Afterbay project features are on much younger and more permeable volcaniclastic and consolidated alluvial sediments, where groundwater recharge occurs.

Due to the porosity of the underlying deposits, the hydraulic heads of the Thermalito Forebay and Afterbay surface water features, as well as varied project-related releases to the Feather River, probably contribute to locally higher groundwater levels, though the extent of this effect has not been quantified (DWR 2004).

DWR is planning a study to determine project effects to groundwater, demonstrate compliance with water quality standards and other appropriate requirements in the application for water quality certification, and identify the need for project modification or mitigation for impacts to groundwater quality or levels from project operations. Water quality analysis is required for determination of conditions in the water quality certification by the SWRCB (DWR 2004).

Flood Management

The Oroville Facilities are an integral component of the flood control system for the surrounding area. During the wintertime, the Oroville Facilities are operated under flood control requirements specified by the U.S. Army Corps of Engineers (USACE). Under these requirements, Lake Oroville is to be operated to maintain up to 750,000 acre-feet of storage space to allow for the capture of significant inflows. During times when flood control space is not required to accomplish flood control objectives, reservoir space can be used for storing water. Flooding could occur during major storms (El Niño years) that exceed the capacity of the dam and cause emergency releases. Inundation maps for Oroville Dam and Thermalito Dam are available from DWR.

PLANT LIFE

LOSRA is located on the extreme eastern edge of the Sacramento Valley extending into the lower elevations of the northern Sierra Nevada Mountains. As defined in The Jepson Manual, Higher Plants of California (Hickman, J., ed., 1993), the park is within the eastern portion of the Sacramento Valley floristic sub-region of the Great Valley floristic region and within the western portion of the Northern Sierra Nevada Foothills floristic sub-region of the Sierra Nevada floristic region. Broad vegetation patterns in the park correspond with elevation changes from the valley floor to the lower elevations of the mountain range, ranging from valley grasslands to foothill woodlands to mixed conifer forests. Riparian and wetland habitats are associated with the margins of Lake Oroville, streams, rivers, and other areas that have abundant soil moisture.

Vegetation Series/Communities/Associations

The information provided in this section is derived from surveys (DWR 2003) that extend beyond the boundaries of the park and may include small areas of private property. The study area for these surveys includes the FERC Project Area, a one-mile buffer area around the FERC Project Area, and a portion of the Feather River floodplain downstream of the Oroville Dam. Vegetation types described below are those that occur within the LOSRA boundaries. (Note: Refer to DWR's study TA – *Biodiversity, Vegetation Communities, and Wildlife Habitat Mapping*, T-2 – *Project Effects on Special Status Species: Plants*, and T-3/5 – *Project Effects on Riparian Resources, Wetlands, and Associated Floodplains* for more information.)

Appendix D describes the vegetation types and vegetation series/associations found in LOSRA. Descriptions of vegetation types and vegetation series, communities, and associations are based on the Holland vegetation classification system (Holland 1986), those described in a Manual of California Vegetation (Sawyer and Keeler-Wolf 1995), and conversations with Todd Keeler-Wolf of the California Department of Fish and Game. In the classification hierarchy utilized in this document, vegetation type is the broadest category, followed by series (equivalent to plant community), and lastly association.

In general, the majority of vegetation around Lake Oroville consists of a combination of mixed oak woodlands, foothill/mixed oak woodlands, and oak/pine woodlands with a mosaic of chaparral. Vegetation surrounding the open waters of the Thermalito Complex consists of emergent wetland types with annual grasslands on the surrounding slopes.

Ten vegetation/land use categories have been identified for LOSRA, seven of which are terrestrial vegetation types. These terrestrial vegetation types have been further classified into thirty-five vegetation series and associations in *Appendix D*. Most of these correspond to the series level as described by Sawyer and Keeler-Wolf (1995).

The most dominant vegetation series/associations in descending order, by acreage, are California annual grassland, mixed oak woodland, foothill pine-mixed oak woodland/chaparral, mixed oak woodland/chaparral, and mixed pine-mixed oak woodland/chaparral.

At least five of the vegetation series/associations are recognized as having special status by the California Department of Fish and Game's Natural Diversity Database. These are black willow riparian forest, cottonwood/black willow riparian forest, mixed willow riparian forest, valley mixed riparian forest, and ponderosa pine-Douglas-fir forest. Rare vegetation series/associations known to occur in or adjacent to Lake Oroville recreation sites that could be potentially impacted from proposed future developments are listed in *Appendix C*.

Rare Vegetation Series/Associations

Black Willow Riparian Forest

This broadleaved, winter-deciduous riparian vegetation type, equivalent to the black willow series of Sawyer and Keeler-Wolf (1995), is characterized by the dominance of black willow (*Salix gooddingii*) with a sparse shrub understory and a variable herbaceous layer.

Cottonwood/Black Willow Riparian Forest

This is a dense, broadleaved winter-deciduous riparian vegetation type dominated by Fremont cottonwood (*Populus fremontii*) and black willow. Understories are typically dense, mostly composed of vegetative shoots arising from mature cottonwood and willow.

Mixed Willow Riparian Forest

This vegetation type is composed of open stands of mature black willow and red willow (*Salix laevigata*), with occasional Fremont cottonwood individuals; usually single trees or groups of two to three around edges of Lake Oroville or occasionally along river edges in upper lake arms.

Valley Mixed Riparian Forest

Valley Mixed Riparian Forest is a tall, dense, broadleaved winter deciduous riparian vegetation type dominated by box elder (*Acer negundo* var. *californicum*), western sycamore (*Platanus racemosa*), Northern California black walnut (*Juglans californica* var. *hindsii*), black willow, red willow, and shining willow (*Salix lucida* ssp*. lasiandra*). Understories consist of vegetative shoots of these species plus shade-tolerant shrubs such as California buttonbush (*Cephalanthus occidentalis* var. *californicus)*.

Ponderosa Pine-Douglas-fir Forest

The canopy of this vegetation type is dominated by ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga mensziesii*) in varying but roughly equal proportions, occupying north-facing slopes, some ridges, and deeper canyons. Other trees that occur in this type include the occasional madrone (*Arbutus menziesii*), canyon live oak (*Quercus chrysolepis*), or black oak (*Quercus kelloggii*). The herbaceous and shrub layers are lacking or minimal, except around the edges.

Special Status Plant Species

Special-status species are those that are legally protected or that are considered sensitive by federal, state, or local resource conservation agencies and organizations. Specifically, this includes species listed as State or federally Rare, Threatened or Endangered; those considered as candidates for listing as Threatened or Endangered species identified by the USFWS as Species of Concern; and the California Native Plant Society's (CNPS) list.

Appendix B summarizes the list of special-status plant species that have potential to occur within the DWR study area, which includes LOSRA and lands outside the park boundary (DWR 2004). Fifteen of the species listed in *Appendix B* have been located within the boundaries of LOSRA and these are identified in that appendix with bold text. Of these fifteen species, those known to occur in or adjacent to LOSRA recreation sites that could be potentially impacted from proposed future developments are listed in *Appendix C*.

Not all of the species in *Appendix B* have the potential to occur in LOSRA because of lack of suitable habitat. *Appendix B* includes six vascular plant species that are State and/or federally listed and an additional 68 species of other status. Of these additional species, 38 are vascular plant species on CNPS Lists 1 and 2; 2 are bryophytes on the CNPS List 2; 23 are vascular species on CNPS Lists 3 and 4; and one is a lichen with a sensitive status as determined by the Plumas National Forest. This list was developed based on information compiled from the U.S. Fish and Wildlife Service (USFWS 1999 and 2002); the California Department of Fish and Game's (DFG 2002) Natural Diversity Database records (CNDDB); the CNPS Rare Plant Inventory (CNPS 2001); Plumas National Forest Sensitive and Special Interest Plant list (USFS 2003); DFG Special Plants List (DFG 2001); and the USFS Pacific Southwest Region Sensitive Plant list (USFS 1998). These special status species include former USFWS Category 2 candidate species and species of concern to USFS, Bureau of Land Management (BLM), and/or CNPS.

Non-Native Plant Species

Non-native (exotic, alien, non-indigenous) species are those that have not evolved in a particular area, and have been introduced through human activities, either incidentally or deliberately. Non-native plant species can adversely impact native plant species and communities and wildlife habitat (including State and federally listed species) through competition. Terrestrial infestations are primarily localized in areas of LOSRA affected by ongoing or previous disturbance such as homesteading and facilities development (trails, roads, campgrounds, etc.). Development of boating facilities and water recreation activities contribute to the altered hydrology within Lake Oroville and enhance the establishment and spread of noxious aquatic weed species.

Noxious weed species are less prevalent and present fewer problems above Oroville Dam than below. Of most concern are those species that are particularly invasive and capable of spreading. Those species identified as most troublesome in the DWR survey area (DWR 2003b) are purple loosestrife (*Lythrum salicaria*) in wetland habitats, yellow starthistle (*Centaurea solstitialis*), giant reed (Arundo donax), tree of heaven (*Ailanthus altissima*), pampas grass (*Cortaderia selloana*), fig (*Ficus carica*), black locust (*Robinia pseudoacacia*), and scarlet wisteria (*Sesbania punicea*).

CSP's Natural Resources Baseline Condition Assessments identify Italian thistle (*Carduus pycnocephalus*), Klamath weed (*Hypericum perforatum*), yellow star thistle, and Himalayan blackberry (*Rubus procerus*) as the most common non-native plant species in LOSRA. Within individual resource management units (RMU's) the extent of non-native species are primarily categorized as localized, but individual stands can range from sparse to dense.

LOSRA Grazing History

Cattle grazing occurs at LOSRA on approximately 417 acres adjacent to the Feather River Diversion Pool and Spillway. This area is owned in fee title by DWR which manages the lease. The last five year lease terminated September 30, 2004 and is being considered for renewal. DWR will be consulting with CSP reqarding the conditions of the lease to mitigate for impacts to public recreation and natural resources.

ANIMAL LIFE

Wildlife Habitats

LOSRA contains a variety of wildlife habitat types, with the predominant habitat being lacustrine, encompassing the open water of the lake. The other habitats within the park are primarily along the shoreline of the lake, and extend upslope from the shoreline to approximately the 1,440-foot elevation. These include but are not limited to annual grassland, mixed chaparral, blue oak-foothill pine, montane hardwood-conifer, and ponderosa pine. There is also riverine habitat present along the Feather River and its tributaries. For a complete list of DFG's Wildlife Habitat Relationships (WHR) habitat types found in the park, refer to *Appendix D*.

The lacustrine habitat of Lake Oroville provides habitat for species such as swallows, bats, and swifts, which forage for insects over the open water. Waterbirds depend on lacustrine habitat for resting and foraging. Osprey, bald eagles, mergansers, California gulls, and other avian species also forage over the open water, diving for fish living in the lake. Riverine habitat along the Feather River provides foraging and resting areas for waterbirds and shorebirds, such as herons, egrets, and sandpipers, which forage along the submerged near shore areas (DWR 2001). Insectivorous birds like black phoebes and swallows also forage over riverine habitat.

Annual grassland habitat occurs in patches within the blue oak/foothill pine habitat around Lake Oroville. This habitat is home to such species as the California ground squirrel, gopher snake, California vole, burrowing owl, horned lark, western meadowlark, Brewer's blackbird, American kestrel, turkey vulture, and northern harrier (DWR 2001). Limited amounts of mixed chaparral habitat are present in some of the higher elevations of the park. Dusky-footed woodrat, wrentit, and California thrasher are some of the wildlife species that can be found in chaparral habitat (DWR 2001).

The blue oak-foothill pine habitat in the park supports species such as western fence lizard, western rattlesnake, acorn woodpecker, plain titmouse, western bluebird, black-tailed deer, Cooper's hawk, wild turkey, and lark sparrow (DWR 2001). This is one of the most widespread habitat types in the park. On many of the north-facing slopes above Lake Oroville, montane hardwood-conifer habitat is home to species such as the California newt, yellow-rumped warbler, mountain quail, black-headed grosbeak, and black bear (DWR 2001). Other forested habitats important to wildlife include Douglas fir forest and Sierran mixed conifer (DWR 2003b).

Habitat Linkages

LOSRA is an important component of a larger network of wildlife habitat in the area. Multiple land agencies own and manage land around Lake Oroville and work collaboratively to protect open space, thus connecting areas of core habitat in the region. LOSRA is connected to Plumas National Forest, providing habitat linkages between the lake and the extensive forested lands owned by the U.S. Forest Service. Portions of LOSRA also link land owned by the California Department of Fish and Game, providing important corridors for wildlife movement. Wildlife movement between all these lands is critical to preserving sustainable and healthy wildlife populations in the region. (Note: Refer to DWR's study T4 – *Biodiversity, Vegetation Communities, and Wildlife Habitat Mapping* for more information.)

Sensitive Wildlife

LOSRA is home to a number of sensitive and special-status wildlife species. Wildlife species considered sensitive are those that are listed threatened, endangered, or species of special concern by the U.S. Fish and Wildlife Service and/or California Department of Fish and Game. In addition, potential habitat exists for additional species that have not been documented recently in the park, but occur in the region around Lake Oroville. Protection of known populations of sensitive species as well as potential habitat that may become occupied in the future is an important priority for California State Parks. Sensitive wildlife species usually depend on specific habitat types within the park, including both aquatic and upland habitats. (Note: Refer to DWR's study T2 – *Special Status Species*: *Wildlife*, and T9 – *Recreation and Wildlife* for more information.

Amphibians

Suitable habitat for California red-legged frogs (*Rana aurora draytonii*) exists in the area around Lake Oroville. However, no recent sightings of this species have been made in the park, potentially due to the presence of non-native predatory fish, bullfrogs, and high levels of recreation (DWR 2003a).

Reptiles

Potential habitat exists for only a few sensitive reptile species near Lake Oroville. Suitable habitat for the threatened giant garter snake (*Thamnophis gigas*) exists in and around areas of freshwater emergent wetland habitat in the park. This species has not been documented in the park, however (DWR 2003a). The northwestern pond turtle (*Clemmys marmorata marmorata*) has been documented near the park in the Oroville Wildlife Area, and most likely is present in suitable habitat in the park.

Birds

A number of State and/or federally listed bird species are either known to occur or have potential habitat present in the park. Bald eagles (*Haliaeetus leucocephalus*) have active nest territories in the park around Lake Oroville (for management purposes these nesting territories are called "primary zones"). This species nests in old-growth trees and snags in remote mixed stands near water (Zeiner et. al. 1990a). Around Lake Oroville it nests in and near the tops of Ponderosa pine. CSP's Natural Resources

Baseline Condition Assessments cite bald eagle as occurring in resource management units (RMU's) in the park more frequently than any other special-status species.

Golden eagles (*Aquila chrysaetos*) have also been observed around Lake Oroville, and are known to nest in the area (DWR 2003a). American peregrine falcons (*Falco peregrinus anatum*) have been documented nesting in the vicinity of Lake Oroville, where a number of historic and active territories are present. The peregrine falcon is a State endangered species that nests on river cut banks, hollows in large old trees, old raptor nests, bridges, skyscrapers, and cliffs (DWR 2003a). Bank swallows (*Riparia riparia*), a state-threatened species, require sandy or silty vertical bluffs or riverbanks for nesting. Years 2002 and 2003 survey results indicate that up to 15 active bank swallow colonies were present on the Feather River between Oroville Dam and Verona. However no occupied bank swallow habitat was identified around Lake Oroville or in the park (DWR 2003a).

A number of additional avian federal or State Species of Special Concern have been documented in the park, some of which are described here (see *Appendix E* for complete list of sensitive species). American white pelicans (*Pelecanus erythrorhynchos*) and double-crested cormorants (*Phalacrocorax auritus*) have been documented in the open waters of Lake Oroville (DWR 2003a). Osprey (*Pandion haliaetus*) have been documented nesting at a number of sites in the park, and foraging over most of the open water habitat in the area. Northern goshawks (*Accipiter gentilis*) could be present in the vicinity of the park. Loggerhead shrikes (*Lanius ludovicianus*) have been recorded in the park, and are known to breed in the area (DWR, 2003a). This small, striking bird is known for skewering its prey, usually insects, on barbs of thorny bushes and barbwire fences. Yellow-breasted chats (*Icteria virens*) and yellow warblers (*Dendroica petechia brewsteri*) could potentially breed in willow riparian habitat in the park.

Mammals

A number of special status mammal species may be found in LOSRA, including long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis volans*), Yuma myotis (*Myotis yumanensis*), Townsend's big-eared bat (*Corynorhinus townsendii townsendii*), and pallid bat (*Antrozous pallidus*). Suitable habitat for ringtails (*Bassariscus astutus*), a State Fully Protected Species, exists in the park. This species has been documented in the area in recent years (DWR 2003a). Pacific fisher (*Martes pennanti pacifica*) could also occur in the montane hardwood/conifer habitat in the park.

Invertebrates

A number of sensitive invertebrate species could potentially live in certain habitats in LOSRA. The federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) could be present in elderberry (*Sambucus* sp.) shrubs and trees in the area. Suitable elderberry habitat is present in a number of locations and historic records of beetle emergence holes exist for the area (DWR 2003a). CSP's Natural Resources Baseline Condition Assessments list Valley Elderberry Longhorn beetle as occurring in three RMU's in the park: Loafer Creek Campground, Foreman Creek, and Goat Ranch Boat-in Campground.

Vernal pools in the park could support the threatened vernal pool fairy shrimp (*Branchinecta lynchi*), endangered Conservancy shrimp (*Branchinecta conservatio*), and endangered vernal pool tadpole shrimp (Lepidurus *packardi*). Typical habitat for these species includes vernal pools, ponded areas within vernal swales, rock outcrop ephemeral pools, playas, alkali flats, and salt lakes (Eng et al. 1990).

LOSRA CULTURAL RESOURCES

Note: This section summarizes cultural resource conditions at LOSRA, but does not attempt to reproduce DWR's cultural resources and sensitivities mapping for their Project 2100 Oroville Facilities Relicensing Project studies. ***Please refer to Appendix G for a listing of DWR-produced resource studies and maps and how to access them on the DWR Website.***

CULTURAL RESOURCES INTRODUCTION

The State Water Project activities that resulted in the construction of Oroville Dam and the impoundment of the Feather River at Lake Oroville have required numerous cultural resource studies at Lake Oroville. Virtually all studies are a result of the construction of Oroville Dam and the resulting recreational development and use at Lake Oroville. A special relationship between the Department of Water Resources (DWR) and California State Parks was defined in the Davis-Dolwig Act of 1961. Most of the cultural resources on land are owned by the Department of Water Resources.

Studies began in the 1950s by the University of California Archaeological Survey during fieldwork at seven possible reservoir locations. With the choice of the Feather River locale for impoundment in the late 1950s, studies continued, primarily conducted by California State Parks (CSP). These early studies focused on prehistoric archaeology and ethnographic data collection. Archaeological surveys during dam construction focused on recording prehistoric sites only in areas of development and construction. As a result of these surveys, several excavations were conducted prior to the impoundment. After dam construction, inventory and excavation at Lake Oroville were undertaken, primarily by CSP as needed for specific projects. A good overview of these previous studies is the Initial Information Package (IIP) which was produced by DWR at the beginning of the current relicensing effort (see IIP pages 167 – 190 of the IIP).

Detailed knowledge of the lifeways of the ethnographic Konkow has been provided by the Konkow people, as consultants during the original cultural resource studies for the dam construction in the 1960s and during the current FERC-related ethnographic research (McCarthy 2003). Along with this direct Konkow knowledge, other researchers and ethnographers have worked in the area from 1872 until the present. Foremost of the early researchers is Roland Dixon, an ethnographer who worked in the area at the turn of the 19th century. His publication in 1905, The Northern Maidu, is one of the most complete ethnographies prepared for any California Native American groups. A good synthesis of the previous ethnographic work is available in the Maidu and Konkow article in the Smithsonian Handbook of North American Indians (Riddell 1978: 386). The most specific overall ethnographic study for the park area is the recent work done

by Helen McCarthy and her team for the FERC relicensing effort and is the basis for this ethnographic overview.

The current FERC Cultural Resource studies, to date, include an archaeological and ethnographic inventory within the Area of Potential Effect (APE) of the Oroville facilities. The APE for the Oroville facilities is larger than the park unit of LOSRA; it also contains many areas managed by other agencies that are part of the DWR Oroville facilities. Thus the numerical information for the number of sites or ethnographic locales is for the larger APE and is not absolute for LOSRA. Additionally, the data presented here are the results from the 2002 field season only; data for the 2003 field season is not available.

Eventually the FERC Cultural Resource studies will include background research, oral interviews, tribal and agency consultations/coordination, field surveys, data analysis, and reporting. Cultural resource issues, action items, and a resulting Cultural Resource Management Plan (CRMP) are being developed through a collaborative process which includes other agencies, Native Americans, and the involved public through a facilitated Cultural Resources Working Group. All of this information will be used to satisfy federal laws such as the Federal Power Act, Section 106 of the National Historic Preservation Act, and State laws such as the California Environmental Quality Act. These studies, action items, and CRMP will have a direct bearing on the management of cultural resources at LOSRA. As a result of these studies, the foothill area of the Feather River has the most complete cultural resource inventory and ethnographic information of any area in the northern Sierra.

Archaeologists surveyed approximately 13,000 acres for the FERC relicensing project in 2002. This study resulted in the recordation of approximately 744 archaeological resources. Of those resources, 277 are prehistoric, 65 are multi-component or mixed historic and prehistoric and 402 are historic resources.

NATIVE AMERICAN OVERVIEW

Prehistory

Although surrounding areas to the east and west show human occupation between 11,000 – 5,000 B.P. (Before Present), there is little direct evidence of this early human occupation in the Lake Oroville region. Within the park, the earliest securely dated archaeological complex is the *Mesilla Complex* with dates between 3000 and 2000 B.P. This complex is considered a foothill variant of the regional Martis tradition. Atlatls with leaf shaped, stemmed, and Martis styled dart points made of basalt, chert, and the local slate were used for game hunting. Millingstone equipment is dominated by manos and metates, suggesting a reliance on hard seeds rather than acorns. Bowl mortars with cylindrical pestles are rarely present. Bone pins and spatulae, *Haliotis* and *Olivella* beads, and charmstones are also part of the Mesilla assemblage. Flexed burials are interred on their sides and occasionally are associated with millingstones or rock cairns. This complex may represent sporadic or seasonal occupation with incipient riverine resource exploitation.

The subsequent *Bidwell complex,* dated between 2000 to 1200 B.P. is marked by the continued use of the atlatl and dart technology for large game hunting. A shift to a more sedentary residential pattern with formal cemeteries may indicate initial tribelet development. Riverine resource procurement of fresh water shellfish, fishing with weighted nets, and hunting were accomplished by task groups from the relatively permanent settlements. While millingstone equipment continues to be dominated by metates, acorn processing with wooden mortars has been hypothesized by researchers. Bone tools such as awls and beads were locally produced. Another local material, steatite, appears in the assemblage as cooking vessels. Burial at the cemeteries associated with the principal settlements was flexed, with dorsal or lateral positions.

About 1200 to 500 B.P., the bow and arrow was introduced during the *Sweetwater Complex*. The continued development of a tribelet form of political organization is postulated. Small, stemmed and corner notched projectile points including the Rose Spring, Eastgate, and Gunther - Barbed styles, tipped the arrows. Millingstone equipment is dominated by cobble and slab mortars and conical, flat ended pestles for processing acorns. Metates and manos continue in the assemblage. Bone tools are better preserved than in earlier assemblages with tubular beads, spatulates, pins, fish gorges, awls and flakers represented. The local steatite industry was elaborated with cups, bowls, platters, and tubular pipes produced. The larger amount of marine shell artifacts including *Haliotis* "banjo" ornaments and *Olivella* beads suggests an expanded trade pattern. Interment was extended or semi-extended. In addition to open air sites, local caves and rockshelters were also used.

The proto-historic Maidu-Konkow, also known as the Northwestern Maidu, one of the divisions of the Maidu linguistic group, are represented in the *Oroville Complex* dated between 500 to 150 B.P. Political organization during this last prehistoric phase was tribelets and is represented in the ethnographic pattern. The bow and arrow technology for hunting continued with projectile point styles dominated by the desert series. Millingstones became increasingly dominated by bedrock mortar features with the acorn complex reaching its greatest development. Mortars and pestles and manos and metates are present. Bone artifacts which are better preserved from this late tradition include small tubular bone beads, incised bird bone whistles/tubes, gorge fish hooks, gaming bones, and awls. Although reduced, the steatite industry continues with ornaments, pipes, cooking slabs, and arrow shaft straighteners present. Marine shell artifacts include the luxury items of clam shell disc beads and thick-lipped *Olivella* beads. Burials were tightly flexed on their sides with occasional stone cairns for markers. Occupation at caves, rockshelters, and open air sites continued. During this last prehistoric phase, population density of the indigenous peoples is at its highest.

Ethnographic and Ethnohistoric

The arrival of Euro-American immigrants began the ethnographic or ethnohistoric period in the Lake Oroville region. At this time, the Konkow were organized in village communities consisting of a ceremonial and political major village with a resident chief and several geographically-related satellite villages. Several of these village communities have been identified (McCarthy 2003:13-14) within the park vicinity: *Pomikeli* (Yankee Hill), *Hudli* (Table Mountain), *Yuno* (Bald Rock), *Toto* (Bloomer Hill), *Chichi* (Mooretown), *Holholholtun* (Enterprise), *Mako* (Oroville east), and *Kunabe*

(French Creek). While many of these villages are no longer extant, membership of the modern tribes in the Oroville area reflects families from many of these former village communities.

The subsistence strategies for the Konkow were similar to other California Indians. They possessed a mixed gathering, fishing, and hunting economy based upon an annual resource cycle. This resulted in a bimodal residential strategy consisting of larger sedentary fall/winter villages with storage facilities and spring/summer/fall dispersed camps during procurement of seasonally available resources. A large fall harvest focused on acorn and salmon procurement and storage. Acorns were gathered by the ton and along with other plants dried and stored for later use and for communal ceremonial feasting. This successful seasonal gathering relied upon an intimate knowledge of plant uses, distribution and seasonality. Management for these resources was greatly aided through the use of fire to discourage brush growth and encourage desirable species.

The protein base of these riverine people was the anadromous fish runs, particularly the fall run of salmon which provided a reliable and abundant protein source. Many salmon spearing locales existed in the park area with Union Bar on the Middle Fork mentioned most frequently by the modern Konkow consultants. The salmon were eaten fresh or were dried or smoked for storage. Other riverine resources used were eel and sturgeon, also anadromous species, and fresh water mussel.

Terrestrial game also provided an important food source. Deer were the main game animal with deer drives, a communal activity, used to take many animals simultaneously. Other game animals included rabbits, squirrels, and birds in the park area and elk, antelope, and migratory fowl from the grasslands to the west.

Both men and women made the tools and objects of the Konkow life. Amongst many objects, men produced the fishing tools such as salmon harpoons and fish hooks and the bows and arrows necessary for successful hunting. Women artists specialized in making a great variety of baskets. These basketweavers were highly skilled and admired by their communities.

A large trade network supplemented the material culture. Areas to the north-south and east-west provided utilitarian and luxury items from other ecozones. Beads, obsidian, and green pigment were obtained through trade to the north while abalone shell, clam and Olivella shell beads were obtained through trade with the Patwins, neighbors to the west.

Within the fall/winter villages, two residential structures existed. Family homes were circular, semi-subterranean, conically shaped, and earth- or bough-covered. The chief lived in a larger semi-subterranean circular structure which was also used for community food storage and ceremonial or community activities. Food was stored in granaries which were built in trees or on platforms. During their stays at the seasonal camps, the people sometimes constructed temporary structures for shade or open brush enclosures for ceremonies.

The ceremonial round of the Konkow reflected the sedentary winter village life with the commencement of activities in October and the finalization in April or May. Five or six ceremonies, focused on communicating with the supernatural world and giving thanks, were conducted during this period. A male Secret Society and shamans regulated ceremonial life. Shamans were also responsible for healing.

Additionally, ceremonial activities focused on proper burial and annual community observances for the dead. Burial took place at a village cemetery which was generally located within one-half mile of a sedentary fall/winter village. In the fall, the community honored the recently deceased through an elaborate mourning ceremony, or "cry" at a burning ground located near the village cemetery. During this observance, many goods and valuable gift items were displayed, exchanged, and burned in honor of the deceased.

Change for the flourishing, complex Konkow society came with the beginning of Spanish colonization. The first exploration into the Maidu territory in 1821 resulted in the naming of the *Rio de Las Plumas*, or Feather River, by Captain Luis Arguello. While this exploration into the area appears to have had no apparent effect on the Konkow, subsequent incursions did.

Fur trappers who infrequently trapped in the area from 1828-1846 had particularly deleterious effects on the Konkow. In 1841, Captain Wilkes of the United States Exploratory Expedition noted the drastically depopulated game in the Feather River area due to the trappers' activities. An epidemic, believed to be malaria, was probably introduced into the valley area by the Hudson's Bay party of trappers led by John Work in early 1832. By late 1833, when Work's group returned to the north, the effects of the "ague" on the valley Konkow were apparent. This epidemic so decimated the Konkow that they were unable to bury their dead and it is estimated that 75% of the Natives were killed by malaria (DWR 2003). Information from contemporary Konkow about an ethnographic village within the park has led to the speculation that this epidemic also may have been inside the park boundaries (DWR 2003). Clearly this enormous depopulation had vast effects on the Konkow people's ability to continue their traditional lifeways.

Land grants, a way of extending colonial population and influence, began in 1839 to the south in Sacramento. John Sutter became a naturalized Mexican citizen and obtained the land grant of New Helvetia. Within the park vicinity, a land grant, Rancho de Arroyo Chico, was given to William Dickey in 1844. It was later acquired by one of Sutter's workers, John Bidwell. While none of these land grants were inside the Lake Oroville State Recreation Area, there were impacts on the local Konkow as a result of the adjacent land grants. Valley lands, which traditionally provided elk, antelope, and migratory fowl, were used for cattle grazing, thus further disrupting the Konkow economy and lifeways. Further alienation of the valley Konkow from their land was continued by the need for labor on these ranchos. The beginnings of a Maidu working class began as laborers began to manage the herds and to build the infrastructure of the land grants.

As the valley Konkow lifeways had changed to adapt to the incursion of the rancho peoples, the lifeways of the rancho peoples, in existence for less than a decade, vanished with the discovery of gold in 1848. Just three months after Marshall's discovery, John Bidwell discovered gold in the park on the Feather River at Bidwell Bar. In the group with Bidwell that discovered this gold were a number of Konkow (DWR 2003a). Other rancho owners and early settlers soon followed with John Potter at Potter's Bar on the North Fork and Sam Neal near Long's Bar. Like Bidwell, these argonauts used valley Konkow laborers.

In 1848, the foothill Konkow were still mostly following their traditional lifeways. With the influx of gold seekers, the foothill Konkow's lifeways were forever changed in 1849. Mining activities which focused around placering the gold deposits in local stream and rivers interrupted the access and availability of the riverine resources. Mining camps and miners' food procurement decreased traditional game. Diseases including pneumonia, influenza, tuberculosis, cholera, smallpox, and typhoid severely diminished the foothill populations affecting the cultural functions of efficient group gathering and storage and ceremonial life. Genocide against the indigenous peoples was perpetuated by the avarice, cultural ignorance, prejudice, misanthropy, and lawlessness of some of the miners. Since there were no laws to protect Native Americans, genocide against indigenous peoples, including the Konkow, was common.

Despite the odds against them, the Konkow survived this onslaught. The foothill Konkow also became part of the American economy as mine laborers working for others or as independent miners. "In 1848 it has been estimated that of the 4,000 miners at work in the central mines, which included the project area, half were Native Americans" (DWR 2003a). However, by the early 1850s, the reality was that easy mining pickings were depleted and most Native Americans had been relegated to camp fringes or had tried to return to a more traditional economic base.

In 1851, the U.S. government tried to negotiate treaties within California in an attempt to settle the many conflicts between the indigenous peoples and the miners and settlers. A 227 square mile Indian reservation, encompassing an area roughly from Chico to Nimshew to Oroville, was negotiated for the Maidu. While this treaty was signed by nine Maidu leaders, powerful American landowners persuaded the Senate to not ratify this treaty. Instead an Indian reservation was set up at Nome Lackee, away from the Feather River country in Tehama County. "Deliveries" of Konkow were made to Nome Lackee over a period of roughly seven years with the Konkow returning to their homes throughout their internment. By 1864 this reservation no longer existed, in large part due to the avarice and underhanded dealings of the responsible government agents (Jewell 1987: 40-41).

The failure of the Nome Lackee reservation was followed by another reservation solution put forth by the Americans. This new reservation, Nome Cult or Round Valley, is in Mendocino County and it was hoped that its remote location on the west side of the valley would discourage Indians from returning to their homelands. In August 1863, foothill Konkow were notified that they must come to Chico Landing on the Sacramento River for a forced removal to the Round Valley reservation. After that time, the foothill Konkow found in the county could be shot on sight (McCarthy 2003: 24). This removal,

now known as the “Death March” took 14 days with only 277 of the original 461 individuals reaching Round Valley. The habit of repatriating after forced removal began immediately. The dislocated Konkow returned over 100 miles to their homes. They were guided home in part by fires ignited by their relatives who had fled into the hills. These fires smoked and glowed from the top of prominent peaks in the vicinity of the park.

The Konkow adapted by living quietly in scattered, remote communities such as Berry Creek, Mooretown, Enterprise, and Concow and by participating in the American economy supplemented by traditional fishing, gathering and hunting. Despite the disruption of their lifeways, the Konkow continued to practice many of their traditions. These ceremonies were noted in the local newspapers at park area locales such as Bloomer Hill (*Toto*) and Foreman Creek *Tie'wa* area (McCarthy 2003: 27, 48).

Modern Native American Lifeways

Land for tribal residence became available through federal government activities beginning at the end of the nineteenth century. Much of this land was acquired as a result of the needs of the large number of homeless Indians throughout the State and formed a uniquely Californian Indian land system called rancherias. These rancherias are reflected in the current federally recognized groups of the park area: Berry Creek Rancheria, Enterprise Rancheria, and Mooretown Rancheria.

Integrating the Konkow into American society was a goal of the American government. To this end, the federal government established a policy that children attend special Indian schools where they were segregated from their cultures, families, and language in an attempt to assimilate them. Some Konkow, especially the Enterprise people, were able to attend the local Mountain Springs School. Other children were sent away to the Indian schools. Following in the repatriation tradition of their ancestors, those children who did not like the schools walked home over large distances.

Twentieth century Konkow economic activities reflected the resource extraction base of the local economy. The men worked in the woods for the different logging operations or were self employed producing shakes and fence posts or by mining. Successful entrepreneurs ran their own logging and mill operations or became ranchers. During the first part of the twentieth century, women basketweavers were an especially important source of income for families as they wove baskets specifically for sale. Many of the foothill people remained secluded and mostly self-sufficient by growing gardens and storing the fall harvest. While spearing fish was illegal, it still remained an important activity with storage strategies shifting to an emphasis on canning.

After World War II, employment opportunities changed and to find work in the timber industry, many men needed to move to jobs outside of the Feather River area. While being away from home was difficult, often an entire nuclear family would move to an area for the summer and camp on the fringes of logging operations. Time spent in these new areas hunting, fishing, and gathering is remembered fondly. The self sufficient nature of the foothill communities started changing as the men and women became more involved in the modern monetary-based economy. At this time, women began to work outside of the home and found work at the Oroville cannery or as day

laborers. Despite the changing work habits, traditional gatherings and celebrations continued in the park area, in part due to the remoteness and uniquely Indian character of the small foothill communities.

The construction of the Oroville Dam in the 1960s destroyed the riverine habitat of the Konkow and stopped the salmon runs, forever altering the Konkow landscape. While the salmon no longer run above the dam, currently salmon are speared below the dam by Konkow people and an annual fall salmon ceremony is held.

The creation of Lake Oroville altered residential patterns as well. Most affected by the construction of the dam were the residents of Enterprise, which was inundated. Additionally one of the parcels of the Enterprise Rancheria, a place of continued traditions, was flooded and is now beneath Lake Oroville.

Today, two of the federally recognized tribes, Berry Creek and Mooretown, have a land base in Oroville. Tribal housing is available and there are casinos for employment opportunities. The Enterprise Rancheria, which lost part of its land base during the impoundment of Lake Oroville, is seeking to acquire land in the Marysville area. The Konkow Valley Band of Maidu is seeking federal recognition and actively participates in community activities.

The Konkow are very interested and involved in cultural resource activities. Ishi, perhaps the last Northern California Indian to practice the old ways, walked to the Oroville area in 1911. The local Konkow believe that Ishi, like so many of their ancestors, was walking home to the place of his mother's peoples.

All of the tribes, as well as some unaffiliated Konkow people, are active in the Lake Oroville FERC relicensing process. Additionally there are Konkow involved in the CSP Lake Oroville Site Steward program, which monitors archaeological sites, and in the CSP Visitors Center exhibit team. Recently, basketweavers from Berry Creek and Mooretown weaving classes attended a Visitors Center exhibit team meeting and have sold several baskets that will be included in the Maidu display.

HISTORIC PERIOD OVERVIEW

The history of the FERC Project Area reflects many of the major events and themes of California history and it is within the context of historical themes that this overview is presented. These themes have been developed as a result of the recent studies and are presented in depth in the Draft Oroville Facilities Cultural Resources Study by Selverston et al.

Early History

From the time of the first poorly-documented Spanish explorations into the Feather River in the early 19th century until the 1830s, little happened of historical import in the area. In 1808, a military expedition led by Gabriel Moraga from Mission San Jose explored portions of the lower Feather River, not within the park area. Twelve years elapsed before the Spanish mounted another expedition which at least had the significance of naming the area's most dominant feature, the Feather River. The1821

expedition of Luis Arguello is credited with the naming of Rio de las Plumas after seeing a large number of feathers floating on the river.

That same year, 1821, Mexico gained independence from Spain. The Mexican government also showed little interest in the area until the 1840s when the Mexican government began to award land grants in the area. Land grants from the Mexican government, were a way to expand political and economic development. Between 1844 and 1846, Governors Micheltorena and Pio Pico made a number of grants in modern Butte County. The most famous of these land grants is Rancho de Arroyo Chico, granted in 1844, and later acquired by John Bidwell.

In the 1820s and 1830s, prior to the era of Spanish land grants, Anglo-American and European trappers visited the area in search of pelts. The first documented trapper in the area was Jedediah Smith, representing American interests. He traversed the Feather River area in 1827 on his way to Oregon. Trappers from the Hudson's Bay Company first entered the area in 1829 with a party led by Michel Lafromboise. In 1832 -1833 a trappers' party led by John Work entered the area. This party is believed to have introduced a disease, probably malaria, to the area which quickly turned into an epidemic. In less than two years, this epidemic is estimated to have killed approximately 75% of the indigenous population. Thus by the 1840s, when the ranchos began to develop in the area, the indigenous population and culture had been severely impacted.

Americans had slowly slipped into California during the Mexican period. Many of these early American immigrants were unwilling to become naturalized Mexican citizens or part of the Californio society. Their quest for a California aligned with the United States instead of Mexico resulted in the Bear Flag Revolt and American intervention of 1846. Thus, less than three years after the granting of Rancho de Arroyo Chico, California was acquired by the United States as part of the settlement of a larger war between Mexico and the United States. This year, 1848, not only saw California become a United States possession, it also was the year of the first gold discovery, an event that has formed the history of the area until today.

Gold Rush and Statehood

Only three months after Marshall's discovery on the American River, John Bidwell discovered gold on the Feather River, located in the park at Bidwell's Bar. He was soon followed by other Californians, with John Potter discovering gold at Potter's Bar and Sam Neal discovering gold at Long Bar near Oroville.

The Feather River gold would not be mined by the locals only, however. Word of the discovery spread quickly and led to one of the largest voluntary migrations in modern history. Among the first gold seekers to arrive were west coast immigrants from Oregon. Their presence is remembered today on maps with the names of Oregon City and two Oregon gulches in the FERC Project Area. By 1849, the migration had a decidedly international feel as argonauts from throughout the world hurried to California. In the 1850 census, of the 3,052 miners in Butte County, 718 were foreign born with the British Isles, France, and Germany most represented. Miners also came from South America and Hawaii. By 1852, Chinese from the province of Guangdong made their

way to the Feather River. While much is not known about individual miners, the ethnicity of many of the early sojourners is left on the maps for the FERC Project Area with names like Spanishtown and Frenchtown near Yankee Hill on the West Branch, Kanaka Bar and Kanaka Peak on the Middle Fork, Ah Moon Bar in Big Bend and the Chinatowns in many of the mining towns.

Fortunately some of the 49ers kept diaries. The park area, especially the South Fork locale, is represented in several books about the 49ers including *The Gold Rush: Letters from the Wolverine Rangers to the Marshall, Michigan Statesman: 1849-1851* and Alonzo Delano's account, *Across the Plains and Amongst the Diggings*. One of the diaries kept by William Swain of the Wolverine Company is the base for J.S. Holliday's popular book, *The World Rushed In*. Much of what we know about the early gold rush comes from these diaries.

No matter how they came to the Feather River, all the miners stopped at Bidwell Bar for provisions and news prior to leaving for the gold fields, mostly upstream. By 1849, Bidwell had given up mining, sold his store and returned to his rancho in Chico. Nonetheless, this important mining town, now submerged beneath Lake Oroville, bears his name.

The tremendous influx of gold seekers prompted the U.S. military governor in Monterey to convene a constitutional convention in 1849. This convention's mandate was to establish some form of government and to petition for statehood. The resulting constitution was very progressive for its time and reinforced individual freedom, the right of a married woman to hold property, and was anti-slavery. This last provision caused some controversy and delayed approval of statehood until 1850. A much larger Butte County was one of the original counties of the State with Hamilton, below Oroville on the Feather River, named the original county seat. Subsequently, Bidwell Bar was named the county seat and by 1856 the county seat moved to Oroville where it has remained.

<u>Gold Mining and Water Development</u>

Resource extraction was and is the basis for the economy of the park area, with the river system itself, both as a geologic agent and as water, providing the economic foundation. Mining the auriferous gravels of the Feather River was the base of the economy for at least 70 years, and utilizing the river's waters was part of the process. Most gold within the FERC Project Area is deposited in stream beds or placer deposits and all technology to remove the gold from the gravel deposits requires water.

The original 49ers employed a fairly simple mining method called "placer mining". Stream gravels were washed by individuals in a pan or bowl using the gold's heavy weight to separate it from the gravel. Miners who organized into self-capitalized companies could move more gravel and employed the technology of the rocker, cradle and/or long tom. To provide a continuous supply of water for these larger washing methods, these early groups began to utilize the creeks by constructing dams, flumes, and ditches. During these early days of the gold rush, the miners lived in transitory, but lively and raucous camps. As a new strike was made elsewhere, these ephemeral camps, with their mostly canvas buildings, were abandoned.

As the gold became harder to recover, mining technology changed, affecting the business structure, the landscape, and settlement patterns. As the stream deposits were played out by the early 1850s, it became necessary to use engineered solutions to recover the gold from the rivers or from dry diggings. These engineered techniques, such as damming and fluming on the large rivers to get at river gravels, required more capital and labor-intensive systems. This was the beginning of capitalized or corporate mining. The corporate financial structure was responsible for the financing of all succeeding mining technologies.

Most of the capital for this new mining technology came from San Francisco investors and their associates. During the 1850s, 87 corporations were formed in Butte County, more than in any of the other mining counties. By July of 1855, there were 17 corporations fluming the Feather River. Miners became employees of these companies. While some of the original mining camps became small permanent communities during this time, most of the mining camps simply vanished. In addition to Bidwell Bar, Stringtown, Enterprise, and Ophir (later Oroville) developed. All of these communities, except Oroville, remained very small. Oroville, below the confluence of all the branches of the Feather River, developed into the primary commercial and government center of this portion of the Feather River drainage.

Ditch companies, formed by either mining companies or water purveyors, supplied water for the dry diggings and later for hydraulic mining. Ditches from the foothills eventually supplied water to Long's Bar, Thompson's Flat, and most ambitiously from Forbestown along the South Fork of the Feather River to Wyandotte, Honcut, and Ophir. By 1856, this ditch was completed by the Feather River and Ophir Water Company, now known as the Oroville Wyandotte Irrigation District.

By 1854, the water conveyance systems provided the infrastructure needed for the technology of hydraulic mining, the most important mining technology in the park area until the mid-1880s. Hydraulic mining used the ditch water to wash down auriferous gravels from hillsides. Both the hillside exposure and the resultant debris concentrations had major impacts on the landscape. Entire mountains disappeared and were redeposited downstream, especially in the flat valley lands. The largest hydraulic mine in the county, the Spring Valley Mine in Cherokee, constructed a debris conveyance ditch that discharged into a tule swamp in Sutter County, thus avoiding immediate downstream effects. Other hydraulic mines, however, were not careful with the debris discharge and negatively affected their downstream agricultural neighbors. As a result of the downstream environmental effects, a court decision, Edwards Woodruff v. North Bloomfield Gravel Mining Company, effectively ordered the cessation of all hydraulic mining in 1884. The reality is that by 1884, hydraulic mining was becoming less and less profitable and would have ended soon. For instance, by 1887, the large Spring Valley Mine, which was not affected by the court decision, ceased operation due to economics.

With the end of hydraulic mining, all subsequent mining consisted of reworking the now redeposited auriferous gravels. Riverbed draining and gravel exposure mining technology began again in the area in the late 1880s and early 1890s. Most notable were the river mining schemes of Frank McLaughlin, labor- and capital-intensive

schemes that were failures. The Big Bend Tunnel Project on the North Fork constructed a tunnel 16 feet wide by 12 feet high and over 2 miles long to drain the river. Another McLaughlin plan sought to drain the riverbed right above Oroville with the English-financed Golden Gate and Golden Feather projects. The Golden Feather project constructed a 6,100 foot wall which was known locally as the China Wall.

The China Wall, as well as many other mining operations, employed many Chinese laborers. The Chinese also organized themselves into mining districts. From 1872-1882, the largest Chinese mining settlement in the United States was in the Oroville area. Known as the Lava Beds District, 5,000 to 8,000 Chinese miners employed small scale dry diggings technology in an approximately 7 square mile area. As with other minorities, the Chinese were subject to prejudice and active persecution, especially during hard times.

The reworking of gravels continued with the last of the large-scale capitalized mining technology, dredging. The first successful dredging attempt in California was on the Feather River in 1894. By 1904, in the Oroville area, there were 24 dredges operating. At its height a few years later, forty dredges were operating along the Feather near Oroville. By World War I, dredging was no longer profitable, although small scale dredging continued into the early 1950s. The final reworking of the gravels persists today as tailings from these dredging operations continue to be mined for aggregate.

The Depression saw a local resurgence of mining. As in the beginning, individual placer mining was the chosen technique as people sought a way to earn income. Individual placer mining continues to be a recreational pastime as the lust for gold speaks loudly to some individuals.

While mining is no longer an economic factor in the area, the water conveyance systems that were developed for the mines continue to be part of the area economics. A number of the ditch systems were converted to irrigation ditches and later to irrigation district infrastructure, including the Oroville Wyandotte Irrigation District and the Thermalito Irrigation District.

The development of hydroelectric power in the area was facilitated by existing mining water systems. By damming the North Fork watershed at Lake Almanor and by using existing mining water conveyance/hydroelectric systems, Great Western Power became the dominant hydroelectric company in northern California in the first decade of the twentieth century. They had a powerhouse and company town, Las Plumas, at Big Bend on the North Fork which became part of PG &E in 1930.

With the building of Oroville dam in the 1960s, the Feather River was ultimately controlled into the world's largest water conveyance system. The State Water Project (SWP) delivers water, based on Feather River releases at Lake Oroville, to water districts as far south as Hemet and has provided the water foundation for the explosive growth of water-deficient Southern California. The Feather at Lake Oroville continues to provide hydroelectric power through the ingeniously engineered power plants of the SWP.

Transportation

The Feather River, while providing the foundation for the local economy, was also an obstacle to transportation and therefore to early economic diversification and development. Upstream from Oroville the Feather is steep, and downstream, the mighty Feather periodically flooded or was almost dry.

The original historic trail into the area was developed by Jim Beckwourth, a mountain man. He used the low pass through the Middle Fork near Sierra Valley for the route of the Beckwourth Trail and crossed the Feather River near Bidwell Bar. Although the Beckwourth Trail was the only low-elevation trail into the gold fields and Central Valley that remained open all year, it never was as popular as other routes during the gold rush.

The Beckwourth Trail proved to be the key to transportation to the northeast as a transcontinental railroad, the Western Pacific Railroad, and a highway, the Feather River Highway (State Highway 70) used portions of the original trail alignment. Alignments for both these routes through Lake Oroville are along the North Fork and not the original Beckwourth Trail which used a more easterly route. The installation of the suspension bridge at Bidwell Bar in 1856 ensured both the longevity of the Bidwell Bar community and the Beckwourth Trail route as this was the transportation route to the mines and communities of Plumas County until the1930s when the Feather River Highway opened.

Downstream of Oroville, steamboat travel on the rivers was important in the 1850s to 1860s. However, the changeable flows of the Feather River with its winter high water and summer low water made steamboat navigation impossible upstream from Marysville. Thus, Marysville was the terminus of steamboat travel and until the 1860s, all freight from the south had to be off-loaded at Marysville and transported to Oroville via wagon. In 1864, the California Northern Railroad was completed from Marysville to Oroville and freight and travelers could come to Oroville via the rail. With the completion of the Western Pacific Railroad in 1910 and the Feather River Highway in 1937, the major transportation routes downstream, towards the south, were completed.

Other Enterprises

While the beginnings of the lumber industry were closely tied to mining requirements, it was not until the completion of the Western Pacific Railroad that logging became more than a source for local construction needs. Like the early mining, the first mills were ephemeral, meeting a local need or simply exhausting the timber resources of an area and then moving on.

The Western Pacific Railroad, however, offered cheaper transportation of the bulky lumber to a larger market and venture capital quickly financed large scale logging operations. The large scale logging operations were in the high elevation conifer forests above the river but features of the logging transportation systems are within the park. The Butte and Plumas Railroad between Oroville and Berry Creek crossed the Feather River near Bidwell Bar. The Hutchinson Lumber Company's (later the Feather River Pine Mill's) railroad crossed the South Fork of the Feather River and continued to the rich timber above Mooretown (Feather Falls). As with all extractive industries, the

lumber industry has a very cyclical nature and thus the history of the large scale logging companies is one of boom and bust.

As the placer mining deposits depleted, some miners decided to stay in the area, giving up mining activities in favor of farming and ranching. Due to the topography and Mediterranean climate of the foothills, none of these farming and ranching endeavors became the large enterprises of the valley to the west; instead they reflect an individual subsistence economy with surplus sold locally. Many of the early agriculturalists acquired their land by homesteading, and typical development included modest residences, agricultural outbuildings, small orchards, vineyards, pasturage, and fencing. Of note agriculturally within the park is the Mother Orange, originally planted at Bidwell Bar; this tree demonstrated that citrus could be a viable crop. A small but locally important citrus industry developed and by 1900 there were 3,300 acres of oranges in the Oroville area. A devastating freeze in 1932 severely affected both the orange and olive industry. Although both citrus and olive groves remain in the area today, the promise of these early agricultural endeavors never recovered from this freeze.

Another local industry based on mining, lime production, built up along the West Branch region in the Lime Saddle area. As with agriculture, the lime industry never progressed beyond an independent subsistence level, mostly supplying local needs for construction and sewage treatment. The West Branch Lime Kilns, operated by William Gwynn, was advertising as early as 1855. Other lime manufacturers in the Lime Saddle area included Augustine and John Parrish, and Charles Curtis.

Today the economic base of the area is still dependent on the mighty Feather River. The damming of the river and creation of Lake Oroville has created the modern recreation and tourism that drives the local economy.

ARCHAEOLOGICAL RESOURCES

During the 2002 field season, about 13,000 acres were inventoried for archaeological resources within the FERC Area of Potential Effect (APE). The inventory consisted of four tasks: rerecording known resources, a complete inventory of the fluctuation zone, a probabilistic sample survey of lands outside the fluctuation zone for identifying prehistoric resources, and a survey of historically sensitive areas based on archival research. A fifth task, inspection of management-specific areas, has since been accomplished, but the data were not available for this synthesis.

The inventory resulted in the recordation of approximately 744 archaeological resources; 277 are prehistoric resources, 65 are multi-component resources; and 402 are historic era resources. The inventory of the fluctuation zone was limited to the 2002 lowest lake level of 690'. In addition to the recordation of the resources, Site Data Management Forms (SDMF), which collected information on cultural and environmental adverse impacts, were completed for 618 of the recorded resources.

To help manage and protect the archaeological sites at Lake Oroville, SDMF were completed for 618 of the 744 sites recorded in 2002. Of the 618 resources that had SDMF completed, 490 sites, or 80%, have been affected by at least one of the following

impact categories: development, public use, vandalism, looting, off-road vehicle use, cyclical inundation, sheet erosion, and shoreline erosion. While these 490 sites have had some kind of impact to them, they still retain some integrity. It is part of the CSP mission to protect and manage our cultural heritage.

Prehistoric Sites

Researchers for the prehistoric site inventory analyzed 224 sites within the fluctuation zone; all of these sites are within the park. While many of the sites are threatened by more than one type of adverse impact, about half of the sites were judged to be in stable condition currently. None of these stable sites is within the fluctuation zone. The 340 sites within the fluctuation zone have been severely impacted, and largely continue to be severely impacted by erosion and exposure problems. Importantly, 150 of the sites outside the fluctuation zone have been impacted and approximately 50 of these sites continue to be threatened.

Development impacts from reservoir construction and maintenance and other construction prior to reservoir activities have affected nearly 80% (+/- 495) of the sites. Although the bulk of the damage has been done, when these sites are considered in conjunction with other types of impacts, such as erosion, it is evident that most of the sites are experiencing ongoing impacts. Only 3% of sites impacted by development are free from ongoing negative impacts.

Public use impacts range from damage from trails to campfires and littering. Public use is affecting 50%, or 309, of the sites with 84% of these public use impacts resulting in some kind of ground disturbance.

Vandalism, or intentionally defacing resources, has affected only 2% of the properties. Looting, the willful removal of cultural material, on the other hand, is inferred at 16% or +/-100 sites. Demonstrable looting in the form of excavation or looter's piles was observed in 33 sites. While the majority of looting is occurring in the fluctuation zone (90%), 10% of the looted sites are in other parts of the APE.

One of the most destructive impacts observed is off–road vehicle use, a common recreation access solution and common recreational pastime within the fluctuation zone. Twenty-one per cent (21%) or 129 sites have been affected by this activity. The degree of damage recorded for off-road vehicle use was heavy for 77%, or 99, of the sites impacted by this activity.

Fluctuation zone sites are particularly impacted by the factors of cyclical inundation, sheet erosion, and shoreline erosion. Cyclical inundation affects 313 sites. Water runoff in the form of sheet erosion, mostly restricted to the fluctuation zone, is affecting 47%, or 288, of the sites. This erosion is particularly destructive for sites left exposed in the upper part of the fluctuation zone. Seventy one per cent (71%) or 221 of these sites are experiencing heavy impacts from this cause. There are 284 sites, 46 percent, which are being impacted by shoreline erosion with 181, or 84 percent, of those sites being heavily impacted.

A further threat exists to resources at Lake Oroville, fire effects from excessive heat and fire suppression activities. The larger land tracts at the Craig area, Foreman Creek, and Potter's Ravine have large fuel build ups. Catastrophic wildfires with their high temperatures can seriously affect artifacts and destroy native plant communities and cultural landscapes. Additionally, fire suppression activities with heavy equipment could cause serious ground disturbance.

Historic Sites

The analysis of the 2002 field season grouped historic archaeological resources by the historic themes of gold mining, water management, transportation, settlement, agriculture, logging, and industry and commerce within the APE. Importantly, sites did not fit into tidy thematic packages as many of the properties represent more than one theme. Gold mining features, from isolated prospect pits to extensive mining landscapes, are found in 124 of the properties recorded during the 2002 field season. These gold mining sites represent four basic mining operations: quartz mining (hard rock mining), prospecting, placer mining, and dredging, and also contain water developments associated with the mining activities.

Water management sites, represented by resources for collection, storage, and conveyance of water, are probably the largest and most complex historic era property type. A total of 97 sites contain elements that relate to this theme. Over 16 miles of ditches were recorded within the APE; many of these ditches, as well as other features of water management, were originally developed for gold mining. In addition to the ditches and the Las Plumas hydroelectric facility, the remains of at least 30 dams were recorded.

Transportation features are contained within 162 recorded resources. Elements of trails, roads, and railroad systems are present in the APE. Significantly, no road section that could be unequivocally identified as the Beckwourth Trail was found. The majority of recorded transportation properties represent road systems with many of these associated with the major roads depicted on 1880s maps. Railroad segments of the Western Pacific Railroad, the Butte and Plumas Railroad, and the Feather River Railroad were recorded within the park.

Settlement features, such as foundations, structure or tent pads, dumps, and landscaping including fencing or corrals, were recorded at 117 of the recorded resources. Settlements associated with mining or homesteading /agriculture reflect a rural settlement pattern of large landholdings and small communities. Additionally, the North Fork contains remains of four small communities (Blinzig, New Blinzig, David, and Isaiah) that were settled after the Western Pacific Railroad completion.

Logging, agriculture, and industry and commerce themes' features account for very few resources within the APE. Aside from transportation features associated with logging, only 1 site that may be related to the timber industry was recorded. There are 18 sites containing agricultural features. Twelve distinct resources representing property types associated with the limestone industry and communications correspond to the industry and commerce themes.

Recognized Properties

Within the park, resources from the historic mining town of Bidwell Bar have qualified for State and local recognition. The suspension bridge, accompanying tollhouse and the Mother Orange tree from the now inundated mining town of Bidwell Bar were placed on the State landmarks list in 1939 as State Historic Landmark No. 314. The town itself was recognized as State Historic Landmark No. 330. In addition, the orange tree and bridge were locally recognized during the 1926 Oroville Orange and Olive Exposition. A monument was dedicated to the pioneers of California by the County Board of Supervisors, Gold of Ophir Parlor No. 190 Native Daughters of the Golden West, and Argonaut Parlor No. 8 Native Sons of the Golden West. In 1964, prior to inundation, the bridge and tollhouse were moved to their current reconstructed location at the Bidwell Canyon Launch Ramp. In 1985, the bridge was recorded to federal standards with an Historic American Engineering Record. The Mother Orange Tree was replanted prior to inundation at the CSP Northern Buttes District headquarters.

Standing Structures/Built Environment

Other than the relocated and reconstructed Bidwell Bar Bridge, no standing buildings or other fully intact elements of the built environment have been identified in the park.

Traditional Cultural Properties

The 2003 ethnographic inventory identifies at least 89 locations in 7 zones within the park area. Ethnographic locales include villages, cemeteries, camps, gathering and fishing areas, spawning grounds, social and cultural meeting areas, swimming holes and picnic areas, ceremonial areas, mythological areas, trails, and place names. Due to the sensitive nature of this information, the report is confidential and not available for public distribution.

Archaeological Collections

CSP's State Archeological Collections Research Facility in West Sacramento curates and preserves artifacts collected from about 46 Butte County sites in and around LOSRA. Much of this material was collected during the construction of Oroville Dam. This LOSRA-related archaeological collection includes over 300,000 objects, most of which are stone prehistoric artifacts such as chipped stone flakes and milling equipment. Food remnant objects are also included. A limited inventory of historic objects is also represented.

The Archaeological Site Stewardship Program

The LOSRA archaeological site steward program at Lake Oroville was initiated in 2001 to provide archaeological site monitoring for a specific area with a history of looting. At the end of the one year probation period, the site steward program was expanded to include all cultural resources at Lake Oroville, especially resources within the lake's fluctuation zone. The program has successfully prevented new looting in the original target area since the program's inception. Currently there are seven active site stewards. About 20 sites are periodically monitored and approximately 350 hours of volunteer time are logged annually for monitoring.

The program is associated with the statewide California Archaeological Site Stewardship Program (CASSP) which partners with CSP under a Memorandum of

Understanding with the Office of Historic Preservation. The CASSP trains and certifies the volunteer archaeological site stewards to monitor archaeological sites. As required for the CASSP program, a local Coordinating Archaeologist oversees the program. The current Coordinating Archaeologist, from the Cultural Resource Division in Sacramento, oversees bimonthly newsletters, provides additional training as necessary, coordinates site monitoring schedules, and provides an interface between the stewards, and CSP Northern Buttes District personnel, particularly law enforcement. At present, the site stewards are mostly a self supporting entity with no funding from CSP or other agencies. Annual unsuccessful proposals are submitted for various CSP cultural stewardship monies to fund expansion of the program and to provide advanced training for the site stewards.

LOSRA AESTHETIC RESOURCES

Note: This section provides an overview of aesthetic resource considerations, but does not reproduce DWR's aesthetic resources and sensitivities mapping for their Project 2100 Oroville Facilities Relicensing Project studies. Please refer to *Appendix G* for a listing of DWR-produced resource studies and maps and how to access them on the DWR Website.

SCENIC RESOURCES

The dams, levees, reservoirs, and related water project facilities near the city of Oroville are dominant features of the region's landscape, affecting an area that extends over 20 miles from the Thermalito Afterbay, located southwest of the city, to the upper reaches of Lake Oroville along the branches of the Feather River. Visitors to Northern California can see these features from Highways 70, 99, 162 and from Lake Oroville State Recreation Area. The water project facilities are among the most visually prominent features from recreational sites both on the lake and the shoreline.

The dam and reservoir facilities fall within the Sierra Nevada foothill landscape region, the transition zone between the flat lands of the Sacramento Valley floor and the steeply sloped mountains of the Sierra Nevada. The foothills are characterized by moderately to steeply sloped ridges and deep, steep-sided canyons. The vegetative cover is a mosaic of chaparral and forests of foothill pine and blue oak. Although the scenery in the portion of the foothill region around the reservoir's eastern facilities is attractive, most of it would not be described as exceptional. The area's scenery is generally of local and regional importance but is not of State or national reputation. One portion of the foothill area near Lake Oroville with scenery of greater note is an area north and east of the terminus of the Middle Fork of the reservoir that is a part of the Plumas National Forest. Here, the area along the Middle Fork upstream of the reservoir has been designated a Wild and Scenic River. In addition, this area is the site of several waterfalls, including Feather Falls on the Falls River. In California Waterfalls (Brown 1997), Feather Falls receives a rating of ten for its beauty, indicating that it has been judged to be among the 20 most beautiful waterfalls in the state. Cape Horn, a large rock outcrop standing above the shoreline on the west branch of Lake Oroville's north branch, is also a noteworthy scenic feature in the area.

The area to the north, west, and south of Lake Oroville (the Fish Barrier Dam, the Thermalito facilities, the Oroville Wildlife Area, and the Low Flow Channel) is in the Sacramento Valley landscape region. The visual character of the flat valley lands that lie west of the Oroville Dam facilities is defined by a mix of agriculture, wetlands, grasslands, and low density urbanization. The agricultural areas include rice fields, orchards, and grazing lands. In many cases, the areas along the valley's rivers and streams are lined by lush riparian forests of tall trees, thick shrubs, and tangled vines. In general, the landscapes in the valley areas around the dam facilities are of local significance.

The Lake Oroville Visitors Center, located at the crest of Kelly Ridge, includes a 47-foot high observation tower designed to provide panoramic views of the dam and reservoir. Many of the public's first views of the reservoir are from the marinas, boat launch areas, campgrounds, picnic areas, and other developed recreational areas around the lake that are operated by the Department.

The Department's 1973 Lake Oroville State Recreation Area Resource Management Plan and General Development Plan defines areas of scenic importance that are seen from the lake—Feather Falls, Cape Horn, and Stringtown Mountain—as major landscape nodes that must be protected from development that would destroy their value as a scenic resource. The plan also recognizes that having natural settings for recreation activities contributes to positive visitor experiences at the lake.

Negative Visual Features and Characteristics

The California Department of Water Resources (DWR) commissioned multiple studies as part of the relicensing process for the Oroville Facilities, one of which is an *Aesthetic/Visual Resources Report* (L-4, FERC Project No. 2100, July 2004). This report identifies visual impacts of the Oroville Dam and water project facilities and operations on various areas in and around Lake Oroville and below the dam.

The study identifies one of the primary negative influences on the aesthetic quality of views in the area as fluctuating lake levels. Lake Oroville is most attractive when at or near its maximum operating storage level of 900 feet. At this level the blue water laps against the green vegetated shorelines. As drawdown of the reservoir's water occurs during the course of the summer and fall, an increasingly broad ring of exposed lake bottom soils appears in the area between the usual high water mark and the drawdown lake level. In some drawdown areas, usually those just below the average high water level, the negative aesthetic effects of drawdown are lessened by groundcover, trees, and shrubs that are able to survive periodic inundations. However, in many areas along the lake, the bare red and gray soils that become exposed create a drawdown zone that contrasts vividly with the vegetated areas above the usual high water level and the water surface below. In narrow, steeply sided arms of the lake, large drawdowns can create conditions in which it appears that the lake is set within a deep, red-sided canyon. In areas where the slopes are gradual, the drawdown areas appear to be large reddish mudflats.

The reservoir usually reaches its highest level, which can vary between 800 and 900 feet, sometime between March and June. During July and August, the period of heaviest water demand, the lake level can drop significantly, but then stabilizes in the fall as water demand tapers off. The lowest water levels, which generally are near 700 feet, usually occur between November and January when the reservoir is drawn down to maximize flood storage in preparation for the spring flood season. In drought years, the reservoir has been drawn down to levels as low as 650 feet. As a consequence of the way the reservoir's water is managed, the reservoir's appearance tends to be very good in late spring and early summer when lake levels are high, but its attractiveness usually declines and is degraded in July and August when the visually contrasting drawdown area expands significantly. This period corresponds to the heaviest recreational use months of the year.

The water bodies downstream of the dam do not have the widely fluctuating water levels that are visible throughout the year in the reservoir area; consequently they generally provide a more positive aesthetic environment for visitors to the LOSRA area. The man-made features of the water project facilities present varying degrees of negative or neutral visual impacts for visitors as reported in DWR's Relicensing Study L-4. However, many of the Project Facilities are not visible from some CSP recreation areas. For more detailed information regarding visual impacts of the Project Facilities, see the L-4 study (listed in the References section at the end of this document).

An unusual feature of the valley landscape in the Oroville area are the large piles of gravel tailings along the Feather River created by dredge mining that took place in the late 19th and early 20th centuries. The rows of tailings created a unique but disfigured landscape and are found throughout the nearby Oroville Wildlife Area.

Potential land use development adjacent to LOSRA areas may negatively affect the largely natural views from many LOSRA locations (see DWR *Oroville Facilities Project 2100 Studies L-1, Land Use Report*, Figure 5.4-1a through 1c, and the Butte County General Plan, *Zoning & General Plan* map, for more detailed information and mapping of potential land use changes). The following text outlines proposed land uses that present potential negative visual impacts to each of LOSRA's primary recreation areas if the lands surrounding LOSRA are fully developed according to the Butte County land use zoning.

Thermalito Forebay Areas (Map 3)
Additional commercial development is proposed in the vicinity of the North Thermalito Forebay recreation facilities with the potential to visually negatively impact the recreation area. The Campbell Hills is particularly visible from the Forebay area.

Diversion Pool Areas (Map 4)
In the future, the Diversion Pool Day-use Area may be surrounded by rural density housing development (1 to 40 acres per dwelling unit) in adjacent areas that are currently only partially developed under the "Agricultural Residential" zoning designation (outside the FERC boundary). Full buildout would eliminate currently open land and natural vistas. The Powerhouse Road Trail Access below Oroville Dam may be within

view of similar development to the south. Future developments could negatively affect views from these facilities or their access routes.

Spillway to Craig Saddle Areas (Map 5)
The Loafer Creek and Saddle Dam recreation areas may be visually impacted by future "Agricultural Residential" housing outside the adjacent FERC boundary. There is also a small commercial area proposed east of the Loafer Creek DUA that may be within its viewshed.

Craig Saddle to Enterprise Areas (Map 6)
Both the Stringtown Car-top Boat Ramp and Enterprise Boat Ramp/DUA areas currently have small residential areas nearby within otherwise undeveloped land. The area immediately around the Stringtown facility is zoned "Agricultural Residential" (1 to 40 acres per dwelling unit) which, if fully developed, may visually impact views from this recreation facility.

The Enterprise Boat Ramp/DUA area is currently surrounded by undeveloped recreation land, but this land is zoned "Timber Mountain" which allows commercial timber production and logging as well as residential uses for employees on parcel sizes of 40 acres or more. If logging occurs, it may cause negative visual impacts to this recreation facility. Outside the FERC boundary north of the Enterprise area, current land uses include small residential areas within undeveloped land; however, this area is zoned "Agricultural Residential," which would allow more housing development that may negatively impact views from the Enterprise recreation facility.

Bloomer and Foreman Creek Areas (Map 7)
The Foreman Creek recreation area is currently within a relatively undeveloped recreational land use area, but to the north and outside the FERC boundary, residential areas exist within otherwise undeveloped land. Zoning for the area outside the FERC boundary includes "Agricultural Residential" and "Timber Mountain," both of which have the potential to negatively impact views from the recreation area and/or its access routes with increased housing development and logging operations.

The County's zoning map for the area outside the FERC boundary and west of the Bloomer recreational facilities indicates "Agricultural Residential" zoning. If the uses allowed under this zoning designation are developed, this could negatively impact the recreation area and/or its access routes.

Goat Ranch to Nelson Bar Areas (Map 8)
The Goat Ranch Boat-in Campground is currently on open recreational lands. Current zoning allows "Agricultural Residential" use (1 to 40 acres per dwelling unit) to the west of the facility which could negatively impact views from the recreational area when developed.

The Dark Canyon Car-top Boat Ramp sits in a canyon area along one of the arms of the Upper North Fork of Lake Oroville. Current land surrounding the facility is undeveloped open space; however, just north of the facility zoning is "Timber Mountain," which allows

logging operations. This type of operation could negatively impact views from the recreation facility.

The Vinton Gulch Car-top Boat Ramp is also in an undeveloped area. Zoning allows "Agricultural Residential" use (1 to 40 acres per dwelling unit) to the south and east of the facility, potentially negatively impacting views from the recreational area when developed.

Lime Saddle recreation facilities are currently in undeveloped recreation open space; however, outside the FERC boundary to the west, zoning is for "Agricultural Residential" use which might negatively affect views from the recreation facilities there if fully developed.

Southwest of the Nelson Bar Car-top Boat Ramp, outside the FERC boundary, are relatively small rural-density residential areas within undeveloped open space. Beyond the FERC boundary in this area, zoning for a large area west and northwest of the recreation area is "Agricultural Residential," which upon full development could negatively impact views from the recreation area and/or its access routes.

The Upper North Fork Area

The Upper North Fork of Lake Oroville has no formal recreation facilities, but boaters are able to access this area. Current land uses include "resource extraction" on National Forest lands (in both Lassen and Plumas National Forests) and minimal recreational uses on DWR lands. Current zoning allows a substantial area north of the Upper North Fork to be developed as "Foothill Area Residential" land, which allows agricultural uses as well as single family dwellings at rural densities (1 to 40 acres per dwelling unit), and group and care homes, among other public and quasi-public activities. If developed, these activities could negatively impact the views of recreational boaters in this area.

The Middle Fork Area

The Middle Fork is similar to the Upper North Fork in that it has no formal developed recreation facilities but is accessible by water for visitors who use LOSRA facilities to launch their boats. Undeveloped land along this waterway is owned by DWR, the BLM, and the USFS as well as by private parties. Certain areas within the USFS lands are currently used for "resource extraction," or timber production and logging.
Current zoning along the Middle Fork, "Timber Mountain," allows commercial timber production/ harvesting by either government agencies or private timber companies along the entire Fork's edge, and this zoning designation extends for miles. It also allows residential development for employees on these lands on a minimum parcel size of 40 acres. If developed, these types of activities could negatively impact the views of recreational boaters on the Middle Fork.

Designated Scenic Areas and Roadways

In general, the aesthetic integrity of the lands along the lake's shoreline is reasonably high. Most of the land surrounding Lake Oroville is owned by DWR. Because of the public ownership of the lands around the lake, the only development on the lake shore

consists of recreational facilities operated by DWR or by CSP or its concessionaires. Aside from the recreational facilities, the hillsides surrounding the lake's maximum operating storage level have a natural-looking appearance characterized by a mix of areas of forest, brush, and grasslands.

The USFS lands along the North and South Fork arms of the reservoir have a "visual retention" management designation, which limits timber harvest and other development activities to maintain the landscape in a natural-appearing condition. The USFS lands along the upper reaches of the Middle Fork of the reservoir have a "recreation area" management prescription that balances recreational use and protection of environmental resources. In addition, the portion of the Middle Fork of the Feather River upstream of the reservoir was nominated as a Wild and Scenic river by Congress in 1968, and is managed by the Plumas National Forest for preservation of the river's free-flowing conditions and ecological, aesthetic, and recreational values. The Plumas National Forest has designated a 15,000-acre area along the Middle Fork of the Feather River and the Fall River immediately upstream of the reservoir as the Feather Falls Scenic Area to protect Feather Falls and several additional waterfalls nearby.

Highway 70 north of Highway 149 is eligible to be a State Scenic Highway, but is not yet designated as such. Part of it is, however, part of the National Forest Scenic Byway system. The Butte County Zoning Plan considers portions of four roadways within the Relicensing Study Area to be eligible for "Scenic Highway" designation. This designation would encourage protection and enhancement of scenic areas adjacent to some LOSRA recreation areas and access routes. They are:

- Pentz Road (within the study area west of the West Branch);
- Highway 162 (along the east side of the main basin from the Canyon Creek area to south of the Bidwell Bar Bridge);
- Highway 70 (on the south side of the West Branch of Lake Oroville near Vinton Gulch); and
- Lumkin Road (at the east end of the South Fork).

Views into LOSRA

When Lake Oroville is filled to its maximum operating storage level at the 900-foot elevation, it covers approximately 15,810 acres or nearly 25 square miles, and has an approximately 167-mile shoreline. Besides being visible from the road along the crest of the dam, the reservoir is prominently visible from Highway 162 and the Bidwell Bar Bridge, to a lesser extent from Highway 70, and from a number of local roads that pass close to it. The reservoir is also visible from streets and homes in the Kelly Ridge residential area located on the ridge overlooking the Bidwell Canyon arm of the reservoir, and from a small number of residences scattered across other hillsides overlooking the lake.

Construction of the Oroville Dam and its facilities led to a loss of the scenic canyon areas flooded by Lake Oroville. However, the reservoir and a number of the project's other features have become points of aesthetic interest and local and regional landmarks in their own right. For example, views of Oroville Dam, the Oroville Dam spillway, Lake Oroville, and the Fish Barrier Dam and Fish Ladder are often featured on

local postcards and in visitor brochures. The Bidwell Bar Bridge, the suspension bridge built at the time of the project's development to carry Highway 162 over the reservoir, has become a local scenic icon, and views of it are featured on postcards and in other local tourism-oriented media.

Visitors can access the top of Oroville Dam for sightseeing by vehicle or on foot. From the top there are good views of the lake and surrounding hills, as well as parts of the town of Oroville to the west and south and the lower bays and river downstream of the dam.

AUDITORY RESOURCES

On quiet days during the off-season, and in the more remote, less-visited fingers of Lake Oroville, visitors can occasionally hear birdcalls, the wind through pine needles, water lapping, or enjoy the lake's other quiet qualities. However, during busy times, as sounds travel and amplify across the lake's broad reaches, sometimes sounds created by motorboats negatively affect visitors who are not using boats, or are using non-motorized boats.

PLANNING INFLUENCES

REGIONAL TRANSPORTATION

LOCAL AND REGIONAL TRANSPORTATION AGENCIES

The California Transportation Commission (CTC) and the Butte County Association of Governments (BCAG) are responsible for regional and countywide transportation planning. Caltrans is responsible for statewide policy implementation of the CTC. The CTC and BCAG are required to develop and maintain respective State and regional transportation plans which rely on input from local city and county government general plans, including their respective circulation elements.

PUBLIC TRANSIT

Butte County Transit (BCT) operates fixed route transit service in the unincorporated county areas (including Palermo and Paradise Pines/Magalia) and to the cities of Biggs, Chico, Gridley, Oroville, and the Town of Paradise. Other transit services operating within Butte County included the Oroville Express, a paratransit operator, and other paratransit operators in Gridley and Paradise. These public transit authorities provide good city-to-city service. Currently no public bus routes provide daily service to the State Recreation Area.

AIR TRAVEL

Aviation facilities in Butte County include both public and private airports and helipads serving commercial, recreational, medical, law enforcement, fire and agricultural needs. The two main publicly-owned public-use airports in the county are Chico Municipal Airport on the northern edge of the City of Chico, and Oroville Municipal Airport 2.5 miles west of Oroville along State Route 162. The privately-owned Paradise Skypark Airport situated 3 miles south of the town of Paradise can function as an alternative airport when the larger airports located in lower elevations are fogged in. Lake Oroville has a designated seaplane-landing site covering 1,460 acres in the center of the main body of the lake. There is a landing area on the water spanning 9,000 feet long by 9,000 feet wide. There are no airport facilities, such as hangars, nor are there any aircraft based at the lake. There is currently an average of only three or four seaplane landings per year.

REGIONAL LAND USES

ADJACENT LAND USES

The Lake Oroville State Recreation Area (LOSRA) is located within the unincorporated portions of Butte County. The vast majority of land in the region is used for agriculture, timber, and grazing. Only 70 square miles (or four percent of all land) in Butte County is devoted to urban uses. The largest urban areas of Chico, Oroville, and Paradise each represent about 1% of county land.

Similar to the larger region, most of the lands surrounding Lake Oroville consist of undeveloped forest, brush, and grazing lands. Within these areas are scattered pockets of development, including public marinas, camping, picnic areas, and other recreational facilities. The only area in proximity to the lake's edge subject to urban or suburban development is on Kelly Ridge, the peninsula that extends into the lake in the area east of the dam. Created in the 1970s, approximately 1,000 lots have been developed with single-family homes that provide year-round housing for a population that includes many retirees.

The lands surrounding the lake are largely within the unincorporated portions of Butte County and therefore fall under the purview of 1979 Butte County General Plan and the Butte County Zoning Ordinance. Except for the Kelly Ridge area where small-lot residential development is permitted, land uses are generally restricted to agricultural and rural residential uses on large parcels. These designations are shown on "Future Land Use Direction" maps (Figures 5.4-1a, 1b, and 1c) in the Oroville Facilities Relicensing FERC Project No. 2100 *L-1 Land Use Report* of July 2004*,* based on the Butte County General Plan.

At the north end of the lake, several small areas along the North and Middle Forks of the Feather River lie within the Plumas National Forest and are subject to the provisions of the Forest Plan that this Forest has adopted.

LAND OWNERSHIP

Land in and immediately around LOSRA is dominated by federal and State ownership, with local and private lands existing primarily in areas that are south and west surrounding the city of Oroville. On the local level, there are several quasi-public organizations that own or manage various lands devoted to utility and some local recreation facilities; these include the Pacific Gas and Electric Co. and the Feather River Recreation and Park District, as well as local school districts, irrigation districts, and other special use agencies. All of these special use ownerships are located to the south and west of Lake Oroville. The Paradise Recreation and Park District adjoins the SRA to the northeast, and the Town of Paradise and the Magalia community are located to the northeast of the park. The City of Chico and the Chico Area Recreation District are to the northwest of LOSRA. Please see *Map 2* for more detailed information regarding jurisdiction of the land surrounding LOSRA; DWR's "Public Land Jurisdiction" map, Figure 5.1-3 of the *Assessment of Recreation Areas Management Study*, R- 5; Table 5.1-1, "Summary of Public Entity Land Management," and Figure 5.1-2, a map titled "Primary Land Management Responsibility," in the *Land Management Report*, L-2, of DWR's Oroville Facilities Relicensing FERC Project No. 2100 studies.

For land ownership in the area surrounding LOSRA, see Figures 5.2-1a, 5.2-1b, and 5.2-1c in DWR's *Land Use Report*, L-1 (DWR 2004) of the Oroville Facilities Relicensing FERC Project No. 2100 studies.

The following are descriptions of public and private landowners surrounding LOSRA and their areas of land jurisdiction and management in the LOSRA area.

Federal Agencies

The U.S. Forest Service and the Bureau of Land Management own lands that lie within the LOSRA boundary and these parcels are subject to the jurisdiction of these federal agencies. The Bureau of Indian Affairs (BIA) owns land near LOSRA boundaries.

United States Forest Service (USFS)
The USFS is an agency of the United States Department of Agriculture. The agency's mission statement is: "To sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations." The Plumas National Forest contains approximately 1,400,000 acres and is located in Plumas, Lassen, Sierra, Butte, and Yuba counties. Of this amount, roughly 1,170,000 acres are federally-owned and managed by the USFS. USFS lands within LOSRA area are managed by the USFS Feather River Ranger District. Plumas National Forest also manages the Feather Falls Scenic Area located on the outer extremity of the Middle Fork of the Feather River. All of the USFS lands are located in relatively remote, undeveloped areas.

Within the LOSRA boundary, there are 1,811 acres of Plumas National Forest lands, which are comprised of several fragmented holdings distributed proportionately between the North, Middle, and South Forks of the Feather River. There are also 228 acres of Lassen National Forest lands within LOSRA, located on the North Fork of the Feather River, which are administered by the Plumas National Forest. These USFS lands continue beyond the LOSRA boundary and constitute a large percentage of land ownership in the area. USFS lands are primarily managed under the Plumas National Forest Land and Resource Management Plan (Forest Plan). Management of these lands is also influenced by the more recent 2001 Sierra Nevada Forest Plan Amendment.

United States Bureau of Land Management (BLM)
The BLM is an agency of the United States Department of the Interior and has the mission "to sustain the health, diversity and productivity of the public lands for the use and enjoyment of present and future generations." The Redding Field Office of the BLM is responsible for the administration of BLM lands in the LOSRA area.

The BLM manages land in scattered, noncontiguous parcels located along the West Branch, and in the Lower North, Middle, and South Forks of the Feather River inside and outside of the LOSRA boundary. Approximatley half of BLM lands within LOSRA are submerged under Lake Oroville, while the other half are above the waters of the lake. BLM has transferred approximately 300 acres to the State within LOSRA. One of the largest BLM holdings is Stringtown Mountain on the South Fork of the Feather River.

United States Bureau of Indian Affairs (BIA)
Another federal landowner in the immediate vicinity of LOSRA is the Bureau of Indian Affairs (BIA). BIA lands typically consist of Native American reservation lands representing distinct Native American groups. The Enterprise Rancheria (reservation) is located near LOSRA along the Middle Fork Feather River tributary. The Enterprise Rancheria consists of Maidu Indians with a tribal enrollment of 420 members.

State Agencies

Several State agencies manage the lands, facilities, and recreational interests in the LOSRA area, including the Department of Water Resources (DWR), California State Parks (CSP), and the Department of Fish and Game (DFG). The majority of the state-owned land in this area is owned by DWR. The properties and management responsibilities of each agency are detailed in a series of deeds and agreements, as well as between the agencies involved pursuant to the 1961 Davis-Dolwig Act (State Water Code section 11900-11925). Each agency operates under approved management plans which guide many management activities within their respective areas.

California Department of Water Resources (DWR)
DWR is the owner, manager and operator of the Oroville Facilities, which include all dams, powerhouses, and transmission facilities in the LOSRA area. In terms of land ownership, DWR has control and possession of most state-held lands in the area, including a substantial amount of land underlying the reservoir (CSP manages most of the recreational use in the Oroville Facilities area). DWR currently operates and manages the Oroville Facilities to maximize its benefit to the State Water Project (SWP) which conserves and distributes water to supplement the needs of urban and agricultural users throughout the state. DWR has transferred ownership of the land used for CSP's Northern Buttes District headquarters facilities, as well as a few additional small parcels of land, to CSP.

The recreational facilities maintained by DWR include the Lakeland Boulevard day-use and trailhead access, the vault toilet across the Diversion Pool at the Burma Road Area, and the restroom on the south end of Oroville Dam. DWR has also maintained developed facilities at three sites at Thermalito Afterbay. DWR is responsible for removing driftwood from Lake Oroville, and has a boat and crew assigned to this continuing task.

California Department of Fish and Game (DFG)
The Davis-Dolwig Act identified DFG as an important manager of lands primarily devoted to resource and habitat protection. DWR transferred management rights to certain areas within the Oroville Facilities area to DFG, with the Oroville Wildlife Area (OWA) and the surface of the Thermalito Afterbay being the largest and most important. DFG manages these lands under a management plan which is due to be revised.

The Oroville Wildlife Area is approximately 11,800 acres in size and stretches approximately 9.5 miles along the banks of the Feather River starting about two miles south of the City of Oroville. Fishing, hunting, nature study, and river-associated recreation are the primary activities at the wildlife area. This area is managed with a cooperative agreement between the DFG and DWR.

The DFG property at North Table Mountain is under consideration for transfer from the DFG to CSP as an addition to LOSRA. The property consists of a mesa composed of volcanic flows, with annual grass pasture land and oak woodland habitat in the bisecting canyons. The 3342 acre site is located north of Oroville in the vicinity of Cherokee (access is from Highway 70 on the North and from Cherokee Road on the South). DFG is drafting a management plan for multiple uses at the site, including wild flower viewing, hunting and livestock grazing. At present, the dominant public use is observation of the annual wildflower bloom during March, April and May. The DFG has asked CSP to accept a deed to the parcel(s), which would enable CSP to manage the visitors by offering interpretive opportunities while protecting the natural resources.

County, City, and Private Lands

Butte County

County-owned properties are generally used for county administrative offices and other government services. In total, the county owns approximately 108 acres of land, constituting only 0.2 percent of the public land in the greater Oroville area. There is no county-owned land adjacent to LOSRA.

City of Oroville

The City of Oroville is situated to the southwest of the main body of Lake Oroville, and a small portion (approximately 140 acres) of the city's jurisdictional boundary extends into LOSRA. This area is located south of Lake Oroville and west of Saddle Dam and includes the shoreline of Lake Oroville between Saddle Dam and the northeastern edge of the Oroville Dam Spillway, Thermalito Diversion Pool, Thermalito Forebay, Thermalito Afterbay, the Low Flow Channel of the Feather River, and the Oroville Wildlife Area.

Town of Paradise

Located approximately 20 miles to the northwest of the main body of Lake Oroville, the Town of Paradise encompasses approximately 23 square miles with a population in the greater Paradise area of about 40,000 persons. A portion of the Town of Paradise corporate limits abuts the West Branch of the North Fork of the LOSRA area along Pentz Road.

Private Lands

Although the land in and surrounding LOSRA is predominantly owned by public agencies, there are significant amounts of private lands in the Lake Oroville area. Private residential developments in the unincorporated portions of Butte County, especially those along Kelly Ridge, are located above and to the east of Oroville Dam.

Other county-regulated private parcels exist on the upper elevations to the north of the lake. Similarly, private development within unincorporated areas of the county occurs around the Thermalito Afterbay.

One sizeable private landowner in the Lake Oroville area is the Pacific Gas and Electric Company (PG&E), which owns several large land parcels used for utility purposes. Some PG&E lands may potentially be deeded to the State as the utility emerges from its recent bankruptcy, and any such lands adjacent to LOSRA may be candidates for acquisition and/or recreational development in the future. The vast majority of the remaining privately-held lands around LOSRA are owned by individual private landowners.

RECREATION OPPORTUNITIES SURROUNDING LOSRA

With several hundreds of thousands of acres dedicated to public open space, outdoor recreational opportunities are abundant in Butte County. The majority of public recreation in Butte County and the Oroville area occurs within a mix of federal, state, county, and city lands, and on park district lands. Federal properties include the Plumas National Forest and Bureau of Land Management lands. State lands include the Lake Oroville State Recreation Area, the Department of Fish and Game's Oroville Wildlife Area, and the Department of Water Resources' facilities at Lake Oroville. Butte County owns a few properties adjacent to LOSRA, and the City of Oroville, the Feather River Recreation and Parks District, and the Paradise Recreation and Park District manage several community parks near LOSRA boundaries.

A small portion of outdoor recreation occurs on private and non-profit-owned lands, including private campgrounds, outdoor recreation guides and outfitters, and lands owned by various non-profit organizations such as the Boy Scouts of America.

The economy of Butte County near Lake Oroville is substantially supported by outdoor recreation in the region. Peak-season and off-season recreation uses support businesses serving the recreation market. Many jobs in Butte County are related to the tourism and recreation industry. Bed and breakfast inns, hotels, campgrounds, hostels, tour guide services, equipment rentals, restaurants, and gas stations all profit from outdoor recreation uses in the region.

NON-LOSRA RECREATION SITES WITHIN THE FERC BOUNDARY

(Main source of information: Relicensing Study R-10 - *Recreation Facility Inventory and Condition Report.* Refer to Study R-10 for more detailed information on this topic.)

The majority of recreation facilities in the FERC Study Area are within LOSRA but there are significant FERC Study Area recreation facilities outside of LOSRA. These non-LOSRA recreation sites are found at or below Oroville Dam and primarily in the Thermalito Afterbay and the Oroville Wildlife Area. These sites are briefly described below to give a context for LOSRA recreation.

Oroville Dam DUA

Located on the southwest shoreline of the reservoir, the crest of Oroville Dam is used for driving and sightseeing, walking, jogging, bicycling, or rollerblading. Some fishing takes place at the edge and can be participated in at any reservoir level. The Oroville Dam DUA facilities are located on the east and west ends of the dam and include picnic tables, flush toilets (one ADA accessible), and one drinking fountain.

Lakeland Boulevard Trailhead Access

The Lakeland Boulevard Trailhead Access is located east of Diversion Pool, near the Diversion Dam. The site is unpaved and provides parking for trail access that is commonly used by equestrians. There is no shoreline developed access at the site.

Feather River Fish Hatchery

Anadromous fish migration up the Feather River is stopped at the fish barrier dam, just downstream from the Thermalito Diversion Pool and Dam. Salmon climb the fish ladder into the Feather River Fish Hatchery where DFG selects fish for breeding. On the north bank of the Feather River is a park-like visitor area with a landscaped parking lot, restrooms, and an observation platform overlooking the Diversion Dam and its flow over the dam. There is an area with windows into the fish ladder that make it possible to observe fish as they swim up the ladder. The Feather River Fish Hatchery is accessible to persons with disabilities. The amenities include designated parking areas, restrooms, and wheelchair ramps. The ramps provide access to the viewing platform, viewing window, and the gathering tank at the top of the fish ladder. Windows are provided along the spawning building to allow visitors to watch the spawning process. On the west side of Table Mountain Boulevard is an additional parking area and pedestrian access to the hatchery complex.

Thermalito Afterbay Recreation Sites

With 17 miles of shoreline and 4,300 surface acres of water, the Thermalito Afterbay is open for boating, swimming, fishing, picnicking, and limited hunting. The surface and shoreline are within the OWA, but recreation facilities and boat ramps are managed by DWR.

Model aircraft enthusiasts have use of a 350- by 300-foot runway for take-off and landing near North Wilbur Road at the Afterbay Canal. The site has a paved runway for model aircraft take-offs and landings that was upgraded in 2002, as well as a portable restroom, picnic tables, a barbecue, and two shaded areas. The area can be accessed from the water as well as well as by road.

The Tres Vias Road Trailhead connects to the Brad P. Freeman Trail. This trail access area consists of a dirt lot and dirt road/trail at the Thermalito Afterbay. There are no developed facilities such as restrooms or picnic tables at this site.

The Toland Road Trailhead is gated with roadside parking only. There are no developed facilities at this site.

The East Hamilton Trailhead connects to the Brad P. Freeman Trail. There is a small gravel parking area that fits approximately five cars and a picnic table.

The Wilbur Road boat ramp consists of a two-lane paved boat ramp, a parking lot with 14 car/trailer combination spaces (one is ADA-accessible space), and one non-ADA portable toilet. In addition to the designated boat ramp, there are several boat launching areas that are not graded or graveled between this site and SR 162.

A two-lane boat ramp with floating dock is available at the Monument Hill site on the eastern shoreline of the Afterbay. There are 10 picnic tables, nine barbecues, four flush toilets, a fish cleaning station, and a swimming beach. There are 10 single-vehicle parking spaces (one is ADA accessible) and 39 car/trailer combination spaces (three are ADA accessible). Additionally, there is a graded and graveled parking area approximately 60 by 60 yards in area.

The Larkin Road boat ramp has a graded and graveled car-top boat ramp, a paved lot for approximately 30-50 vehicles, and a single ADA-accessible vault toilet. In addition to the designated launching area, there are four often-used launching ramps that are not graded or graveled.

Oroville Wildlife Area Recreation Sites

Located southwest of Lake Oroville, the OWA contains a series of ponds and levees adjacent to the Feather River. Fishing, hunting, nature study, hiking, camping, and target shooting are the primary activities at the wildlife area. The trails are not highly maintained and none are ADA accessible. This area is managed under a cooperative agreement between the DFG and DWR.

The Rabe Road shooting range, managed by DFG, is an unstaffed public shooting area. It is technically a rifle range, but pistol use commonly occurs there as well. The shooting range is adjacent to the Clay Pit State Vehicular Recreation Area. Seven concrete picnic tables and a pit toilet were installed near the parking lot in spring 2003.

There are an undetermined number of primitive campsites at three designated camping areas in the OWA that DFG calls Areas C, F, and G. The OWA has one improved one-lane boat ramp and several unimproved boat ramps (not graded or graveled).

RECREATION SITES OUTSIDE LOSRA AND THE FERC BOUNDARY

Clay Pit State Vehicular Recreation Area (CSP)

Located adjacent to the OWA, the Clay Pit State Vehicular Recreation Area provides a riding area for OHV enthusiasts. The site is accessed from Larkin Road and is south of

SR 162 and the Oroville Municipal Airport. The clay used to build Lake Oroville Dam was taken from this area three miles southwest of Oroville. The resulting depression, a large shallow pit ringed with low hills, is the site of this 220-acre recreation area. It is a motorcycle, all-terrain vehicle (ATV), and dune buggy use area. There is a well-marked entrance road that leads to a paved staging area used for loading and unloading off-highway vehicles (OHVs). Aside from the paved staging area and the entrance road, the entire site is one large open dirt area where OHVs (including trucks) can explore.

North Table Mountain Ecological Reserve (DFG)

Table Mountain is a flat-topped volcanic feature that dominates Oroville's northern skyline. In the 1990s the Department of Fish and Game acquired 3342 acres of North Table Mountain in order to preserve the area's rare vernal pool habitat and its sensitive plant and animal species. Table Mountain's spectacular late winter and early spring wildflower display attracts thousands of visitors annually. Hunting is permitted for deer and upland game in accordance with the general hunting regulations. As the LOSRA General Plan is being prepared there is some discussion that CSP may be given jurisdiction over this area.

Other Nearby Recreation and Interpretation Sites

Feather River Recreation & Park District

The Feather River Recreation & Park District provides a variety of park and recreational services to more than 50,000 people in southeast Butte County. The District operates Riverbend Park, Bedrock Park, and the Nature Center which are located along the Feather River and offer fishing, birding, hiking, biking, picnicking, and educational opportunities. The District also offers youth and adult classes as well as sports and other programs.

Camping

In 1988 the Plumas National Forest had nearly 2.3 million visitor days, with camping and water recreation opportunities offered in many different areas of the forest and along its waterways.

In addition to the numerous camping opportunities available within LOSRA and the OWA, several private campgrounds provide varying types of camping experiences in the greater Oroville area. In the low-flow channel area of the Feather River, two commercial campgrounds have been developed with a total capacity of approximately 175 campsites. The Riffles Campground includes about 75 campsites, while the larger River Reflections Campground includes about 100 campsites. These have been developed adjacent to the Feather River with river access being a primary attraction for the people who use these campgrounds.

Trails

Equestrian, hiking, and bicycle trails in the Oroville area have been developed and maintained by several different public agencies. The Plumas National Forest provides

opportunities for hiking, mountain biking, and equestrian uses, including the Feather Falls Trail. The City of Oroville has hiking and bicycling trails that extend along the Feather River and connect the Oroville Wildlife Area with the Diversion Pool below the Oroville Dam.

Feather Falls Trail

Feather Falls is located on the Fall River, which runs into the Middle Fork of the Feather River less than a mile from the northeast corner of Lake Oroville. The Feather Falls is the nation's sixth highest waterfall at 640 feet. The Feather Falls Trail is located within the Feather Falls Scenic Area in the Plumas National Forest. The trailhead is a 35-mile drive from the city of Oroville, and the trailhead provides restrooms, camping, and parking. The trail to the falls is 4.5 miles long requiring a round trip of nine miles for visitors to hike to the falls and return.

National Recreation Trails

The National Trail System Act of 1968 authorized the creation of a system comprised of National Recreation Trails, National Scenic Trails, and National Historic Trails. The Pacific Crest Trail (PCT) is one of eight National Scenic Trails in the United States; it spans some 2,650 miles and extends from the Mexican border on the south to Canada on the north, passing through three western states. The PCT runs generally in a north-south direction about 35 miles east of LOSRA, crossing the Middle Fork of the Feather River and then Highway 70 near the town of Belden approximately 40 miles northeast of Lake Oroville.

The Historic Beckwourth Trail

The Beckwourth Trail is what is left of the historic California Trail system of wagon roads and pack trails that led emigrants west in the mid 1800s. The Beckwourth Trail ran approximately 100 miles from Reno over the crest of the Sierras down to the portion of Bidwell's Bar which now lies under Lake Oroville. The main part of the trail is paralleled by or covered by the Oroville-Quincy Highway. This is not a maintained hiking trail though parts of it can be located and traversed by a committed hiker who locates and uses available Forest Service literature and maps.

<u>Interpretation</u>
Regional interpretation is presented by various community organizations and State and federal agencies.

The Oroville Chinese Temple and Gardens is open to the public and offers guided tours. The Lott Home in Sank Park was the 1860s Victorian country home of a local judge. The Pioneer Memorial Museum contains 6,000 square feet of pioneer history, including old ink presses, gold mining equipment, clothing, pictures and more. The Butte County Historical Society holds the archives of Butte County history and is open by appointment. The Ehmann Home offers guided tours of a Victorian era home. The Feather River Recreation and Parks District offers many recreational and interpretive

opportunities in and around the community. Huntington's Sportsman Store Hunting Museum and the Surplus City Military Museum show examples of wild and non-native game animals and military machinery and equipment.

The Feather River Fish Hatchery is run by the Department of Fish and Game and the Department of Water Resources and offers tours of the facility regularly. The Hatchery also hosts an annual Oroville Salmon Festival at which CSP operates an interpretive booth.

Limited guided hikes are offered to U.S. Forest Service trails that lead to Feather Falls and Bald Rock.

VISITOR SAFETY AND EMERGENCY SERVICES

PUBLIC SAFETY

Relicensing Study R-2 – *Recreation Safety Assessment* addresses safety within the study area. Public safety response at Lake Oroville State Recreation Area is primarily provided by State park rangers. However, other law enforcement agencies such as the Butte County Sheriff and the California Highway Patrol have concurrent jurisdiction and will occasionally provide visitor protection services within the park as well. These two agencies generally provide law enforcement duties either as a result of a call for mutual aid or as a result of a citizens call that does not get passed on to CSP staff.

Lake Oroville State Recreation Area is interspersed with lands operated by the BLM, the U.S. Forest Service and the California Department of Water Resources. In addition Butte County, the City of Oroville and Union Pacific Railroad have jurisdictional responsibility for lands that border or are within or near LOSRA. Consequently there are times when State park rangers will cross into these other jurisdictions to provide public safety response. These areas are usually identified as Zones of Impact or areas near LOSRA that have operational impacts upon the State Recreation Area. It is not uncommon for the various agencies to request mutual aid in response to a variety of public safety events. For example, the City of Oroville requests the assistance of State park rangers at large public events and the City of Chico requests ranger assistance for large community events.

Park staff is generally first on the scene in response to calls for medical services. However, the California Department of Forestry will also respond to calls for medical aid and seriously injured visitors can be transported to the Oroville Hospital or in the case of Lime Saddle, the Feather River Hospital in Paradise. In some cases, Enloe Hospital Life Flight will transport seriously injured patients to their advanced care facility in Chico.

CDF also has primary jurisdiction in the event of a hazardous material spill. CSP, the Department of Fish and Game, California Highway Patrol, and the Butte County District Attorney's office assist with public safety and criminal investigations.

Search-and-rescue events will normally be coordinated by CSP staff. More extensive rescue events may become part of the Butte County Office of Emergency Services (OES) and include CSP, Butte County Search and Rescue and the California Department of Forestry.

Boat patrol at Lake Oroville is undertaken primarily by State park rangers. On rare occasions, including major holiday weekends, the Butte County Sheriff may also provide public safety boat patrol services on Lake Oroville.

REGIONAL WILDFIRE MANAGEMENT

The basis for wildland fire protection in California is a comprehensive strategy adopted by the State Board of Forestry (SBF) and CDF in 1996. This strategy, known as the California Fire Plan, provides a general statewide framework for developing county or area specific fire plans. The Fire Plan has five strategic objectives and five major plan elements. The plan elements are 1) wildfire protection zones, 2) initial attack success, 3) protection of assets, 4) pre-fire management, and 5) a fiscal framework. *Table 21* lists the fire policy documents for each agency with fire management responsibilities in the study area.

Table 21. Federal, State, and Local Fire Management Policies and Plans in the Study Area.

Agency	Document Title	Date
Federal		
USFS	Healthy Forest Initiative	2002
USFS	Sierra Nevada Forest Plan Amendment, Record of Decision	2001
USFS	Plumas and Lassen National Forests, Proposed Administrative Study	2002
BLM	Redding Resource Management Plan	1993
State		
CDF and SBF	The California Fire Plan	1996
CDF	Butte Unit Fire Management Plan	2002c
CSP	Wildfire Management Planning: Guidelines and Policy	2002
CSP	Loafer Creek Prescribed Fire Management Plan, Lake Oroville State Recreation Area	1999
DFG	Oroville Wildlife Area Management Plan	1978
Local		
City of Oroville	General Plan and Implementing Regulations and Codes	1995
Butte County	General Plan and Implementing Regulations and Codes	1996

Source: EDAW 2003

CDF is the responsible fire protection agency both for the park and Butte County, which contracts with CDF for fire protection services. LOSRA occurs within the area of responsibility of the CDF Butte Unit. The 2002 CDF Butte Unit Fire Management Plan assesses the existing level of wildland fire protection service, identifies high risk and high value areas where potential exists for costly and damaging fires, and prescribes

methods to reduce future costs and losses. CDF stations that respond to fires in LOSRA are located at Kelly Ridge near the park's Visitors Center, in the town of Paradise, and at the main headquarters of the CDF Butte Unit in the town of Oroville.

Fires occasionally occur within the park involving vehicles, boats, and wildlands. Wildland fires are an historic concern because of the climate, vegetation, and activities in the area. CDF will stage within the park in an effort to deal with wildland fires that are burning near the park. Park staff is occasionally called upon to transport CDF staff to remote locations within the park to deal with fire and medical emergencies.

REGIONAL DEMOGRAPHICS AND POPULATION TRENDS

POPULATION TRENDS

The population of California grew almost 14 percent during the 1990s. This robust increase is expected to continue in the future. As the State population has increased over the past 10 years, many traditionally non-urban counties, such as Butte County, have seen significant increases in their population due in part to relocation from urban centers to less-populated rural areas. Specifically, the population of many of the counties in the Central Valley increased more than 17 percent during the 1990s.

The population of Butte County totaled an estimated 204,000 residents at the beginning of 2000 (California Department of Finance 2000). Population centers within the county include the cities of Chico, Paradise, and Oroville. The county is largely rural, with slightly more than 50 percent of its population residing within unincorporated areas. Much of the recent growth within Butte County has occurred in the city of Chico, which has experienced a 5.3 percent annual population growth rate since 1981.

Population growth in Butte County is likely to accelerate in the future and could increase demand for recreation opportunities and facilities in more rural areas.

The Town of Paradise, located north of Lake Oroville, is the largest community in the vicinity of the lake. With an estimated population of 26,000 at the beginning of 2000, Paradise accounted for 12.9% of Butte County's population. Paradise has been the county's slowest-growing community over the past 20 years, with an annual growth rate averaging 0.9% since 1981.

The City of Oroville, 8 miles southwest of Oroville Dam, is the second-largest incorporated town near the park with 13,000 residents; the greater Oroville area encompasses 45,000 residents. The City of Oroville's General Plan encourages new industries be established in the area to increase the population's growth rate, in order to improve the city's economy. The nearby communities of Gridley and Biggs with populations of approximately 5,700 and 1,700 are the only other incorporated communities near the reservoir. Among the county's unincorporated communities, Thermalito, immediately west of Oroville, is the largest.

Increasing use of Lake Oroville State Recreation Area is anticipated due to the population growth trends in California and in Butte County, and especially from the towns, counties, and closest metropolitan areas to the park, including the Sacramento region.

CULTURAL DIVERSITY

According to the 2000 U.S. Census, Hispanic and Asian/Pacific Islander populations were two of the fastest growing ethnic groups in California. By 2030, it is anticipated that Hispanic people will represent approximately 43 percent of the state's population. These types of cultural/ethnic shifts may affect preferences for recreation opportunities. Hispanic outdoor visitors tend to convene in larger than average groups and may be more spontaneous in planning recreational activities than other visitors. Butte County's population in 1990 was approximately 84% Caucasian, 8.5% Hispanic, 3.8% Asian, and less than 2% each of African-American and American Indian residents.

GOVERNMENT AGENCIES

Planning for State Parks must be wide-ranging to consider issues that cross regional, local community, and park boundaries. Certain federal, State, county, and community agencies provide oversight and/or review of various aspects of CSP's planning, development, and operational activities at LOSRA. Examples of such oversight include planning-related laws and policies, such as the California Environmental Quality Act (CEQA) and the Americans with Disabilities Act (ADA), and regulatory agencies such as the Regional Water Quality Control Board and Air Quality Management Districts. Additionally, numerous California State Park Resource Management Directives guide the planning process.

See *Appendix F* for a broader listing of agencies that have policies, regulations, and plans that may influence future planning, development, and operational activities at LOSRA.

FEDERAL AGENCIES

United States Forest Service (USFS)
The United States Forest Service is a major landowner in the LOSRA region. The USFS owns lands that lie within the LOSRA boundary and these parcels are subject to USFS jurisdiction. See page 111 for more information on the USFS.

United States Bureau of Land Management (BLM)
The BLM is responsible for scattered lands in the LOSRA area managed under the direction of the 1993 Redding Resource Management Plan (RRMP). The RRMP directs the management of public lands and federal mineral estates that are administered by the BLM within the Redding Resource Area of north-central California. Lands managed by the BLM in and around LOSRA are designated as "undeveloped public lands." The four main land management issues which are addressed in the RRMP are land tenure

adjustment, recreation management, access, and forest management. The BLM owns lands that lie within the LOSRA boundary and these parcels are subject to BLM jurisdiction. See page 111 for more information on the BLM.

United States Army Corps of Engineers (USACE)
The USACE is mandated to regulate certain types of activities in wetlands and waters of the U.S. The USACE requires permits for the discharge of dredged or fill material into any water of the U.S. or wetland under its jurisdiction. A permit from USACE must also be obtained for any and all structures, whether permanent or temporary, that are planned to be in or over any navigable water of the U.S. and those that affect the course, location, or condition of the water body. Permits are also required from the USACE for any project that requires dredging of, or placement of fill into, any wetland or water of the U.S.

United States Fish and Wildlife Service (USFWS)
The USFWS has regulatory authority over federal Threatened and Endangered plant and animal species. Whenever a federally-listed plant or wildlife species, or designated (or proposed) critical habitat occurs within a proposed project area, California State Parks is required to consult with the USFWS on direct or indirect impacts to those species or their habitat as a result of the project. If potentially significant impacts are identified, an Incidental Take Permit and/or mitigation measures may be required.

National Oceanic and Atmospheric Administration - National Marine Fisheries Service (NOAA Fisheries)
NOAA Fisheries conserves, protects, and manages living marine resources in a way that ensures their continuation as functioning components of marine ecosystems, affords economic opportunities, and enhances the quality of life for the American public.

STATE AGENCIES

The policies, plans, and programs of various State agencies and organizations affect the park in many ways.

California Air Resources Board
The California Air Resources Board is a part of the California Environmental Protection Agency, an agency that reports directly to the Governor's Office in the Executive Branch of California State Government. The Mission of the California Air Resources Board is to promote and protect public health, welfare, and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the State.

The major goals of the Board are to: 1) provide safe, clean air to Californians, 2) protect the public from exposure to toxic air contaminants, 3) provide leadership in implementing and enforcing air pollution control rules and regulations, and 4) provide innovative approaches for complying with air pollution rules and regulations.

LOSRA is located within the Sacramento Valley Air Basin and is under the jurisdiction of the Butte County Air Quality Management District. As such it must comply with the rules and regulations set forth by the District through park facility design and management as well as management of recreational activities within the park.

California Department of Boating and Waterways (DBW)

By law, the California Department of Boating and Waterways has responsibility for the design and construction of boating-related facilites at LOSRA. It plans, designs, finances, and constructs boating facilities throughout the State Park System, at State Water Project reservoirs, and on other State lands. The DBW's primary objective is to plan and develop boating facilities in environmentally acceptable areas with priority on the development or expansion of facilities where the greatest needs exist. It oversees a comprehensive set of State laws and regulations governing the equipment and operation of vessels on State waters, and keeps track of boating accidents to provide a data base for accident analysis. DBW has and continues to fund large and small projects at LOSRA. DBW's contributions are critical to the LOSRA operation. They provide floating restrooms, improve launch ramps and launch ramp parking, and replace launch ramp restrooms, among other activities. By law they also have responsibility for developing building projects along the waterway; the aquatic center is an example. CSP provides on-going maintenance for these facilities.

California Office of Emergency Services (OES)

The Governor's Office of Emergency Services coordinates overall State agency response to major disasters in support of local government. The office is responsible for assuring the state's readiness to respond to and recover from natural, manmade, and war-caused emergencies, and for assisting local governments in their emergency preparedness, response, and recovery efforts.

OES maintains caches of specialized equipment, principally for use by local law enforcement agencies. OES fire engines are stationed with fire districts at strategic locations throughout the State, including one within a few miles of the park, and can be dispatched when needed. OES assists local governments and other State agencies in developing their own emergency preparedness and response plans for earthquakes, floods, fires, and dam breaks, among others.

California Department of Fish and Game (DFG)

The California Department of Fish and Game is the trustee agency for the State's plant and wildlife resources. As such, they have regulatory authority over all of the State's special plant and wildlife species. Any project that has the potential for direct or indirect impacts to State-listed plant or animal species or Species of Concern requires consultation with California Department of Fish and Game. Authorization for "take" of listed species (i.e., an Incidental Take Permit) and mitigation may be required.

Any project that involves work within a streambed or stream banks of any permanent or intermittent stream requires a permit from the California Department of Fish and Game under Section 1601 (i.e., a Streambed Alteration Agreement) of the Fish and Game

Code. A Streambed Alteration Agreement is also needed for any project that will: divert, obstruct, or change the natural flow of any river, stream, or lake; use materials from a streambed; or result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake.

Fish and Game approves slot limits for the many bass tournaments that take place at LOSRA. DFG works with DWR to manage the fishery at LOSRA, and occasionally performs law enforcement activities on the lake related to fish and game.

California Department of Forestry and Fire Protection (CDF)
CDF's mission emphasizes the management and protection of California's natural resources, a goal that is accomplished through ongoing assessment and study of the State's natural resources and an extensive CDF Resource Management Program. CDF oversees enforcement of California's forest practice regulations that guide timber harvesting on private lands. While Californians are learning more about the positive as well as the negative effects of fire, the prevention and control of large, damaging fires remains a priority for CDF.

California Department of Transportation (Caltrans)
The California Department of Transportation has jurisdiction over several of the transportation routes through Butte County. Several regional highways, including Highways 70 and 162 used to access Lake Oroville, are owned and managed by Caltrans. Permits are required for any construction work within a Caltrans right-of-way. CSP should also notify Caltrans for review of any construction work planned within the watershed area of the park's managed properties in which Caltrans property exists, and within Caltrans rights-of-way, such as for roadway connections from park to Caltrans roads.

Regional Water Quality Control Board (RWQCB)
The Central Valley Regional Water Quality Control Board (CVRWQCB) is the office that has jurisdiction over relevant projects occurring within LOSRA. A permit from the RWQCB is required for all projects requiring a USACE Section 404 (Clean Water Act) permit or a California Department of Fish and Game Section 1601 (i.e., Streambed Alteration Agreement) permit. A permit from the RWQCB is also required for all projects that have the potential for direct or indirect project-related impacts to water quality, or if the project requires a construction storm water permit or waiver (i.e., for projects with greater than one acre of land disturbance).

BUTTE COUNTY GOVERNMENT

Butte County regulates county and privately-held properties within its boundaries via its General Plan and County zoning ordinance codes. The County's land use policies, found in the *Land Use Element* of the *Butte County General Plan*, provide policy guidelines for how the land and its resources will be used.

Butte County's General Plan assigns land use designations to federal, State and private lands, although the County only has jurisdiction over private lands that include unincorporated as well as incorporated areas of the County. For incorporated areas, such as the City of Oroville, the County and City general plans are designed to be consistent with one another.

Generally, future planned land uses immediately surrounding the reservoir are designated as *Public*, reflecting the large quantity of public land management adjacent to the reservoir. Because entities such as CSP, USFS, and BLM implement their own land use planning, this designation does not provide information on allowable land uses; this information is provided in the *Oroville Facilities Relicensing Study L-2 – Land Management Report*. Further inland (but within the FERC study area), lands are primarily designated *Agricultural Residential* and *Timber Mountain* on the east side of the reservoir (these zoning designations are intended for resource extraction, mainly timber production in the LOSRA area, and resource preservation, and allow very minimal housing development), and *Agricultural Residential* and *Grazing and Open Land* on the west side.

Lands along the tributaries that feed into Lake Oroville also possess distinct planned land use patterns. In addition to *Agricultural Residential* and *Grazing and Open Land*, the West Branch Feather River area also contains limited *Low Density Residential* to the west and *Foothill Area Residential* to the east. The North Fork area is planned for *Grazing and Open Land* along with *Timber-Mountain* land uses. Along the Middle Fork and South Fork reaches, the primary planned land use designation is *Timber-Mountain*. However, the South Fork area also contains *Agricultural Residential* north and south of the reservoir and limited *Grazing and Open Land* areas to the south. The Kelly Ridge area is designated *Public* near the reservoir and *Low Density Residential,* with very limited amounts of *Commercial,* further inland.

These Butte County land use designations currently affect recreational activities and facilities at the park in various ways, such as the quality of surrounding viewsheds and park access routes (see the *LOSRA Aesthetic Resources* section), and will affect planning and implementation of future park facilities and recreational activities in the future.

Butte County Association of Governments (BCAG)

The regional planning organization for Butte County is the Butte County Association of Governments (BCAG). The BCAG is an association of local governments formed by Butte County that includes the cities of Biggs, Chico, Gridley, Oroville and the Town of Paradise.

BCAG is the designated Metropolitan Planning Organization (MPO) and Regional Transportation Planning Agency (RTPA) for Butte County. BCAG is responsible for the preparation of all federal and State transportation plans and programs that secure transportation funding for highways, local streets and roads, transit, aviation, rail and bikeway/pedestrian facilities. BCAG represents and works in close cooperation with all

local governments in Butte County, other State and federal agencies, and the public to improve transportation in Butte County.

CITY OF OROVILLE

Similar in nature to the county's jurisdiction, the city primarily regulates private lands as well as its own municipal properties under its General Plan. All development on city-owned property within LOSRA area is subject to the policies detailed in the City of Oroville General Plan and Zoning Ordinance.

LOCAL RECREATION AND PARK DISTRICTS

There are two recreation and park districts adjacent to the park providing recreational facilities and activities for surrounding communities:

The Feather River Recreation and Park District, located in the southeastern portion of Butte County, covers more than 735 square miles encompassing most of Lake Oroville. While centered around the Oroville area, services are also provided to its rural communities such as leisure classes, sports programs, and special events.

The Paradise Recreation and Park District north of the park offers a diversity of leisure services and activities in that region.

RELEVANT PLANNING DOCUMENTS

The following land and resource management plans are relevant to the LOSRA General Plan:

1) Oroville Facilities Relicensing FERC Project No. 2100 Studies
2) Plumas National Forest Land and Resource Management Plan (DWR 2003, 2004) (1988, as amended)
3) Redding Resource Management Plan (BLM 1993);
4) Resource Management Plan and General Development Plan, Lake Oroville State Recreation Area (CSP 1973);
5) Amended Recreation Plan for Lake Oroville State Recreation Area (DWR 1993);
6) Oroville Wildlife Management Area Management Plan (DFG 1978);
7) Butte County General Plan (1996)
8) Butte County 2001 Regional Transportation Plan
9) The City of Oroville General Plan (1995)
10) The Paradise Recreation & Park District Master Plan 2001-2016

These plans and their implementing polices as they relate to the project are described below:

1) Oroville Facilities Relicensing FERC Project No. 2100 Studies

The Department of Water Resources commissioned these studies as part of the relicensing process for the preparation of a license application to be submitted to the

Federal Energy Regulatory Commission (FERC) for the Oroville Facilities Project No. 2100 (Project). See the References section for a complete listing of these studies.

2) Plumas National Forest Land and Resource Management Plan (LRMP) (1988, as amended)

Some of the lands at the North Fork, Middle Fork, and South Fork extremities of Lake Oroville are National Forest lands that are part of the Plumas National Forest (PNF). In addition, in the Big Bend area defined by the large bend in the North Fork at the north end of the lake, there is an area of National Forest lands that are a part of the Lassen National Forest but are administered by the Plumas National Forest. The management policies for these lands were established by the Plumas National Forest Land and Resource Management Plan (LRMP), adopted in 1988. In general, the policies for the lands in these areas emphasize resource conservation, provision of high quality recreational opportunities, and protection of visual resources.

The National Forest lands adjacent to the North Fork and South Fork arms of the reservoir have been designated with a Visual Retention management prescription, which carefully controls timber harvest and other development activities to maintain the landscape in a natural-appearing condition. The National Forest lands adjacent to the Middle Fork end of the reservoir have been designated with a Recreation Area management prescription that has standards and guidelines for balancing recreational use with protection of environmental resources. In this area, no timber harvest is permitted.

The Middle Fork of the Feather River, from the point where it enters Lake Oroville, eastward to the area of its origin near Portola, was established as a Wild and Scenic River by Congress in 1968. The Forest Plan manages the National Forest System lands along this reach of the river for preservation of the river's free-flowing condition and ecological and aesthetic value, and provides for a spectrum of recreational opportunities. Since 1965, a 15,000-acre area along the Middle Fork tip of the lake and extending several miles to the north and east along the Middle Fork of the Feather River and along Fall River has been designated as the Feather Falls Scenic Area. This area was established to protect this area's highly valued scenic features, which include Feather Falls, located on the Fall River one-half mile east of Lake Oroville. Feather Falls has a drop of 640 feet, sixth highest in the continental United States. Other scenic resources in this protected area include South Branch Falls, Curtain Falls, and Brush Creek Falls. This area is managed for recreation and protection of scenic values, and the Forest Plan's management prescription for this area provides that it be recommended for National Natural Landmark status.

The Plumas National Forest LRMP provides management direction, as well as standards and guidelines, for the upper reaches of Lake Oroville within the forest's French Creek Management Area and Galen Management Area. These management areas, and their standards and policies as they relate to Lake Oroville, are described below.

French Creek Management Area

The French Creek Management Area is located between the North Fork of the Feather River, the Pulga-Four Trees Road, and the Oroville-Quincy Road. This 29,892-acre management area is primarily within the watershed of French Creek, which flows into the North Fork of the Feather River within Lake Oroville.

Galen Management Area

The Galen Management Area extends easterly from Big Bend on the North Fork to the canyon of the Middle Fork of the Feather River. This 8,719-acre management area is bounded on the north by a segment of the North Fork Feather River and the Oroville-Quincy Road through the Brush Creek Work Center and on the south by the Forest boundary. Instability is a problem in the steep North Fork Canyon. Dispersed recreation is light because the area lacks recreational attractions and private land is widely interspersed. Major activities include fishing, hunting, and some camping. No developed campgrounds are in the area.

3) Redding Resource Management Plan and Record of Decision (1993)

This resource management plan for the Redding Resource Area was developed by the Bureau of Land Management (BLM) in 1993. The Lake Oroville area falls within the BLM's Ishi Management Area. The land management objective for BLM properties that fall within the LOSRA area include the following:

> "Transfer via exchange or the Recreation and Public Purposes Act (R&PP) to the State of California all surface and submerged public lands encompassing approximately 6,400 acres within and adjacent to the Lake Oroville State Recreation Area. All lands identified by California or BLM as excess to park needs will be offered for exchange to any party after two years from approval of the Final RRMP."

4) Resource Management Plan and General Development Plan, Lake Oroville State Recreation Area (1973)

This management plan for Lake Oroville State Recreation Area was developed by CSP in 1973 and is still in use today. This plan describes allowable recreational uses and intensities for various areas around the lake, such as Bidwell Canyon, Lime Saddle, Goat Ranch, and others. Recreational intensities described in the plan are primarily tied to slope and resource protection constraints. The plan also describes the existing and proposed recreational development within 15 areas of the park, including Kelly Ridge, Bidwell Canyon, Loafer Creek, Spillway Launching Ramp, Lime Saddle, Thermalito Forebay, and other areas. These potential developments included overnight facilities (camping sites, group camps, cabins, and lodges), day-use facilities (parking, picnic units, and swimming beaches), and boating facilities (launching lanes, car/trailer parking, and marina slips).

The management policy statement contained within the plan is as follows:

> "The lands and resources at Lake Oroville State Recreation Area shall be managed so as to make an optimum contribution to the enjoyment of recreational opportunities and facilities in a natural or quasi-natural environment. Landscape values and vegetation elements shall be protected against scarring and degradation to the fullest practicable extent and shall be enhanced to improve the recreational environment whenever and wherever possible. Hunting may be permitted if time or space zoning can afford adequate safety. Cultural values shall either be adequately protected or fully recovered under professional direction."

The management plan also states that the purpose of Lake Oroville State Recreational Area is to:

> "…perpetuate, enhance, and make available to the public the recreational opportunities afforded by Lake Oroville, Thermalito Forebay, and adjacent land and water areas and to protect all environmental amenities so that they make an optimum contribution to public enjoyment of the area."

5) Recreation Plan for Lake Oroville State Recreation Area (1993)

The Department of Water Resources (DWR) Amended Recreation Plan (1993) for LOSRA superseded the 1966 conceptual document, Bulletin 117-6, and was adopted by the FERC as the recreation plan for LOSRA. This was done in compliance with the FERC Order of October 1, 1992. The 1993 plan describes the recent improvements (pre-1993 plan adoption) and the commitments of DWR to construct specific additional facilities and take specific actions to address the fisheries and recreation needs at LOSRA deemed necessary by FERC. The plan also detailed the timeframe for the completion of the proposed projects. DWR also acknowledged in the 1993 plan that, as the licensee, they were responsible for funding specific improvements. The 1993 plan describes the fish and wildlife resources, facilities, local area, user patterns, operation of the Oroville Complex, economic considerations, recreation plan, and the fisheries management plan.

This updated plan acknowledged that recreation activities and preferences had changed over time in terms of less demand for boat use and fishing, and increased demand for equestrian, bike, and hiking trails. Another finding was that use patterns at that time (1993) had changed somewhat due to low water levels, making some facilities inaccessible or unusable. The plan states many recommendations for facility expansion and modification in light of these findings. All of these recommendations have since been implemented.

6) Oroville Wildlife Area Management Plan (1978)

In 1978, the Department of Fish and Game (DFG) developed the management plan for the Oroville Wildlife Area. The purpose of the plan was to provide for the preservation and enhancement of the Oroville Wildlife Area and for the reasonable use and enjoyment by the public. In 1962, the Director of the Department of Water Resources declared that public interest and necessity required the acquisition of the Oroville Borrow Area (the clay source for the construction of the Lake Oroville Dam) for fish and

wildlife enhancement and recreation. On August 12, 1968, 5,500 acres was transferred to DFG for creation of the Oroville Wildlife Area.

The 1978 plan describes the purpose for the plan, a description of the area, a history of the site, the present (1978) situation and problems, and recommended action programs. The plan states that one of the three primary objectives of the area is to provide for the recreational, scientific, and educational use of the area. The plan also states that destructive uses and activities incompatible with wildlife and fisheries objectives will be eliminated through enforcement of existing regulations or development of additional regulations if necessary.

7) Butte County General Plan (1996)

With exception of areas at the North Fork, Middle Fork, and South Fork extremities of the lake that come under the jurisdiction of the Plumas National Forest, the lands near Lake Oroville are subject to the provisions of the Butte County General Plan and Zoning Ordinance. The County General Plan and Zoning Ordinance also regulates land use and development that occurs in the unincorporated areas surrounding the city of Oroville, where many of the project's downstream facilities are located.

The Butte County General Plan adopted in 1996 was designed to provide a vision and guidelines for land use in the county until 2016, and is supportive of California State Parks' mission and the park's purpose to provide public recreation. Its policies direct the county to encourage CSP to "complete their development of recreational facilities in the Lake Oroville State Recreation Area" based on early plans put forth for the water project's recreational component.

The Butte County General Plan encourages acquisition and management of open space lands and land supporting sensitive wildlife and vegetation by groups and agencies interested in the preservation of recreational opportunities, wildlife habitat and resource values in the region. It recommends establishing strict public policy for the preservation of historical, archaeological and cultural resources in the county, to "safeguard the heritage of the past to provide the community a cultural foundation for measuring change."

8) Butte County 2001 Regional Transportation Plan (RTP) (2001)

The RTP, developed by the Butte County Association of Governments (BCAG)/ Regional Transportation Planning Agency (RTPA), provides guidance on transportation, pedestrian, and bikeway development in the county. Relevant policies to LOSRA include assistance to local jurisdictions in developing transportation and circulation systems that have adequate capacity and design standards for all transportation modes, including non-motorized vehicles such as bicycles; and the development of trails that increase access to regional wilderness and recreation areas. The 1998 Countywide Bikeway Master Plan includes policies that support countywide bikeway projects such as bicycle trails within LOSRA and connections to trails outside the park. The plan proposes meeting the needs of both the avid cyclist and the occasional or recreational

rider by emphasizing connections to regional recreational centers and by taking advantage of local scenic qualities in locating trails.

9) City of Oroville General Plan (1995)

The City of Oroville General Plan was adopted in October 1995. The City's General Plan presents a vision for the City's future, including recommendations for land use, design, circulation, open space, recreation, and natural resources. The General Plan calls for enhancement of recreational and biological resources at Lake Oroville, as well as the reduction of potential flood and seismic hazards. Also strongly recommended are ongoing planning and management of the city's natural and cultural resources, including conservation of oak woodlands, wetlands, and riparian corridors in the area to enhance the quality of life for residents and visitors.

The Oroville General Plan contains specific references to the CSP-managed recreation areas. The General Plan recommends CSP's development of the Thermalito Afterbay as a destination water recreation park in accordance with the state's original master plan of recreation development associated with the FERC license. The City's General Plan also supports the Feather River Recreation and Parks Department's efforts to develop several of its recreational project sites on Lake Oroville, providing an opportunity for CSP to coordinate and harmonize facilities development with another recreation provider on the lake. The City of Oroville's 1998 Bicycle Transportation Plan lists a need for bicycle support facilities for its trails that pass by several of the water project facilities and CSP-managed areas.

10) The Paradise Recreation and Park District Master Plan 2001-2016

The Paradise Recreation and Park District Master Plan supports the goals of the bikeway master plans of Butte County and the City of Paradise. These plans support countywide bideway projects such as bicycle trails within LOSRA and connections to trails outside the park, including those within this Park District.

PLANNING ISSUES

LOSRA PLANNING ISSUES

The following key planning issues of the General Plan describe the primary resource constraints and opportunities at LOSRA that have been identified by CSP's public scoping and planning analysis as warranting future management attention.

INTER-AGENCY PLANNING

LOSRA is managed in the context of many agencies, levels of government, communities, and interest groups. Inter-agency issues that relate to this planning effort include issues such as jurisdiction, land ownership, cooperation, funding, regulations, recreation facilities, natural and cultural resource planning and protection, trails, biocorridors, vegetation management and wildfire, water quality, education, public safety, and enforcement. Agencies and stakeholder groups related to this planning effort are discussed in the *Planning Influences* section.

An interagency issue recognized in this General Plan is the relationship of CSP's LOSRA recreation management to recreational management of the Department of Fish and Game's Oroville Wildlife Area (which includes the Afterbay). The public views and uses the recreational facilities of LOSRA and DFG's Oroville Wildlife Area and the local facilities as if they were one unit.

BOATING

Boating facilities are numerous and are generally in good condition at Lake Oroville. These facilities are well-distributed throughout the study area, except for the North Fork and the Middle Fork of Lake Oroville where road access is minimal. Demand for boating is projected to continue to increase over the next 30-50 years. Boating activity is also strongly affected by changes in reservoir pool level at Lake Oroville and can vary by water year, affecting access at some boat ramps and car-top boat ramp sites. This situation has been partially resolved by recent boat ramp improvements. Increased recreational boating demand and current low lake level operating conditions create the following boating access and facility needs:

- Need for a new boat ramp and to widen, extend, and improve some existing boat ramps.
- Need to improve and add car-top boat launching facilities.
- Need to expand marina and boat ramp parking.
- Need to improve some marina facilities.
- There may be a need for additional floating restrooms.
- Need to expand and improve the Aquatic Center.

SWIMMING, FISHING, AND SHORELINE ACCESS

Swimming, fishing, and shoreline access opportunities are provided at Lake Oroville and the Thermalito Forebay and Afterbay. Reservoir level fluctuations at Lake Oroville make some swim areas unusable at certain times of the year or in a low water year.

Thermalito Forebay and Afterbay provide swimming opportunities throughout all of the summer months as their pool levels are more stable but these waters are relatively cold. Summer bacteria levels at certain swim areas in the study area occasionally present water quality concerns for swimmers. Inadequate shoreline access and fishing facilities were other concerns expressed by park visitors. This information reflects the following needs:

- Need to improve shoreline access in some areas.
- Need to improve swimming access and quality.
- Provide temporary event grandstands for events such as fishing tournaments.
- Some LOSRA areas need fish cleaning stations and/or ADA-compliant fishing piers or platforms.

DAY-USE RECREATION

Day-use recreation facilities are generally in good condition throughout the study area. However, the eastern portion of Lake Oroville lacks existing day-use and picnicking facilities. Developed day-use facilities with shoreline access are desired, though in limited supply at Lake Oroville. At the Diversion Pool, no day-use facilities exist except for a vault toilet building. Additional day-use facilities in this area are needed including access from Lakeland Boulevard. Day-use facility needs include:

- Need to provide additional day-use areas and facilities.
- No day-use facilities exist at the Diversion Pool, except for a vault toilet building.
- Additional day-use facilities, such as picnic tables, grills, and shade structures are needed at certain LOSRA recreation areas.

CAMPING

Estimates of projected (future) use at developed campgrounds in the Lake Oroville resource area indicate that most sites will be at or exceeding their facility capacity prior to the end of the new anticipated license term (assumed to be 2050 for planning purposes). While existing camping capacity appears adequate and facilities are well-maintained, development of new developed campsites is a management option that should be considered to help address the anticipated need for additional camping capacity in the future. By 2050, it is estimated that approximately 75-100 new campsites may be needed (based on future monitoring results) in the Lake Oroville resource area to meet demand for camping based on current projections. Camping facility issues include:

- Improved camping facilities are needed for families, groups, RV users, “en-route” campers, and equestrians.
- Need to improve existing campground activity centers and campfire centers.
- Currently there are no “environmental camping,” in-park resort, yurt, or cabin/tent cabin camping options at LOSRA.

TRAILS

The study area has a significant amount of non-motorized trails. Most trails are in good condition and user conflicts are low. However, some trail improvements are needed. Trail Facility needs include:

- A Comprehensive Non-Motorized Trails Program is needed to address the entire trails network.
- Some trailhead facilities need improvement and some trail connections are missing.
- Some LOSRA trail users report experiencing conflict with different recreational uses on some trails.

Discussion of Statewide Trail Issues

Recreational trails often provide the primary access to the majority of any park's natural, cultural, and scenic attractions, including interpretive exhibits and other recreational facilities. Recreational trails serve the needs of hikers, joggers, mountain bikers, equestrians and others. There is a general increase in trail use throughout California's state park units as the state's population increases. Newly developing trail uses are constantly emerging (such as mountain biking 20 years ago or inline skating more recently). The ongoing increases in trail use often result in competition for access to existing trails, conflict when new trail users are either allowed or prohibited from using public trails, and demand for the construction of new trails.

Recreational trail use is the subject of an increasing body of research and applied knowledge accumulated over the last ten to fifteen years. As trail use becomes increasingly popular, there is a greater a need to better understand both the environmental and social impacts of greater numbers of people recreating on trails. A body of trail research has emerged from the United States, Canada, and Australia on the effects of trail users on the environment and on each other. In the United States a document was published in 1994 by the Federal Highway Commission that summarized the findings of assorted studies. The report is titled *Conflicts on Multiple-Use Trails*: *Synthesis of the Literature and State of the Practice*. The publication cites research articles and summarizes their findings in terms of impacts on the physical environment, the social aspects of trail use, and management actions that can minimize social conflicts.

The main threat to trail integrity is water flow on the surface. New trail design and construction techniques have proven effective in sheeting water from the trail, thus preventing or significantly reducing the amount of water that runs down a trail tread causing "entrenchment" and the resulting increased erosion.

Pedestrians, equestrians, and bicyclists have varying levels of impacts on trail integrity. Generally, with the number of passes being equal, pedestrians and bicyclists have about the same effect on dry trail surfaces, while horses, primarily because of their significant weight and the action of shoe-clad hooves, cause a greater impact in both dry and wet conditions. Additional impacts may be caused by hikers and bicyclists on

dry trails when they create short-cuts on switchbacks or seek trail-side jumps. On wet trails both bicyclists and hikers tend to go around excessively muddy or wet areas of a trail, increasing the width of the trail beyond its original design. Trail design, coupled with the total number of trail passes, regardless of user type, are the factors that most affect trail integrity.

The focus of social issues is on the compatibility of different trail users and the resulting conflicts when users perceive that their trail experience has been, or will be, negatively altered by a different type of trail user. Research shows that conflict centers mostly on "perceptions of safety" as different user types meet on the trail. The speed differential is the factor most often cited, usually by equestrians with regard to mountain bike speeds. Mountain bikers often contend that horses could to be better trained (desensitized to the "surprise" approach of mountain bikes and other trail users). Additionally, there is a tendency for the "first" trail users to resist "encroachment" by new trail users into what they often see as their personal domain. It is also common, at least during the initial conflict stages, for one user group to devalue the trail use of other user types.

California State Parks works to meet the needs of many different types of trail users. Studies have shown that actual injuries between user groups are rare and that trail design, signage, education and enforcement can be effective in controlling trail conflict. As the public demand for trails increases, the Department attempts to implement state-of-the-art trail design and the latest best-practices for managing trail behavior.

Discussion of LOSRA Trail Issues

Trail use at LOSRA has been and remains controversial. Historically, the primary trail user groups were local equestrians and hikers. As mountain biking became popular throughout the country in the mid 1980s, bicyclists started to appear in limited numbers on LOSRA trails. Initially there were no major conflicts. However, user conflicts emerged as the number of bicyclists increased over the years and as mountain bikers and equestrians made formal requests for increased trail opportunities. At the heart of the issue is the perception by some users that the trails were designed for equestrians and hikers and the belief that it is not safe to combine horses and bikes on the same trails. The mountain bicyclists generally believe that equestrians and hikers can safely co-exist on the same trail, and that bicyclists have equal right to the trail system along with any other user. Hikers currently represent a small percentage of the trail users at LOSRA and have not expressed such trail use concerns.

After much study and public debate State Parks management converted the entire LOSRA trail system to multi-use in March 2002 in order to increase trail opportunities for all users. This action increased objections regarding safety concerns by local equestrians who felt they would be displaced or forced to ride under unsafe conditions. Bicyclists were in favor of the change to multi-use and felt they finally had an adequate supply of trails at LOSRA. The public conflict over the multi-use designation went all the way to FERC, which issued an order to DWR to revert the trails back to their original designation prior to March 2002. FERC further stated in their decision that all parties to the conflict should seek resolution through further public discourse.

LAND USE AND AESTHETICS

Multiple land ownerships and uses within and adjacent to the park complicate park management and access and potentially affect views from within the park. Land use and aesthetics issues include:

- The potential transfer of Bureau of Land Management lands to the State and the potential acquisition of PG&E property at Lime Saddle.
- The natural views that exist in some areas of the park could be affected by future development on ridgelands overlooking the park. Butte County's General Plan shows potential Agricultural-Residential land use around many areas of the lake which may impact viewsheds and park access qualities if developed. The existing natural setting of the Diversion Pool area would be compromised if the ridgelands south of the Diversion Pool (owned by PG&E) are sold to private parties and developed. The natural views and park setting of the North Forebay are similarly vulnerable to development on the Campbell Hills north of the Forebay.
- The potential use of the Foreman Creek area for Native American ceremonial and Native American Graves Protection and Repatriation Act (NAGPRA) repatriation or reburial purposes.
- The existing grazing lease on the north shore of the Diversion Pool creates some conflict with recreational access and use in that area of LOSRA.
- The seasonal drawdown of the Lake Oroville reservoir exposes extensive ringed and barren slopes that detract from the lake's visual appeal. Tires were once used to create artificial reefs around the lake's margins for fish habitat and when these are exposed by the lake drawdowns they present an eyesore. Driftwood also negatively affects aesthetics along the exposed shoreline.

VEGETATION AND FIRE MANAGEMENT

- Vegetation and fire issues include biomass and vegetation fuel load reduction in urban-wildland interface zones and restoring natural vegetation processes such as plant succession and fire cycles.

SPECIES AND HABITATS

- Plant and animal species issues include non-native invasive plant and animal control, sensitive species and habitat protection (e.g., vernal pools, bald eagle, peregrine falcon, osprey), and regional conservation planning and habitat linkages.

CULTURAL RESOURCES

- Cultural issues include loss of cultural resources by looting and by recreation impacts and the effects of reservoir level fluctuations on cultural resources.

INTERPRETATION AND EDUCATION ISSUES

Interpretation and education-related facilities and programs, such as informational kiosks, signage, information dissemination, and interpretive trails or campfires, have the potential to enhance visitor experiences and help modify visitor behavior to increase human safety and protect natural and cultural resources.

- Interpretive issues include the need for interpretive improvements such as interpretive trails, panels, staffed kiosks, campfire centers, renovation of the Visitors Center; interpreting to widely-dispersed visitors; and the use of education to improve visitor safety and minimize natural and cultural impacts of recreational use. One of the issues that emerged during the Relicensing Process was the possible relocation of the Visitors Center to a site near Highway 70 to provide easier access.

PARK OPERATIONS

- The major LOSRA park operations issue is inadequate maintenance facilities at the Lime Saddle Campground and the Forebay Area.

PLAN PROPOSALS

MISSION, CLASSIFICATION, DECLARATION OF PURPOSE, AND VISION STATEMENT

The planning and management of Lake Oroville State Recreation Area is directed by a hierarchy of mandates and guidelines flowing from the State Park Mission, through its State Park Classification and its Declaration of Purpose, to its Vision Statement.

DEPARTMENT MISSION

The Department's mission is to:

> "Provide for the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation."

CLASSIFICATION

California State Parks uses a wide spectrum of unit classifications from the California Public Resources Code (Section 5019.50-5019.80) to establish the overall management and recreation intent of a particular park unit. The California Park and Recreation Commission classifies all units of the State Park System. Being classified as a "state recreation area," (as opposed to "state preserve" or "state park"), this general plan for Lake Oroville State Recreation Area must be consistent with the following Section 5019.56 of the Public Resources Code:

> State recreation units consist of areas selected, developed, and operated to provide outdoor recreational opportunities. The units shall be designated by the commission by naming, in accordance with the provisions of Article 1 (commencing with Section 5001) and this article relating to classification.
>
> In the planning of improvements to be undertaken within state recreation units, consideration shall be given to compatibility of design with the surrounding scenic and environmental characteristics.
>
> State recreation units may be established in the terrestrial or underwater environments of the state and shall be further classified as one of the following types:
>
> State recreation areas, consisting of areas selected and developed to provide multiple recreational opportunities to meet other than purely local needs. The areas shall be selected for their having terrain capable of withstanding extensive human impact and for their proximity to large population centers, major routes of travel, or proven recreational resources such as manmade or natural bodies of water. Areas containing ecological, geological, scenic, or cultural resources of

significant value shall be preserved within state wildernesses, state reserves, state parks, or natural or cultural preserves.

Improvements may be undertaken to provide for recreational activities, including, but not limited to, camping, picnicking, swimming, hiking, bicycling, horseback riding, boating, waterskiing, diving, winter sports, fishing, and hunting.

Improvements to provide for urban or indoor formalized recreational activities shall not be undertaken within state recreation areas.

DECLARATION OF PURPOSE

The Declaration of Purpose describes the purpose of the park and is the broadest statement of management goals designed to fulfill the vision for the park. A Declaration of Purpose is required by the Public Resources Code, Section 5002.2(b), "setting forth specific long-range management objectives for the park consistent with the park's classification . . ."

The existing LOSRA Declaration of Purpose (written September 1973) is:

> "The purpose of Lake Oroville State Recreation Area is to perpetuate, enhance, and make available to the public the recreational opportunities afforded by Lake Oroville, Thermalito Forebay, and adjacent land and water areas and to protect all environmental amenities so that they make an optimum contribution to public enjoyment of the area."

The LOSRA Declaration of Purpose is revised as follows:

> "The purpose of Lake Oroville State Recreation Area is to perpetuate, enhance, and make available to the public the recreational opportunities afforded by Lake Oroville, Thermalito Forebay, and adjacent land and water areas and to protect and perpetuate the unit's natural values and processes.
>
> The function of California State Parks at Lake Oroville State Recreation Area is to design, construct, operate, and maintain public recreational facilities of such scope and in such manner as to realize the maximum recreational potential of the area, consistent with the orderly operation of the Water Project facilities and with the protection of significant natural and cultural resources."

LAKE OROVILLE STATE RECREATION AREA VISION STATEMENT

The Vision Statement describes how the park will be managed and interpreted by park staff and how it should be experienced by visitors as the proposals in this general plan are implemented. The guiding vision for Lake Oroville State Recreation Area is as follows:

> "Lake Oroville State Recreation Area offers outstanding aquatic and upland recreational opportunities to visitors of all ages, backgrounds, and abilities.

Visitors find recreation, relaxation, rejuvenation, and inspiration in the park's water bodies, its recreational improvements, and its natural uplands. Recreational settings range from developed marinas, campgrounds, and beaches to remote hiking, boating, and camping opportunities. A wide variety of recreational opportunities, from motor boating and RV-camping to horseback-riding and bicycling are available throughout the year. The park is managed to preserve and enhance its recreational, cultural, aesthetic, educational, and natural values. The story of the Maidu people and the area's pioneers inspire and teach visitors to discover their own connections and commitment to this land and its history. The park's recreational and educational facilities and programs encourage a diversity of safe visitor experiences in harmony with others and the environment. The park maintains cooperative relationships with neighboring communities, landholders, and agencies in areas of mutual interest."

INTRODUCTION TO GOALS AND GUIDELINES

The Goals and Guidelines section is the heart of this general plan in that it delineates the plan's proposals for managing the park's natural, cultural and aesthetic resources, for interpreting these resources, for providing recreational facilities and opportunities, and for operating and maintaining the park. The "Goals" establish the purpose and the "Guidelines" define how the plan proposes that the Department achieve this goal. Each guideline is tagged with a prefix and a number to identify that guideline and its area of concern. For example, the guidelines for the South Thermalito Forebay Areas are designated with a guideline prefix of **SF** followed by that guideline's number.

An example of a guideline prefix and number is: **WAT-1** (followed by the guideline).

There are two different types of Goals and Guidelines. The first type given is the "park area" view that presents "management intentions" and guidelines specific to each of the park's six planning areas. The second type (presented after the "park area" guidelines are all described) is a "parkwide" view that presents all the management goals and guidelines that are of a general nature.

Recommended research studies and plans are listed immediately following each subject area in the Parkwide Management Goals and Guidelines section so they can be easily found for scheduling and budgeting purposes.

NOTE: Under the Davis-Dolwig Act, California State Parks, the Department of Water Resources, and the Department of Boating and Waterways work together to plan, design, fund, and construct recreation facility improvements. DWR holds fee title to most of the lands that form Lake Oroville State Recreation Area and DWR's license for operating the Oroville Facilities is issued under the authority of the Federal Energy Regulatory Commission. CSP operations must avoid interfering with the operation of the Oroville water and power facilities. This complex jurisdictional context of CSP's

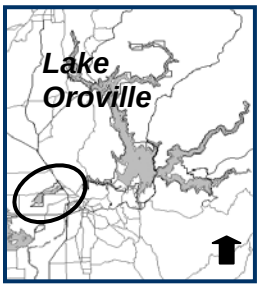
LOSRA management necessitates the following caveat that applies to all management intentions and guidelines for LOSRA areas and all parkwide LOSRA goals and guidelines:

> *In order to meet the goals of each involved agency, to facilitate the most efficient and effective management, and to provide the greatest public good, California State Parks intends to cooperate with, consult with, and coordinate with the Department of Water Resources, the Department of Boating and Waterways, the Department of Fish and Game, the Federal Energy Regulatory Commission, and other pertinent agencies as needed and as required in applying the management intentions, goals, and guidelines presented in the Lake Oroville State Recreation Area General Plan.*

MANAGEMENT INTENTIONS AND GUIDELINES FOR LOSRA RECREATION AREAS

This section presents the management intentions and guidelines for the park's many recreation areas. The management intentions define for each specific park site how the plan proposes to achieve its stated recreation goal to "*Provide an appropriate variety and intensity of recreational opportunities that will allow California's diverse population to enjoy and refresh themselves in a healthful outdoor recreation setting.*"

See the ***Recreation Facility Proposals Map*** (Map #10) for an overview of the following recreation facility improvement recommendations.



THERMALITO FOREBAY AREAS

South Thermalito Forebay Area

Statement of Management Intent

The South Thermalito Forebay Area will continue to be managed as an area of moderately high recreational development and use focused on recreational opportunities offered by the stable water level of the Forebay. Water-oriented recreation will continue to be focused in the day-use area where picnicking, fishing, and swimming occur and at the boat ramp. Power-boating is an appropriate activity in this area. The broad vistas of open hills, sky, and water are an aesthetic resource that should be preserved.

South Thermalito Forebay Area Guidelines

SF-1 Improve day-use facilities by providing amenities such as a swim beach area, landscaping, additional tables and pole-stoves, an ADA accessible fishing pier or platform, and paved parking. Evaluate options to warm the water (consistent with natural resource values) to enhance swimming opportunities.

SF-2 Consider providing day-use facilities on the north shore of the South Thermalito Forebay (accessed from Nelson Avenue).

SF-3 Provide new trail opportunities in the South Thermalito Forebay Area.

SF-4 Restrict access to vernal pool areas to protect them from disturbance by day-use activities.

Thermalito Afterbay Area and Afterbay Outlet of the Oroville Wildlife Area

The Thermalito Afterbay Area and the OWA Afterbay Outlet BR/DUA/Camping Area are currently managed by the California Department of Fish and Game. DWR's Relicensing process may identify alternative arrangements for managing the Afterbay Area and the Afterbay Outlet of the Oroville Wildlife Area. One such alternative may include participation by CSP, consistent with the Davis-Dolwig Act. If CSP should become involved in managing these areas, the following guidelines should be considered for implementation by CSP.

TA-1 If CSP is given responsibility to manage the Larkin Road Car-top BR in the Afterbay Area: Construct 5-10 new family picnic tables with shade structures at this site and provide a swim beach area. Evaluate options to warm the water to enhance swimming opportunities.

TA-2 If CSP is given responsibility to manage the OWA Afterbay Outlet BR/DUA/ Camping Area: Enhance current day-use facilities by adding paved parking, additional vault toilets, and picnicking areas. Improve camping at the Thermalito Afterbay Outlet area by establishing designated sites furnished with tables and camp stoves.

TA-3 If CSP is given responsibility to manage the OWA Afterbay Outlet BR/DUA/Camping Area: Continue operation of Monument Hill and Wilbur Road boat ramps and day use areas.

North Thermalito Forebay Area

Statement of Management Intent

The North Thermalito Forebay Area will continue to be managed as an area of high recreational development and use focused on recreational opportunities offered by the stable water level of the Forebay. Recreational demand in this area will likely remain high or increase due to its proximity to Highway 70 and to Oroville. Water-oriented recreation will continue to be focused in the day-use area and at the Aquatic Center and will be limited to non-motorized vessels. When appropriately-sited and with adequate service, en-route RV camping is an appropriate activity for this area.

North Thermalito Forebay Area Guidelines

Extend and enhance trail opportunities and provide additional shoreline trail access points in the North Thermalito Forebay Area.

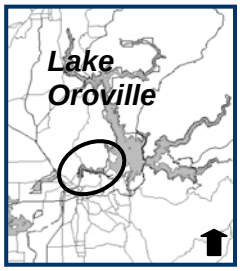
Evaluate options to warm the relatively cold water Forebay to enhance swimming opportunities (consistent with natural resource values) and to protect water quality in the swim area. Consider constructing one or more swimming or wading pools if water quality concerns restrict swimming in the Forebay.

Expand and improve the boating aquatics center and make the facilities ADA accessible. Improvements could include: a boating safety and education facility; locker rooms and showers; docks; landscaping; additional parking and covered boat storage and utilities; and group use enhancements including support for open water swims and triathlon events.

Improve day-use facilities, parking, and provide a fish cleaning station as needed.

As needed, construct a maintenance facility to serve the Forebay day-use areas.

Consider developing low-impact, walk-in camping opportunities in the North Thermalito Forebay Area.



DIVERSION POOL AREAS

Statement of Management Intent

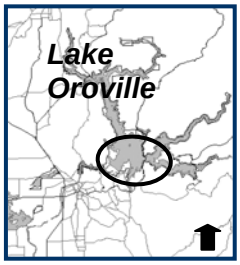
The Diversion Pool Area provides access to a beautiful stretch of stable water in the original channel of the Feather River. This area will continue to be managed as a low intensity recreation and interpretive area to maintain the visual beauty and refuge-like quality of this area for hikers, wildlife watchers, equestrians, bicyclists, picnickers, swimmers, and non-motorized boaters.

Diversion Pool Area Guidelines

DP-1 Construct additional day-use facilities including approx. 5-10 new picnic tables with pole grills and a gravel car-top boat ramp near the vault toilet building along the Diversion Pool along the Burma Road.

DP-2 Provide an ADA-accessible fishing pier or platform as needed.

DP-3 Cooperate with DWR to provide recreational access from Lakeland Boulevard to the Diversion Pool and to develop a Diversion Pool day-use site on the south shoreline with parking, restroom, picnic facilities, and a car-top boat launch.



SPILLWAY TO CRAIG SADDLE AREAS

The Spillway Area

Statement of Management Intent

The Spillway Boat Ramp and Day-Use Area will continue to be managed as an area of high recreational development and use. The Spillway Boat Ramp will likely remain the park's largest capacity boat launching facility. The popular fishing and boating activities of this area can be enhanced by providing self-contained RV camping spaces with amenities. When appropriately-sited and with adequate service, Enroute RV camping is an appropriate activity for this area. The two trailheads will continue to provide access to the Potter's Ravine and Brad Freeman Trails.

Spillway Area Guidelines

SW-1 Develop self-contained RV camping spaces with amenities such as tables, electrical service (to permit campers to use air conditioning), and landscaping.

SW-2 Consider extending the boat ramp length below 695 feet msl. The priority for low-water access has been established during the Relicensing Process to be at the Bidwell Canyon Boat Ramp.

SW-3 Encourage concessionaire to provide a floating store and gas dock at the Spillway BR to serve boaters.

SW-4 Evaluate potential and need for a new full-service marina at the Spillway. If evaluation and carrying capacity analysis support a new marina at the Spillway, encourage concessionaire to develop appropriate marina facilities.

SW-5 Add a fish-cleaning station when needed.

Lake Oroville Visitors Center

Statement of Management Intent

The current visitor center will continue to be a major educational resource for the park and local area. If a new visitor center is constructed close to a Highway 70 exit to replace the current Lake Oroville Visitors Center in order to reach more visitors, such a new center should continue interpreting the cultural and natural resources, the recreational opportunities, and the public value of LOSRA and the California Water Project. Access to the Dan Beebe and Bidwell Canyon Trails will continue to be provided from the visitor center area.

Lake Oroville Visitors Center Guidelines

VC-1 If the current visitor center is relocated, the existing visitor center building should be adapted to a new educational use such as an Environmental Education Center.

Bidwell Canyon Area

Statement of Management Intent

The Bidwell Canyon Area will continue to be managed as an area of high recreational development and use. Water-skiing, bass tournaments, and other special events are popular and appropriate activities for this location. Day-use water-oriented recreation will continue to be focused in the Boat Ramp and the Day-use Area and camping-oriented recreation will continue to be focused at the Campground. The marina will continue to provide needed visitor boating-related services. Visitor and resource carrying capacity and the adequacy of trails, access, parking, campsites, interpretation, picnicking, fishing, boat access, the marina, and other visitor support facilities should be monitored and improved as necessary.

Bidwell Canyon Area Guidelines

BC-1 To address Bidwell Marina parking deficit, construct new marina parking lot (100-190 spaces) on site of "Big Pine" loop of existing campground. Construct new replacement campground loop (38 campsites) adjacent to remaining "Gold Flat" loop to mitigate for loss of 38 campsites due to expansion of Bidwell Marina parking facilities.

BC-2 To improve boat launching and parking at the Bidwell Boat ramps consider constructing a boat ramp on the south side of the existing Ramp #1 to 640'. The ramp could provide about 40 parking spaces. Consider resurfacing the lower overflow gravel parking lot with concrete to provide additional parking spaces.

BC-3 Increase Bidwell Boat Ramp Parking for periods of high pool levels.

BC-4 Provide additional boarding dock(s) if feasible to maximize boat launching capacity.

BC-5 Encourage concessionaire to provide upgrades to ADA accessibility at the marina.

BC-6 As appropriate adding to the new concessionaire contract a requirement that the marina concessionaire should provide safe and effective marina parking and access options, such as a shuttle.

BC-7 Provide temporary event grandstand space for use by concessionaires or event organizers during fishing tournaments or other special events as needed.

BC-8 Modify the existing group activity hall to also serve CSP operational needs.

Saddle Dam Area

Statement of Management Intent

The Saddle Dam Area will continue to be managed as a day-use trailhead and as an access point to Lake Oroville.

Saddle Dam Area Guideline

SD-1 Construct short developed trails in Saddle Dam area to access the shoreline from the trailhead/parking area. Improve existing equestrian parking and provide a restroom, picnic tables, a water trough and hitching posts for horses, and native shade trees.

Loafer Creek Area

Statement of Management Intent

The Loafer Creek Area will continue to be managed as an area of high recreational development and use. Water-oriented recreation will continue to be focused in the Boat Ramp, picnicking at the Day-use Area, and camping-oriented recreation at the Family Campground, the Group Campground, and the Equestrian Campground. Visitor and resource carrying capacity and the adequacy of trails, access, parking, campsites, interpretation, picnicking, boat access, and other visitor support facilities should be monitored and improved as necessary.

Loafer Creek Area Guidelines

LC-1 Develop a group activity hall that can also serve CSP operational needs when needed.

LC-2 Add new group camp areas at Loafer Creek as needed. Consider making sites usable by RV users as well as non-RV users. Consider converting south portion of the day-use area to two new group camp areas.

LC-3 Upgrade basic campsites to RV sites by adding utilities for hookups and pavement as needed.

LC-4 Provide approximately 15 new campsites near or adjacent to the existing Loafer Creek Campground if determined necessary.

LC-5 Seek ways to provide alternative camping opportunities such as cabins, tent cabins, yurts, etc. to meet the needs of visitors who do not wish to camp in their own tents or RVs, and to meet ADA requirements.

LC-6 Expand the Loafer Creek Horse Camp.

LC-7 Improve the existing dirt service road at Loafer Creek Day-Use Area to allow convenient car-top boat access. The gated service road could be opened to the public when the Loafer Creek boat ramp becomes unusable due to low water conditions. Provide an entrance station to allow for fee collection and public information.

LC-8 Provide additional boarding dock(s) as needed to maximize launching capacity.

LC-9 Provide additional parking at the boat ramp when monitoring results demonstrate a need.

LC-10 Provide improved shoreline access and ADA-accessibility to the day-use area and swimming beach, and cove. Provide ADA enhancements at Group and Equestrian campgrounds.

LC-11 Evaluate potential swim facility options to provide improved swimming opportunities at Loafer Creek DUA during the primary 4-month recreation season.

LC-12 Provide a new fish cleaning station as needed.

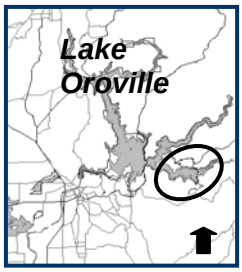
Craig Saddle Area

Statement of Management Intent

The Craig Saddle Area will be managed to provide safe, convenient, and enjoyable boating, camping, hunting, and fishing opportunities, to offer needed visitor support services, and to preserve its cultural resources.

Craig Saddle Area Guidelines

CS-1 Identify and designate a portion of the Craig Saddle Area as a Cultural Preserve to help preserve the Maidu archeological features in this area.



STRINGTOWN AND ENTERPRISE AREAS

Stringtown Area

Statement of Management Intent
The Stringtown Car-top Boat Ramp will be managed to provide car-top boat access to Lake Oroville as feasible.

Stringtown Area Guidelines

ST-1 Extend the concrete boat ramp to 800' level and appropriately sign and barricade the old submerged and degraded road bed for safety when exposed.

Enterprise Area

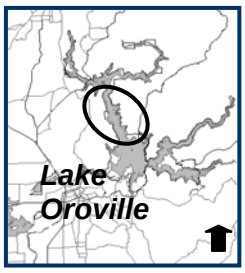
Statement of Management Intent
The Enterprise Boat Ramp will be managed to provide safe and convenient boat, swimming, and fishing access to Lake Oroville and to offer needed visitor support services. Recreation uses and access at this site will be developed and managed in such a way as to protect the cultural resources of the area.

Enterprise Area Guidelines

EN-1 While protecting the cultural resources of the area, extend the boat ramp length to about 750 feet msl to provide a greater likelihood of full summer-season usability and to meet user demand on the east side of Lake Oroville during a wider range of water conditions. Identify area for additional gravel parking as close as possible to 750 elevation terminus of the improved boat ramp. If feasible, add gravel parking for 10 cars with trailers.

EN-2 Provide a boarding dock at the boat ramp.

EN-3 Add picnic tables.



FOREMAN CREEK AND BLOOMER AREAS

Foreman Creek Area

Statement of Management Intent

The Foreman Creek Area will be managed to provide safe and convenient camping, boating, swimming, and fishing opportunities and to offer needed visitor support services. Recreation uses and access at this site will be developed and managed in such a way as to protect the rich cultural resources of the area and to maintain road access to the campground.

Foreman Creek Area Guidelines

FC-1 If the outcome of DWR negotiations with Native American groups concerning the Foreman Creek Area do not preclude it, identify and designate a portion of the Foreman Creek Area as a Cultural Preserve to help preserve the Native American archeological features in this area.

FC-2 Reconfigure, clearly define, and improve recreational day-use area and facilities to better serve user needs and to focus and direct recreational use and thereby limit impacts on cultural resources. New facilities could include a restroom and picnic tables, and a new access road to less-sensitive areas.

FC-3 Provide additional visitor interpretation and education regarding the preservation of cultural and other sensitive resources.

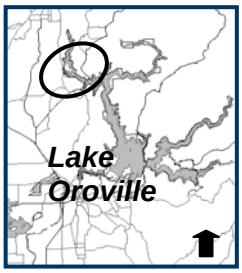
Bloomer Area

Statement of Management Intent

The four Bloomer Boat-in Campground sites will be managed to provide safe, convenient, and enjoyable boating, camping, swimming, and fishing opportunities for individuals and groups and to offer needed visitor support services.

Bloomer Area Guidelines

Note: There are no outstanding issues at this site that necessitate general plan guidelines.



GOAT RANCH TO NELSON BAR AREAS

Goat Ranch Area

Statement of Management Intent

The Goat Ranch Boat-in Campground will be managed to provide safe, convenient, and enjoyable boating, camping, swimming, and fishing opportunities and to offer needed visitor support services.

Goat Ranch Area Guidelines

Note: There are no outstanding issues at this site that necessitate general plan guidelines.

Dark Canyon Area

Statement of Management Intent

The Dark Canyon Car-top Boat Ramp will be managed to provide safe and convenient car-top boat access to Lake Oroville as feasible.

Dark Canyon Area Guidelines

DC-1 Repair or replace the vandalized vault toilet at the Dark Canyon car-top boat launch area.

Vinton Gulch Area

Statement of Management Intent

The Vinton Gulch Car-top Boat Ramp will be managed to provide car-top boat and fishing access to Lake Oroville as feasible.

Vinton Gulch Area Guidelines

Note: There are no outstanding issues at this site that necessitate general plan guidelines.

Lime Saddle Area

Statement of Management Intent

The Lime Saddle Area will continue to be managed as an area of high recreational development and use. Recreational demand in this area will likely increase due to growth in the Paradise area. Day-use water-oriented recreation will continue to be focused in the marina/boat ramp/day-use area and camping-oriented recreation will

continue to be focused at the family campground and the group campground. Visitor and resource carrying capacity and the adequacy of trails, access, parking, campsites, interpretation, picnicking, swimming, fishing, boat access, the marina, operations, and other visitor support facilities should be monitored and improved as necessary.

Lime Saddle Area Guidelines

LS-1 Develop new trails in the Lime Saddle Marina Area to provide views and connect existing and proposed facilities (such as the marina, the campground, and Parrish Cove).

LS-2 Expand parking facilities at Lime Saddle.

LS-3 As needed, add approximately 50 individual/family camping sites. Consider providing alternative camping opportunities such as cabins, tent cabins, yurts, etc. to meet the needs of visitors who do not wish to camp in their own tents or RVs, and to meet ADA requirements.

LS-4 Construct approximately 25 to 50 new RV/tent campsites and other improvements if needed based on monitoring results.

LS-5 Provide one new group campsite (usable by both tent and RV campers) with utilities at the Lime Saddle Complex as needed in the future.

LS-6 Provide a new campground activity facility if and when the campground is expanded in the future.

LS-7 Develop a campfire center.

LS-8 If feasible, develop a trail to the water's edge and create a water play area at the beach.

LS-9 Add a fish cleaning station.

LS-10 Provide a shop and storage facility for campground maintenance when needed.

LS-11 Encourage concessionaire to rehabilitate the marina and add new services such as: improving boat dock capacity, providing boat slips and overnight mooring for campers, adding group picnic facilities, a marina store, and a low-water shuttle system.

LS-12 Consider constructing 50-60 vehicle parking spaces at the Lime Saddle BR/DUA/Marina.

LS-13 Extend and widen the boat ramp.

LS-14 Provide additional boarding dock(s) if feasible to maximize launching capacity.

LS-15 Consider providing a day-use area at Parrish Cove that is linked by trail access to the Lime Saddle Campground and Lime Saddle BR/DUA /Marina.

LS-16 Add day-use improvements such as providing a grassy area, adding covered picnic tables near the marina, and upgrading landscaping.

Nelson Bar Area

Statement of Management Intent

The Nelson Bar Car-top Boat Ramp will be managed to provide car-top boat access to Lake Oroville as feasible.

Nelson Bar Area Guidelines

NB-1 Improve road, designate turnaround areas, and widen ramp to improve safety for car-top boaters.

PARKWIDE MANAGEMENT GOALS AND GUIDELINES

RECREATIONAL ACTIVITIES, FACILITIES, AND VISITOR EXPERIENCE

LOSRA has many well-developed and popular recreational opportunities and the park also has substantial opportunities for improving recreational access, opportunities, and experience.

Recreational Activities, Facilities, and Visitor Experience Goal:

Provide an appropriate variety and intensity of aquatic and terrestrial recreational opportunities that will allow California's diverse population to enjoy and refresh themselves in a healthful outdoor recreation setting.

Recreational Activities, Facilities, and Visitor Experience Guidelines

REC-1 Currently there exists a valuable spectrum of boating experiences available at LOSRA ranging from higher density suburban and rural boating experiences to quieter rural and semi-primitive experiences. Continue monitoring and developing policies and regulations to preserve the quieter rural and semi-primitive experiences and the overall safety and quality of boating at LOSRA.

REC-2 Plan recreational opportunities within a regional context and in coordination with federal, state, county, and city park agencies, to promote the best regional mix of recreational facility types, sizes, and locations.

REC-3 Provide facilities in the park that facilitate recreational activities such as boating, swimming, fishing, hiking, horseback riding, bicycling, picnicking, camping, hunting, nature study, education, and the enjoyment of solitude.

REC-4 Establish bank fishing sites and disabled-access fishing sites near campgrounds and day-use areas as needed.

REC-5 Add equestrian trailhead improvements when and where needed in LOSRA.

REC-6 Add group RV camping areas with utilities as needed in LOSRA.

REC-7 Provide Floating Campsites and Floating Restrooms around the lake when and where needed.

REC-8 Provide accessible facilities (e.g. structures, trails, etc.) that comply with all state and federal guidelines and requirements.

REC-9 Enhance the recreational use of watercraft on LOSRA waters by supporting the provision of safe and convenient water access facilities at both high and low lake levels.

REC-10 Technological innovations and recreation trends may generate interest in types of experiences and activities not currently available at LOSRA and the surrounding region (examples from the past few decades include boardsailing, open water swims, triathlons, and mountain biking). Accommodate such innovative recreational experiences and activities as they arise if appropriate studies determine their compatibility with existing park and regional recreational, land use, and resource management goals.

REC-11 California's diverse ethnic populations may create the need for new types of recreational facilities in state parks to fit cultural preferences. For example, consider constructing more and/or larger day-use facilities that support the physical requirements of expanded family groups where there is a high demand for this kind of activity.

PLAN Water Recreation Opportunity Spectrum Study

Continue the Water Recreation Opportunity Spectrum (WROS) study, or conduct a similar study, to provide the data and analysis needed to develop policies to establish and/or preserve an optimal mix of water recreation experiences and opportunities at LOSRA ranging from higher density suburban and rural boating experiences to quieter rural and semi-primitive experiences.

TRAILS

Trails provide a significant opportunity for recreational enjoyment of Lake Oroville SRA.

Trails Goal:

Develop appropriate trails that provide regional, park, and local connections and allow visitors to access and enjoy park trail experiences. Provide trails adequate to meet the changing recreational, educational and interpretative needs of those who visit LOSRA.

Trails Guidelines

TRL-1 The Department shall coordinate with other regional land management agencies and trail advisory groups to evaluate and monitor resource conditions, survey user needs and concerns, and solicit recommendations from a broad base of trail users, local businesses, regional, state and federal government agencies with trail related interests and responsibilities.

TRL-2 LOSRA will support regional, State, and federal recreational trail objectives, as appropriate within legal and policy mandates and future trail plans.

TRL-3 Coordinate with adjacent public and private land owners in identifying potential for additional trails or critical trail connections. Consider land purchase or limited trail easements acquired from willing sellers to achieve these trail objectives.

TRL-4 Trail design, construction and maintenance standards shall adhere to the Department's specifications and guidelines contained in the CSP *Trails Handbook.*

TRL-5 Trails should be designed and constructed, where possible, to improve trail access and promote connectivity between use areas.

TRL-6 Provide trail opportunities throughout the LOSRA for visitors with varying mobility. Modify existing trails and construct proposed trails that access the variety of settings and features within LOSRA to meet the Federal Access Board Guidelines. Improve accessibility to facilities at existing staging areas serving trails that comply with the Federal Access Board Guidelines.

PLAN Comprehensive Trails Plan

Complete a comprehensive trails plan that will provide a system of trails capable of meeting the public recreational trail demands anticipated at LOSRA, consistent with the unit's classification, and that ensures cultural and natural resource protection, public safety, accessibility and other legal and policy mandates.

PUBLIC ACCESS AND CIRCULATION

LOSRA consists of dispersed recreational areas that are accessed by roads and parking facilities within and around the park.

Public Access and Circulation Goal:

Establish a pattern of circulation and access for all visitors, to include integrated and efficient multi-modal transportation, that allows for clear choices for visitor arrival, departure, and travel throughout the park, while creating a sense of entering and being in a park.

Public Access and Circulation Guidelines

ACC-1 Coordinate with Caltrans and Butte County to assure that alterations and maintenance of roadways and signage will result in easy, safe and enjoyable driving experiences for motorists, consistent with park resource management goals and guidelines.

ACC-2 Explore, with local transportation providers, the feasibility of instituting an integrated transit service that would link and provide connections between the park's key activity centers and Oroville, Paradise, and beyond (e.g. shuttle services, bus service, etc.) especially during peak season, weekends and holidays when visitation to the park will be highest. Provide facilities and design features (e.g., bus pullouts, transit shelters, etc.) to support public transportation where appropriate.

ACC-3 Explore alternatives for accommodating special event parking conditions, such as the use of unpaved overflow parking areas, satellite parking areas, and special event shuttle service.

ACC-4 Evaluate signage associated with park visitation and signs on public roads leading to the park to help create a park identity, orient visitors, identify destinations, interpret park resources, and provide appropriate warnings of potential hazards. Recommend appropriate modifications to the existing sign program.

ACC-5 Consider providing recreation facility orientation for disabled users to increase comfort level and usage by these visitors. This type of orientation could be advertised and organized through the local or regional disabled community.

INTERPRETATION AND EDUCATION

Interpretation is an educational experience that enhances a park visitor's experience and their understanding of its resources. Interpretation promotes recreational enjoyment, visitor safety, cultural and natural resource protection and appreciation, and understanding of management and maintenance practices. Interpretation can orient the visitor to where they are in the park and what is available for them to see and do. It can also educate visitors about how to help preserve the resources they came to enjoy and how to have a safe visit. At this park, interpretation can help integrate the park's widely-distributed recreation sites by emphasizing the water that connects them all geographically and thematically.

General Interpretation

General Interpretation Goal:
To increase visitor understanding, appreciation, and enjoyment of the recreational, natural, cultural, and aesthetic resources of the park and the Lake Oroville region.

General Interpretation Guidelines

INT-1 Provide a variety of interpretive programs that reach out to California's diverse population. Evaluate programs according to current departmental program evaluation standards and guidelines.

INT-2 Partner and coordinate with other agencies, jurisdictions, and organizations to provide interpretation and environmental education about the Lake Oroville area.

INT-3 Provide interpretive messages throughout the park that are informational and enjoyable while avoiding visual clutter that distracts from the visitor's experience. Rotate and maintain exhibits to keep them up-to-date and interesting.

INT-4 Interpretive facilities and programs should integrate park aesthetics and sustainable design and be consistent with the mission of California State Parks.

PLAN Interpretive Plans

The interpretive goals and guidelines in this general plan provide general interpretive direction. Future interpretive management plans will provide more specific direction to the park's interpretive programs and facilities.

Update the park's interpretive planning documents as necessary. Documents should define environmental influences and visitor expectations, and delineate the park's interpretive themes, periods, facilities, media, activities, and collections management. They should also make recommendations about interpretive concessions, cooperating associations, research needs, interpretive objects, and interpretive priorities as well as analyze the park's interpretive resources and provide a historical narrative.

Prepare interpretive plans or exhibit plans as needed to define a specific interpretive development project. The scope of an interpretive plan can include: an analysis of existing conditions; intended audiences; special concerns (such as culturally sensitive subjects, accessibility, staffing, safety and security); resources (such as collections, graphics, landscape features, and historic structures); goals and objectives; and interpretive themes and periods. The plan makes specific recommendations for interpretive components such as storyline, media, design concepts, interpretive objects, and schematic designs.

Interpretive studies or plans that could be considered include: an interpretive trails plan, an interpretive plan for the Tollhouse and Suspension Bridge area at Bidwell Canyon, an interpretive study or plan for an Environmental Living and/or Environmental Studies

Program in the park, an interpretive shelters/panels plan for the park, a Lime Saddle Campground interpretive plan, and a revision of the 1989 LOSRA Visitor Center Interpretive Plan.

Interpretive Facilities and Activities

Proposals concerning large-scale site-specific interpretive facilities (such as the Visitor Center or a new campfire center) are covered in the Management Intentions and Guidelines for LOSRA Areas section. More flexible or smaller-scaled interpretive facilities (such as interpretive panels or trails) and interpretive activities are not outlined in this general plan, as such proposals would be too detailed and restrictive for this plan's scope.

Interpretive Themes

Interpretation uses themes to connect visitors to the significant recreational, natural, and cultural resources of the park in personally meaningful ways. Themes provide a point of view for presenting information and inspiration through various interpretive media.

The unifying theme relates and integrates the park's individual themes.

Unifying Theme: Lake Oroville's rich natural, cultural, aesthetic, and recreational resources provide opportunities for visitors to enjoy this park today and for preserving these values and experiences for tomorrow.

The park's individual or supporting themes follow:

Natural Resources Theme*:* Natural cycles, varied ecosystems, and a diversity of plant and animal species contribute to the recreational and economic benefits of Lake Oroville.

Natural Resources Theme Guidelines

INT-5 Interpret the geological story of the Oroville area.

INT-6 Interpret the water cycle and how the Feather River Watershed delivers the water that brings us recreation, food, and electrical energy.

INT-7 Interpret the complexity and dynamics of the park's plant communities and species with an emphasis on sensitive communities and species.

INT-8 Interpret the life cycles and adaptations of fish and wildlife in the Oroville area. Interpret local animal species with an emphasis on rare species.

Maidu Theme*:* The Maidu and other early Native Americans have lived in the Oroville area for hundreds of years.

Maidu Theme Guidelines

INT-9 Interpret what we've learned of the early Native American lifestyle from the park's archeological sites and what visitors can do to protect these sites.

INT-10 Interpret how the Maidu people interacted with the plant and animal life, lands, and waters of the Oroville area.

INT-11 The trade items and trading network of the Maidu tell us much about their lives and relationships to the land and surrounding peoples.

INT-12 Interpret early American/Maidu contact and the effects of this contact on the native peoples. Interpret the fact that Maidu people live in the area today and maintain their cultural heritage.

INT-13 Interpret the story of the Yahi Indian, Ishi, who emerged from the mountains around Oroville as the last survivor of his group and taught 20th century Americans about the old ways of his people.

American Period Theme*:* Early settlers carved out a living from the land.

American Period Theme Guideline

INT-14 The American settlement period brought a mix of cultures, lifestyles, and great land changes to the Lake Oroville area. Interpret the American period history of the Lake Oroville area up to the present, including mining, ranching, lumbering, railroading, and road building.

Water Project Theme*:* Building the State Water Project's Oroville Dam reshaped land, water, and lives.

Water Project Theme Guidelines

INT-15 The Oroville Facilities are an important part of the California Water Project.

INT-16 The construction of Oroville Dam in the 1960s is a fascinating story of engineering and earth-moving.

INT-17 The construction of Oroville Dam created many recreation, water-management, and economic benefits while also greatly altering the area's natural, social, and cultural environments and resources.

Recreation Theme*:* Having fun and being safe at Lake Oroville is up to everyone.

Recreation Theme Guideline

INT-18 Recreational tips will help visitors enjoy a safe and memorable time at Lake Oroville State Recreation Area while helping others enjoy their visit and avoid harming the park's many valuable resources.

Environmental and Cultural Stewardship Theme - Preserving our Heritage*:* Lake Oroville's rich cultural history and natural values deserve our care and concern.

Environmental and Cultural Stewardship Theme Guidelines

INT-19 Show how people today and in the past have cared for this land, its waters, lifeforms, and cultural values. Include stories such as the Maidu's reverence for the land and current efforts to preserve the natural, recreation, aesthetic, and cultural values of the Lake Oroville area.

INT-20 Interpret how different cultural views, land uses, and changing technology created varied lifestyles and impacts. Examples of groups with differing approaches include: the Maidu, early miners, pioneers, ranchers, railroad developers, loggers, dam engineers, and tourists/recreationists.

INT-21 Promote an understanding of why it is important to protect cultural values and sensitive plant and animal populations and to control invasive non-native plants and animals.

INT-22 Interpret the role and dangers of wildfire in the area, including: wildfire/urban interface concerns, fire management used by the Maidu, and modern fire management techniques and issues.

Interpretive Collections

Interpretive collections are key both for understanding a park's cultural and natural histories and for interpreting that information to the public. Collection guidelines outline the types, acquisition, maintenance, qualities, and quantities of objects in the interpretive collection.

Interpretive Collections Goal:
Collect and conserve objects that reflect and help interpret the cultural, natural, and recreational values of the park.

Interpretive Collections Guidelines

INT-23 The park's interpretive collection objects should relate closely to the park's themes, values, history, resources, and visitor experience.

INT-24 Archeological and paleontological materials, natural history specimens, and historic objects associated with the park are all potential interpretive collection items for LOSRA. Items may be collected for formal display or for "hands-on" interpretation/demonstration. Replicated cultural items are appropriate interpretive collection objects.

INT-25 Appropriate and relevant objects may be acquired and maintained: 1) to preserve original elements of the cultural and natural environment; 2) to preserve documentation of people, events, and cultural or natural features that are central to the park's purpose, and 3) to support the interpretation of themes that are put forth in this plan or in an interpretive prospectus or plan.

INT-26 If further museum collection needs are identified during future interpretive planning, the existing Scope of Collections Statement, dated April, 1999, shall be consulted.

INT-27 Collections acquired for or maintained at the park will be managed in accordance with the policies and procedures outlined in Chapter 20: Museum Collections Management of the Department's Operations Manual.

CONCESSIONS

In several LOSRA locations, there are private concessionaires supplying recreational opportunities and services that the Department cannot provide.

Concessions Goal:
When California State Parks is not able to provide a variety of appropriate recreational opportunities or services at the park, private concessionaires can be utilized to provide these opportunities or services (PRC 5080.03).

Concessions Guideline

CON-1 After establishing that a concession proposal is compatible with the park's General Plan and Concessions Plan, CSP should evaluate the suitability of the proposed use, the anticipated or known demand for that opportunity or service, potential safety issues, and whether the proposed revenue production is likely to be adequate for the concession to be successful.

PLAN Concessions Plan
Investigate potential concession opportunities for the park, including alternative camping opportunities such as yurts and tent cabins, while keeping in mind the park's aesthetic values and the recreation and resources goals and guidelines outlined in this General Plan.

VISITOR SAFETY

There are several areas of potential concern regarding visitor safety at LOSRA. Included are operations of DWR Water Project facilities and CSP-managed areas; and natural hazards such as floating driftwood, erosion-prone soils and landslides, earthquakes, and potential naturally-occurring asbestos in certain areas of LOSRA.

Hazards and Safety Goal:
Provide for public safety in LOSRA by evaluating the risks and potential for hazardous situations in the park and implementing management actions to minimize or prevent hazards from harming people, structures or resources.

Hazards and Safety Guidelines

SAF-1 Implement specific management actions to address public safety issues regarding use of the lake and its recreation facilities. Educate visitors about how to keep safe while recreating in the park and about potential safety issues with DWR Water Project and CSP operations.

SAF-2 Encourage DWR to continue with an aggressive driftwood collection and disposal program. Use interpretive media to educate visitors about driftwood hazards and how to avoid danger, and about where and how driftwood can be collected and disposed of.

SAF-3 Erodable soils, existing landslides, naturally-occurring asbestos, and earthquakes are potential geologic hazards in the park. The siting and design of permanent structures and major development projects should involve professional geological evaluations, site investigations, and soil and slope stability testing to avoid placing park facilities in areas containing these potential hazards.

WILDFIRE SAFETY AND MANAGEMENT

Wildfire can cause the loss of human life and property and subsequent fire suppression tactics can have long-lasting environmental impacts. Portions of the park are located within a wildland-urban interface where the risk of wildfire is high.

Wildfire Safety Goal:
Protect people, property, and sensitive park resources from wildfire.

Wildfire Safety Guidelines

FIR-1 Accomplish wildfire suppression activities in accordance with a MOU between the Department and the California Department of Forestry and Fire Protection (CDF).

FIR-2 Work with the Department of Water Resources and other appropriate agencies to accomplish wildland fuel modification measures and policies.

PLAN Fire Management Plan

In cooperation with the California Department of Fire Protection, ensure that the LOSRA Wildfire Management Plan is kept up to date and addresses all aspects of wildfire planning, including prevention, pre-suppression, and suppression and specifying emergency actions for the protection of public safety, park structures, and adjacent landowner structures. Examples of appropriate fire strategies to be discussed in the plan include the creation of defensible space around structures, wildfire education programs, recreation area evacuation procedures, and park fire regulations. It should identify fire suppression methods and ways to protect sensitive park resources. This plan will also address Prescribed Fire Management Programs designed to achieve ecosystem and cultural landscape management goals.

NATURAL RESOURCES

Watershed Management and Water Quality

Watershed and Water Quality Goal:
Promote healthy watershed processes and high quality waters in the LOSRA and the Lake Oroville watershed in cooperation with other state and federal agencies and the local community. Increase the understanding of water quality problems in the watershed including the impacts of erosion, septic systems, and recreational use on the water quality of Lake Oroville and the Feather River and its tributaries.

Watershed and Water Quality Guidelines

WAT-1 Consider potential impacts related to the geology, soils, and watershed within Oroville SRA when planning new buildings, campsites, new septic systems, roads, or trails. Site-specific investigations should be conducted in any areas where new development is planned. The investigations may include existing literature research, reconnaissance geologic mapping, aerial photo surveys, and geotechnical investigations.

WAT-2 Identify potential naturally-occurring impacts to water quality in LOSRA, such as landslides, debris flows, and stream channel and lake bank erosion. Determine if these natural processes have been aggravated or accelerated by human activities and, if so, devise enhancement measures. Recognizing that flooding and bank erosion are natural ecological processes, limit erosion improvement measures to addressing human-accelerated erosion and sedimentation.

WAT-3 As appropriate, rehabilitate stream and upland areas to restore natural drainage patterns and geomorphic stability. Enhancement activities might include road and trail rehabilitation or removal, eliminating manmade channel restrictions, stream modifications, debris management, or re-vegetation. Installation or maintenance of channelized streams and hardened stream banks should be minimized or eliminated except where necessary to protect existing critical infrastructure. Where it is necessary to stabilize a channel in place, bio-engineering methods should be utilized to the greatest extent possible.

WAT-4 Identify and manage manmade erosion occurring from roads, trails, and lake banks on park lands. Where feasible, use best management practices from local Resource Conservation Districts, the Natural Resources Conservation Service, and State Parks when removing or regrading existing roads and trails. Minimize locating new facilities in areas where landsliding or bank erosion is occurring or could occur.

WAT-5 Reduce concentrated surface water runoff and sediment transport, keep disruption of soils to a minimum, reduce impervious surfaces, and use proper techniques for water removal from trails and roads. Implement best management practices to prevent soil erosion during and after construction.

WAT-6 Ensure that new park projects do not degrade surface and groundwater quality. Refer to the current edition of the Central Valley Regional Water Quality Control Board's Basin Plan for the water quality standards and the surface water quality objectives for the Feather River and its tributaries.

WAT-7 Cooperate with federal, state, county, and local agencies to protect the water quality of Lake Oroville and the Feather River and to reduce sediment and nutrient delivery and other non-point sources of pollution into the lake. Participate, where feasible, in the collection of water quality data from state park lands. Work with academic and other researchers to increase the scientific knowledge that could benefit park watershed management. Facilitate information sharing with the Department of Water Resources as part of their studies on the geomorphic effects of Lake Oroville.

WAT-8 Where possible, naturally-occurring materials (boulders, cobbles, logs, driftwood) should be used for restoration or construction of fish habitat. Manmade or modified materials that may adversely affect water quality (i.e., old tires, creosote-treated timbers) should not be used. (See also AES-8.)

PLAN Watershed Management Plan

Develop a Watershed Management Plan, using State Parks Resource Inventory and Condition Assessment data and Department of Water Resources studies for the park, to define current conditions, identify data gaps, and to determine where improvement measures are needed. Elements of this plan may include, but not be limited to:1) Inventory and prioritize sediment sources, analyze the sediment transport functions in the stream systems with respect to their impact on instream habitat and on sediment delivery to Lake Oroville. Assess the impacts of park roads and facilities on water quality. 2) Determine if additional fluvial geomorphic analysis is needed for the Feather River and its tributaries (and if so, at what level). This analysis would provide a scientific basis for selection, design, implementation and monitoring of future fisheries habitat enhancement and sediment reduction projects. 3) Assess the impacts to ecology, the watershed, and water quality from recreation and other park activities.

VEGETATION MANAGEMENT

Plant Communities

Preservation and perpetuation of representative examples of natural vegetation complexes are statewide goals for the department. In addition, a central goal of natural area management in the State Park System is to restore, protect, and maintain native ecosystems and indigenous flora and fauna.

Past management practices, including logging, ranching activities, grazing, fire suppression and agricultural development have changed the ecological conditions under which native vegetation has flourished within LOSRA. These changes have created shifts in species composition and changes in the structure of vegetation complexes. Concurrently, wildlife values have declined in some locations. Natural vegetation complexes are essential habitat for both rare and locally important wildlife species, such as the bald eagle.

Several of the native plant series/associations in the park, such as valley oak riparian forest and valley oak woodland, are classified as rare by the California Department of Fish and Game Natural Diversity Database.

Plant Communities Goal:
Protect, perpetuate, and restore the native vegetation complexes of LOSRA through active resource management programs.

Plant Communities Guidelines

VEG-1 Re-establish the natural ecological processes essential for the development of native vegetation complexes, expansion of these complexes, and the removal or reduction of non-native plant species. These objectives will be met through the preparation of comprehensive management plans utilizing sound ecological principles and professionally accepted methods.

VEG-2 All seedlings and saplings used in habitat restoration projects will originate from seed collected from native plant species within park boundaries or from nearby areas with equivalent ecological conditions.

VEG-3 Control and/or eradicate non-native species to prevent the establishment and spread of these species with priority given to those species most invasive and conspicuous in the park.

VEG-4 Continue to work with DWR to administer the grazing lease on north shore of the Diversion Pool to avoid negative impacts to recreation and resource values.

Special Status Plant Species

Special status plants are those listed annually on the California Department of Fish and Game's Special Plant List. Species listed by the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the California Native Plant Society (CNPS) as rare, threatened, or endangered are a subset of the Special Plant List. Species that are proposed for listing by the federal government and state candidates for listing are legally protected as if they were listed, and species listed by CNPS on their lists 1A and 1B meet the criteria for listing and are protected as such. Other species locally sensitive and important to the management of park units are also considered special by the department.

There are 15 special status plant species reported to occur within the boundaries of LOSRA. Another six species are known to occur on lands adjacent to or near the park. Suitable habitat for these six species is found in the park.

Special Status Plant Species Goal:
Protect special (rare, threatened, endangered, or endemic) plants within the park and manage for their perpetuation in accordance with applicable state and federal laws and regulations.

Special Status Plant Species Guideline

Protect all special plant species to the degree necessary to maintain or increase populations.

Prescribed Fires

Wildfires can be a threat to human life and property and can also severely damage State Park System resources. The prescribed use of fire can simulate a more natural fire regime and reduce the risk of catastrophic fires. In addition, controlled fires provide the added benefit of enhancing conditions for the restoration of native plant communities.

Prescribed Fire Goal:
Restore the ecological role of fire in the natural ecological processes of Lake Oroville State Recreation Area, to the degree this is practical.

Prescribed Fire Guideline

When appropriate, employ prescribed fire to achieve ecosystem and cultural landscape management goals that are defined in a park-wide Prescribed Fire Management Program. This program will be periodically upgraded to reflect the ongoing accomplishments and necessary refinements, changes in prescribed fire science and technology, and state and federal regulations. A primary component of the

Prescribed Fire Management Program will be coordination of program activities with relevant agencies, including the Department of Water Resources and California Department of Forestry and Fire Protection.

WILDLIFE MANAGEMENT

General Wildlife Management

Healthy native wildlife populations can best be maintained by encouraging partnerships with adjacent landowners, maintaining and creating biocorridors, and participating in regional wildlife management efforts. Scientific research conducted in the park by other agencies and groups, including monitoring wildlife populations, is important to tracking the distribution and condition of wildlife habitats and populations. Wildlife also provides both consumptive and non-consumptive recreation opportunities.

General Wildlife Management Goal:
Protect and maintain native wildlife populations and their habitats at LOSRA, in order to preserve regional biodiversity and provide a more enjoyable outdoor experience for park visitors.

General Wildlife Management Guidelines

WIL-1 Protect all sensitive native wildlife species and their habitats including all taxa that are locally important (e.g. endemic species) as well as those protected by federal and/or state law. A comprehensive list of species requiring special management attention should be maintained and regularly updated.

WIL-2 Rehabilitate and enhance wildlife habitat using sound ecological principles and professionally accepted methods. For example, work with DWR to enhance bass habitat where possible and replace tires used as artificial fish habitat with more aesthetic and natural alternatives.

WIL-3 Consider reintroduction of extirpated species only if historical documentation exists to confirm the presence of the species of interest within the area at some time in the past and if suitable habitat exists within the park and region to support its survival. Reintroduction of a species will be conducted in coordination with DWR and will not negatively affect populations of other native species. Individual animals to be re-introduced will come from local populations or the closest, most genetically similar populations.

WIL-4 Reduce and, where possible, eliminate wildlife access to human food and garbage by using wildlife-proof trash containers and dumpsters throughout the park,

and educating the public about the detrimental effects that wildlife access to human food can have on the ecological balance of the park and surrounding regions.

Sensitive Wildlife Management

Sensitive Wildlife Management Goal:
Protect special (California Species of Special Concern, Threatened, Endangered, or species of local or regional importance) animals within Lake Oroville State Recreation Area and manage for their perpetuation in accordance with the Department Operations Manual and local, state, and federal law.

Sensitive Wildlife Guidelines

Avoid impacts and disturbance to highly valued wildlife habitat, such as vernal pools, ponds, and riparian habitat. Riparian understory should be retained and managed as a dense and multi-structured vegetative layer.

Park maintenance activities such as roadwork, trail building, and facility repair and maintenance, should be avoided or minimized during the breeding or active seasons for sensitive species in their occupied habitats. These include, but are not limited to the bald eagle (January 1 – August 15), peregrine falcon (February 1 – August 15), bank swallow (May 1 – July 31) and giant garter snake (March – October).

Exclude human activity from “primary zones” around bald eagle nests during breeding season periods. However, human activity need not be excluded from primary zones that are not actively used by bald eagles during any particular year.

Monitoring of bald eagles and other sensitive species is required to identify population trends of these important species.

Monitor potential bank swallow habitat for occupancy. If bank swallows are detected in the park, design bank protection and flood control projects to minimize impacts to active colonies.

Factor the needs of sensitive aquatic species into the timing and implementation of any work that results in streambed alteration or disturbance to ponds, wetlands, or riparian habitat, in order to avoid adverse impacts to these species. Protect giant garter snake and California red-legged frog (CRLF) habitat at the Forebay and if projects occur near potential CRLF habitat around Lake Oroville, the sites shall be surveyed for CRLF.

WIL-11 Identify and protect vernal pools that may contain sensitive vernal pool species, as well as associated upland habitats in the park.

WIL-12 Protect elderberry plants where possible to support valley elderberry longhorn beetle populations.

WIL-13 Inspect buildings for sensitive species, particularly for bat populations, and establish protection measures for any species identified prior to major maintenance, construction, or structure demolition.

Habitat Linkages (Biocorridors)

Biocorridors are lands held and managed primarily for the purposes of linking larger habitat areas. When so linked, these lands form a continuous vegetative cover facilitating the movement of animals and the dispersal of plants. Protecting linkages within the park, as well as between the park and other wildland areas, is important to maintaining ecosystem health and supporting regional conservation.

Habitat Linkages Goal:
Maintain, enhance, and where possible restore the movement of native species through the park and surrounding region in order to protect species abundance and diversity.

Habitat Linkages Guidelines

WIL-14 Work with DWR and other agencies to focus efforts to preserve effective biocorridors between core habitat areas in LOSRA and other protected lands to increase species abundance and diversity within the region.

WIL-15 Maintain working relationships with other landowners and jurisdictions in the Oroville region to coordinate efforts to identify and preserve habitat linkages.

Non-native Animal Species Control

Throughout California, habitat destruction and invasion of non-native species are the two largest threats to the survival of many endangered species. Native wildlife populations in the region around Lake Oroville have also been affected by non-native animals, which can prey upon and out-compete native species.

Non-native Animal Control Goal:
Control, and where possible, reduce or eliminate populations of non-native wildlife that are impacting natural habitats and native wildlife populations.

Non-native Animal Control Guideline

WIL-17 When it is necessary to regulate animal populations, use methods based on sound principles of ecosystem management and that are consistent with Department Resource Management Directives.

PLAN Wildlife Management Studies and Surveys

Management and protection of sensitive species is dependent upon adequate maps, ongoing inventory and monitoring programs, and maintenance of an up-to-date database regarding species presence within, movement through, and uses of the park. Wildlife management and studies should focus on monitoring wildlife population trends in Lake Oroville SRA and surrounding open spaces, monitoring the health and function of the park's wildlife habitats and biocorridors, and inventorying and monitoring sensitive species such as listed vernal pool species. Work with resource agencies such as DFG and DWR, as well as surrounding landowners, to conduct studies on the distribution and condition of wildlife habitats and both native and non-native wildlife populations. Develop a non-native wildlife management plan identifying impacts to native wildlife and potential management actions to restrict and/or reduce populations of species such as the bullfrog and the brown-headed cowbird.

CULTURAL RESOURCES

Cultural resources at LOSRA consist of important and potentially important prehistoric and ethnographic sites, historic and ethnohistoric resources, traditional cultural properties, and cultural landscapes. These known cultural resources define the flow of history of the cultural landscape. Protecting and interpreting cultural resources provide information that will help current and future generations understand and protect the cultural heritage of the Lake Oroville area.

Cultural Resources Goal:

Provide an appropriate level of protection, stabilization, preservation, interpretation, and community involvement concerning the park's cultural resources, focusing on areas of important cultural significance.

Cultural Resources Guidelines

CUL-1 Work with the Department of Water Resources to protect resources through implementation of the Historic Properties Management Plan (the HPMP was developed as part of the FERC relicensing process).

CUL-2 Continue and expand the Site Steward Program.

CUL-3 Continue and expand public education programs oriented towards cultural resource conservation.

CUL-4 Consult with cultural resources specialists prior to undertaking construction, development, or rehabilitation projects in developed or undeveloped areas. All such program undertakings will comply with the Secretary of Interior's Standards for the Treatment of Historic Properties or as specified within the HPMP.

CUL-5 Work with DWR to protect important cultural resources as much as possible from adverse effects resulting from park visitor use, development of facilities, resource management programs, fluctuation of lake levels, and natural processes, such as erosion. Protect important cultural resources from adverse effects resulting from excessive fuel loads and resultant wildfires.

PARK AESTHETICS

At Lake Oroville State Recreation Area, largely a human-altered environment, a visitor's positive sensory impressions of park facilities and environments can make a substantial difference in that visitor's park experience.

Aesthetics Goal:
Encourage satisfying aesthetic experiences for park visitors.

Aesthetics Guidelines

AES-1 The park's overall aesthetic qualities, both positive and negative, should be clearly identified, including sights, sounds, smells, and impressions of the character of recreational experiences available at the park. Work with DWR and with other landowners both inside and surrounding the park, when appropriate, to identify and establish positive aesthetic standards for the park and within common viewsheds. At the time of park facility and program development, a project site's aesthetic qualities should be defined. Development of facilities and park resources, interpretive and maintenance programs should evaluate and consider incorporating identified positive aesthetic elements and standards into the project to improve visitor experiences at the park.

AES-2 Aesthetic values should be considered when making daily management, maintenance, and site and structure modification decisions, especially concerning park restrooms. Existing park elements with negative aesthetic values should be modified to reflect the identified positive aesthetic qualities of the park.

AES-3 Apply the concept of "positive first impressions." For elements that will exist together in a specific area in the park (such as signs or other structures), consolidate, simplify, and present these in a visually clear and uncluttered way.

AES-4 Buildings and structures should be integrated into existing landforms; preserve and showcase views; use muted colors that reflect natural surroundings; and take advantage of (or screen) ephemeral conditions (weather, wind, hot sunlight, etc.) to help create positive visitor and park staff experiences. Promote a dark night sky by limiting light sources at night and directing night lighting down, not up, as much as possible.

AES-5 Screen parking lots, dump sites, roads, water project facilities and park operations structures from public recreational use areas where possible. Road alignments through the park should hug natural terrain contours and give visitors a positive aesthetic experience while traveling through the park.

AES-6 Preserve the values of silence and natural sounds where appropriate, especially at night. Locate noise-producing service and maintenance functions and roadways away from public recreational areas, if possible.

AES-7 Consider creating positive odor experiences such as a native plant interpretive trail that allows close access for touching and smelling plants, which can create positive park memories.

AES-8 Artificial fish habitats constructed in areas that become exposed due to drawdown of the reservoir should be made of or look like natural elements.

AES-9 Maintain consistency with other agencies' guidelines for aesthetics in the Lake Oroville area as appropriate, such as those of the Butte County General Plan and the aesthetic recommendations of the US Forest Service for their lands surrounding LOSRA.

SUSTAINABLE DESIGN, CONSTRUCTION, AND MAINTENANCE

A sustainable facility or program creates low levels of negative impacts to natural or cultural resources, can be maintained with materials that are non-toxic to people or the environment, and contains materials that are recyclable. Sustainable projects and programs can contribute to the department's mission to preserve important resources, create a healthier environment with more positive park visitor experiences, and help

create less intensive, more self-sustaining programs to maintain and enhance park facilities.

Sustainable Design Goal:
Use sustainable design in the siting, construction, and maintenance of all park facilities, where possible, and in natural and cultural resources and interpretive programs.

Sustainable Design Guidelines

SUS-1 Where feasible, use natural, renewable, indigenous, and recyclable materials, and simple-to-maintain and energy-efficient design. Encourage and support recycling in the park.

SUS-2 Use the sun for an energy source where appropriate, especially in areas remote from existing utilities such as boat-in campsites.

SUS-3 Consider constructing buildings partially below grade to limit viewshed impacts and to take advantage of the natural insulating properties of soil, reducing long-term energy costs.

SUS-4 Use cost/benefit analysis over time to help justify the use of more costly sustainable construction materials and/or design.

SUS-5 Consider using non-toxic materials in park maintenance and resource management programs.

PARK OPERATIONS

Effective and efficient park operations is essential to the Department's mission at LOSRA.

Park Operational and Staff Housing Goal:
Provide needed and appropriate services and facilities for park security, resource protection, visitor access and services, public health and safety, park administration, maintenance, and staff housing in the most efficient, effective, and environmentally-sensitive way.

Park Operational and Staff Housing Guidelines

OPS-1 Consistent with the District staff housing study and proposals of this General Plan, provide for staff housing needs in areas that require staff security.

OPS-2 Locate maintenance facilities where they can most efficiently serve park maintenance needs, where these sites can be visually screened, and where they do not harm significant natural or cultural values, disturb visitor experience, or displace important public recreational uses.

OPS-3 Establish park operational boat berthing capacity at high and low reservoir pool levels.

COMMUNITY AND INTER-AGENCY RELATIONS

Community Relations

Community Relations Goal:
Maintain and enhance positive relations and communications between State Parks and neighboring communities and landowners towards meeting common goals, including security, safety, aesthetic and resource protection, and recreational opportunity.

Community Relations Guideline

COM-1 Encourage and support park staff in coordinating with local communities and to respond positively to statewide and local concerns about the park.

Regional Planning

Regional Planning Goal:
Enhance interagency coordination concerning the regional planning and management of ecological, biological, recreational, cultural, aesthetic, and educational resources to implement a more efficient, effective, cooperative, and holistic resource and recreation vision.

Regional Planning Guidelines

COM-2 Continue Department participation in regional planning forums to coordinate recreation and land use issues. Provide guidance in regional resource and recreation planning, development, and management issues such as trail connections, water access, scenic corridors, camping, land acquisition, water quality, wildfire and prescribed burning issues, non-native plants and animals, biocorridors and traffic issues.

COM-3 Maintain and enhance positive relations and communications between State Parks and local governmental agencies.

ACQUISITION AND JURISDICTION

At Lake Oroville State Recreation Area, the State of California owns the land managed by California State Parks. The public acquisition of additional land potentially available from willing sellers in the region and new jurisdictional management arrangements could add new recreational opportunities, improve the efficiency of park operations, better protect natural and cultural resources, and provide open-space buffers.

Land Acquisition and Jurisdiction Goal:
Increase recreational and resource management opportunities, preserve positive aesthetic values, provide open-space buffers for natural and cultural resources, and increase operational efficiencies within the park through a land acquisition program.

Land Acquisition and Jurisdiction Guidelines

ACQ-1 The Department should encourage the public acquisition of properties that become available from willing sellers in the Pacific Gas & Electric Company's land holdings adjacent to the Diversion Pool and Lime Saddle Marina. With willing sellers, the Campbell Hills area is also an appropriate potential acquisition that would help preserve natural views on the north side of the North Forebay.

ACQ-2 Coordinate with regional public and private recreation and natural and cultural resource management providers to encourage acquisition of in-holdings or that promote connectivity between various agencies' properties. This approach to land acquisition will strengthen the management and development goals of each agency and provide the public with enhanced recreational and resource protection programs in the region. An example of this type of potential acquisition would be the transfer to the state of surplus Bureau of Land Management properties scattered around Lake Oroville.

ACQ-3 If the DFG transfers its responsibilities for the North Table Mountain area to CSP, CSP shall evaluate the management plan for the 3342 acre site and either endorse the DFG draft management or modify it as necessary to carry out the objectives of the LOSRA General Plan. If DFG retains its management role, the recreation uses of the area should be coordinated with those of the LOSRA lands and the goals and guidelines of the LOSRA General Plan, including consideration of access, potential interconnectivity of trails, and day-use recreation activities.

RECREATION CARRYING CAPACITY

The primary purpose of this Recreation Carrying Capacity section is to analyze the effects of general plan proposals on existing recreation carrying capacity at the Lake Oroville State Recreation Area (LOSRA) in order to determine appropriate levels of visitor use, management options, and the quantity and type of facility development prior to implementation. This analysis focuses on the capacity of developed recreation facilities in the LOSRA because they receive the greatest amount of visitation and are subject to increased visitor impacts (e.g., crowding issues, ecological degradation, visitor displacement, etc.).

Recreation carrying capacity has been defined in a number of ways, but a useful definition is the "level of use beyond which impacts exceed standards" (Shelby and Heberlein 1986). The concept of recreation carrying capacity was originally developed out of biological models that attempted to determine the capability of a given environment (e.g., range, pasture) to sustain a specific number of animals over time. As such, undue attention has been placed on developing a specific number of visitors that represents the ideal carrying capacity of a recreation facility. In actuality, many management issues regarding carrying capacity decision-making are not necessarily density dependent; rather, these issues also relate to the ecological, social, and managerial aspects of recreational opportunities (McCool 1996). Visitor use should be evaluated in relationship to its potential effect on natural, cultural, aesthetic, and recreation resources, as well as overall visitor experience.

Capacities expressed in absolute numbers of users or vehicles are not the primary focus of this analysis. While quantitative data collection is a vital component of the capacity decision-making process, of equal importance is qualitative professional judgment (e.g., prior experience, management context and priorities, public values, judicial rulings, park legislation, tradition, history, etc.). As such, capacities discussed in this report are generally expressed in qualitative terms, such as "below", "approaching", "at", or "exceeding capacity."

The California Department of Water Resources (DWR) commissioned multiple studies as part of the relicensing process for the preparation of a license application to be submitted to the Federal Energy Regulatory Commission (FERC) for the Oroville Facilities (FERC Project No. 2100). As part of this process, two studies, Relicensing Study R-8 – *Recreation Carrying Capacity* and Relicensing Study R-7– *Reservoir Boating* were developed to assess and evaluate recreation resources associated with the Lake Oroville State Recreation Area. These studies assessed what level of public recreational use is sustainable and compatible within the overall capacity of the LOSRA for the next 30-40 years. Information gathering for these studies was conducted during 2002-2003. These studies, along with Relicensing Study R-11 *Recreation and Public Use Impact Assessment,* provided the baseline recreation carrying capacity information utilized in this section of the General Plan.

Although the following Recreation Carrying Capacity analysis utilizes information obtained from the three studies, it was not the Department's intent to reproduce all information contained in the studies by DWR. A complete set of Relicensing Studies is

available from the Department of Water Resources and at the California State Parks Northern Buttes District Office.

CARRYING CAPACITY STUDIES

DWR METHODOLOGY

Four types of carrying capacities were delineated as part of Relicensing Study R-8 – *Recreation Carrying Capacity and* Relicensing Study R-7– *Reservoir Boating:*

Ecological Capacity – Concerned with the impacts of recreation on the ecosystem, such as the percent of impacted ground cover and the amount of observed soil compaction and soil erosion;
Spatial Capacity – Concerned with the impact of available space on recreation, such as number of visitors in a given area, or the availability of adjacent areas for site expansion;
Facility Capacity – Concerned with facility impacts, such as number of people, groups, or vehicles per boat ramp, restroom, parking lot or campground, percent occupancy for various facilities, waiting time to use facilities, and the number of campground refusals; and
Social Capacity – Concerned with visitors' perceptions of surrounding recreational use. Considers factors such as perceived crowding, number of encounters with groups of a particular size or type, and other conflicts.

Identify primary limiting factors
Each of these four capacity types or indicators were investigated for each developed recreation facility and facility type (e.g., campground, day-use area, boat ramp, etc.), as well as the LOSRA as a whole. Quantitative and qualitative data were used to identify ecological, spatial, facility, and social capacity impacts and management parameters at each facility. One or more capacity types were identified as the primary limiting factor(s) at each recreation site based on the level of concern for known or perceived impacts. A limiting factor is defined as an indicator that constrains the level of recreational use (capacity) at a site or area. This factor often drives future decision-making and is often the "trigger" that determines when recreation use has reached a specific level (below, approaching, at, or exceeding) of capacity.

Determine overall capacity
After evaluating the capacity level for each indicator type (ecological, spatial, facility, and social capacities), an overall capacity conclusion was determined for each recreation facility and for the LOSRA as a whole. In order to make this determination, the four capacity types were considered. No attempt was made to prioritize one capacity type over another; rather, all capacity types were considered equally. Field observations, professional judgment, available recreation use data, and input from site managers and agency personnel was also reviewed. Generally, if at least one capacity type was characterized as being at or exceeding capacity, then the facility was considered to be at least approaching its overall capacity.

Provide capacity priority

Using the overall capacity level as an indicator, each developed recreation facility and the LOSRA as a whole was categorized according to the overall capacity priorities. The overall capacity priority level of a developed recreation facility is provided to guide future management decisions. When determining the overall LOSRA capacity priority level, consideration was given not only to the capacity of developed recreation facilities, but also to dispersed recreation use sites, potential areas of development (or lack thereof), population and recreation activity trends in the region, input from site managers and agency personnel, and professional judgment (see *Table 22* below).

Table 22. Overall Capacity Priority Levels for Developed Recreation Facilities at Lake Oroville Facilities.	
Overall Capacity Level	**Overall Capacity Priority**
Below	Low
Approaching	Moderate
At or Exceeding	High

CSP METHODOLOGY

CSP's methodology used for this General Plan corresponds with the DWR studies and methodologies. Overall priorities, capacity levels, and a description of limiting factors were extracted from the DWR relicensing studies. Collectively this information was used as the baseline conditions for this analysis. Only facility locations where General Plan proposals had the potential to affect carrying capacity, were used for this analysis (refer to *Table 23: LOSRA Recreation Carrying Capacity Analysis*).

General Plan guidelines were derived from an inventory and analysis of existing conditions, needs and desires; identification of issues and concerns; and an overall review of recreation area opportunities as previously described in the General Plan. This analysis compares how these general proposals (guidelines) would affect the baseline carrying capacity information as determined by Relicensing Study R-8 – *Recreation Carrying Capacity* and Relicensing Study R-7– *Reservoir Boating.*

Carrying capacity information pertaining to each facility location was researched using the relicensing studies. This information was then used to analyze the potential carrying capacity effects a General Plan proposal could have on a particular facility. Generally, if the existing carrying capacity was determined to be "below" or "approaching" capacity and it was anticipated that the associated limiting factors were not adversely affected by a facility proposal, then implementation of the plan proposal was expected to retain a level of "below" or "approaching" capacity. These facilities were elevated to a level of "approaching or "at" capacity when implementation was expected to elevate either ecological, spatial, facility or social capacity levels and thus affect the overall capacity of the site.

If the existing carrying capacity was determined to be "at" capacity, but studies suggest that site redesign and limited expansion could likely be accommodated, then

implementation of the proposal was expected to retain a level of "at" capacity. If the general plan guidelines helped to address limiting factor issues without threatening ecological, spatial, or social limiting factors, then implementation of the proposal was expected to at least retain a level of "at" capacity. Plan proposals that would elevate a facility from "at" capacity to "exceeding" capacity were identified and removed from the plan and further analysis.

DWR STUDY FINDINGS

The results of the Department of Water Resources Relicensing Study R-8 – *Recreation Carrying Capacity* and Relicensing Study R-7– *Reservoir Boating* conclude that: ***Overall, existing recreational use in the LOSRA is considered to be "approaching" capacity.*** The primary limiting factors to recreational use in the LOSRA include spatial and facility capacities. Spatial capacity is considered a limiting factor because of limited suitable areas for expansion at many of the existing developed recreation sites, as well as the high percentage of the LOSRA lands classified as "low" in terms of potential recreation development suitability. Facility capacity is a limiting factor due to the inability of the LOSRA facilities to accommodate large percentages of visitors during high use times, as well as the inability to utilize recreation area facilities during low pool elevations, among other concerns.

Capacity findings for individual recreation areas and for site and facility types overall were found to be predominately approaching or below capacity and therefore ***Capacity-related decisions regarding recreation in the LOSRA should be regarded as a moderate priority at this time.*** The fact that both spatial and facility capacities are considered limiting factors is important for future capacity-related decision-making, as excess spatial capacity is necessary to expand the facility capacity of a developed recreation site. In the event that facility capacity must be expanded in the future, but potential spatial capacity is not available for expansion, other capacity-related management options such as directing visitors to alternative facilities will need to be considered.

Overall, existing recreation use on non-motorized trails in the LOSRA is considered to be "below" capacity. Currently, all of the capacity indicators appear to be "below" capacity and none are anticipated to be limiting factors in the future. Future comprehensive trail analysis may further refine this conclusion. Considering the capacity types, capacity-related decisions for trails in the study area should be regarded as a "low priority" at this time. However, trail-related capacity should be further explored in future trail studies.

Due to the diversity of boating use, the wide range of boating conditions at various locations and time of year, and the complexity of physical, facility, social and ecological factors, no attempt was made to calculate a maximum boating use limit (boats at one time) for Lake Oroville or the downstream reservoirs. Rather, this study determined whether current use levels and character of use appear to be approaching or exceeding acceptable levels based on physical/spatial, facility, social, and ecological criteria.

In general, boating capacity does not appear to be a significant issue on the reservoirs. The highest use sections of Lake Oroville may be "approaching" social and spatial capacity during peak use times, but this appears largely to be a function of preferred shoreline mooring locations filling up rather than conflicts with active boat traffic. Facility capacity limits may be limiting use of the two northernmost arms of the lake, where only one major launch ramp (Lime Saddle Boat Ramp) exists. However, those areas are relatively narrow and have less surface areas than other zones, so lower use levels are generally appropriate.

CSP STUDY FINDINGS

Table 23 compares the anticipated carrying capacity effects of General Plan proposals with the existing recreation carrying capacity conditions at the LOSRA. Comparisons are provided for each facility location where general plan proposals could potentially affect the recreation carrying capacity of that facility. The purpose of this comparison is to assess whether implementation of facility and management proposals would likely exceed the carrying capacities of existing facilities. In general, facility related plan proposals are only recommended for existing facility locations, therefore no analysis was made for locations not previously surveyed by Relicensing Study R-8 – *Recreation Carrying Capacity and* Relicensing Study R-7– *Reservoir Boating.*

Carrying Capacity Survey Conclusion

Ten of the twenty-one developed recreation sites analyzed as part of this study showed an increase in capacity level (e.g. from "approaching capacity" to "at capacity"). ***Following the implementation of all General Plan proposals overall recreation use in the LOSRA is anticipated to move from "approaching capacity" to be "at" capacity level.*** It is also anticipated that the primary limiting factors to recreational use will continue to be spatial and facility capacity types.

CARRYING CAPACITY MANAGEMENT

In the preparation of detailed management plans and consideration of facility implementation, CSP should evaluate the four capacity indicators on a site-specific level and determine standards and indicators for condition monitoring and in establishing recreation carrying capacity limits, as appropriate.

The priorities for future management decisions, indicated in *Tables 22 and 23*, can be used as a basis for determining which sites should be considered for capacity-related management actions and further investigation. High priority would indicate to managers that there is a high probability that a particular facility is close to exceeding its capacity and a high level of caution, study and monitoring should be used when making a management decision for that location. The Relicensing Study R-14 – *Assessment of Regional Recreation and Barriers to Recreation*, as well as portions of Relicensing Study R-17 –*Recreation Needs Analysis*, both consider the regional recreation context and associated regional capacities and should be reviewed for additional information when making recreation carrying capacity-related decisions.

Recreation management actions in the LOSRA should be based in part on a comprehensive review of the four capacity indicator variables, both at the site and in the larger regional context. Recreation managers in the LOSRA need to be cognizant that the four capacity indicator variables are interrelated and that making a change to one variable may result in a potential change in another.

ADAPTIVE MANAGEMENT PROCESS

The General Plan provides a vision with goals and guidelines that describe the desired resource conditions and visitor experiences for the park. Given the dynamic nature of resources and social influences, static goals and guidelines alone would not achieve the desired results. State Parks also needs the ability to adapt management to changing park conditions. The foregoing recreation carrying capacity analysis established that the General Plan proposals, when implemented, would fall within the carrying capacity of LOSRA given what we currently know. However, future conditions will likely change in ways that cannot be predicted and CSP needs a process for adapting its management to meet the conditions and constraints of such future changes. This section presents a process by which reevaluation, research, monitoring, and actions are used to adjust management to these ever changing conditions.

The Department uses a process of adaptive management to ensure that the General Plan's goals are met and that desired resource conditions and visitor experiences are realized over time (see *Table 24*). This process, in coordination with the adaptive management and monitoring processes outlined in the *Department of Water Resources Recreation Management Plan,* provides the framework for an overall adaptive management process at the LOSRA.

Since the park's recreational, natural, cultural, and educational resources and experiences are part of the flux of continual change of cultures and nature, California State Parks uses an adaptive management process to maintain the values it is mandated to protect. We can think of this management process as a kind of feedback system, similar to a thermostat that regulates a building's temperature within an acceptable range. Indicators and standards of quality are integral components in determining the recreation carrying capacity of an area. Indicators are defined as, "measurable, manageable variables that help define the quality of the visitor experience; standards of quality are defined as, "the minimum acceptable condition of indicator variables" (Manning et al. 2001). Like a thermostat, the Adaptive Management Process defines a measurable scale (e.g. Degrees) called Management Indicators, sets an acceptable condition for the indicators (e.g. should not exceed 70 degrees) called standards, and takes corrective action (e.g. turn up the air conditioner) called Management Actions when standards are exceeded. Adaptive management is a cyclical process that specifies on-going research, monitoring, and management to manifest the vision and goals of the Lake Oroville State Recreation Area General Plan and to prevent the degradation of park resources and visitor experiences due to overuse or changing ecological or demographic conditions. *Table 23* and *Figure 1* describe this Adaptive Management Process.

As the schematic diagram shows, adaptive management begins with the definition of Vision and Goals and desired park resource conditions and visitor experiences. The Park Management Actions (shown at the center) achieve these goals through on-going park research, monitoring, and management. Park Management Actions are directed by the General Plan's Guidelines and Study Recommendations, as well as the results of future studies and investigations. These future studies and management plans will determine the standards and indicators used to monitor changing conditions and ensure the quality of park resources and experiences are maintained. The effects of previous management actions, condition assessments, and visitor surveys are then reassessed with regards to the park-wide goals and guidelines. This on-going evaluation is necessary due to the dynamic nature of resources and social influences, and thus the adaptive management cycle continues.

The Adaptive Management Process (*Table 24*) provides three example *Issues* that the planning team addressed during the General Plan process for Lake Oroville State Recreation Area. It includes the associated future desired conditions *(Goals)* and the relevant *General Plan Guidelines and Recommended Studies* for each issue. This table also shows the type of measurable standards to be developed during subsequent planning phases. Following the general plan, this table would be completed with a list of known issues, with indicators and standards of measurement that will identify the desirable range of activities or limits of acceptable change to resources or visitor experiences. It also identifies examples of warning indicators that would alert staff when, and if, these sustainable levels of use (the standards) are approaching capacity or being exceeded. Finally, the table provides examples of management actions that could be taken to help resources recover from visitor use impacts or help restore desired visitor experiences that may be threatened. It is expected that on-going research, site investigations, and monitoring will produce the detailed information necessary to make these informed decisions, and take future actions that will help reestablish the plan's "desired conditions" and the vision for the park.

It should be noted that the Department of Water Resources' *Recreation Management Plan* provides a recreation monitoring program which defines indicators, standards, corrective management options and monitoring locations for all recreation areas located at the LOSRA. It will be important for California State Parks to coordinate its monitoring activities with the program established by DWR.

Table 23. LOSRA Recreation Carrying Capacity Analysis

Department of Water Resources Relicensing Assessment					**California State Parks Carrying Capacity Assessment**		
EXISTING FACILITY	EXISTING CAPACITY[1]	LIMITING FACTOR(S)[2]	DESCRIPTION OF LIMITING FACTOR(S)	OVERALL CAPACITY PRIORITY	GENERAL PLAN PROPOSAL(S)	ANALYSIS OF PROPOSAL(S) (Based on DWR studies)	ANTICIPATED CAPACITY AFTER IMPLEMENTATION
North Thermalito Forebay Boat Ramp and Day-Use Area	BELOW CAPACITY	Facility	Future parking capacity constraints	LOW	Extend and enhance trail opportunities Enhance swimming opportunities Expand and improve Boating Aquatics Center Improve day-use facilities (parking, fish cleaning stations) Construct maintenance facility Consider developing environmental camping	Potential to physically expand the recreation site Existing site lands and adjacent lands are categorized as high for future recreation development Added parking could address parking capacity constraints	APPROACHING CAPACITY
South Thermalito Forebay Boat Ramp and Day-Use Area	BELOW CAPACITY	None	N/A	LOW	Improve day-use facilities Provide additional day-use facilities Provide new trail opportunities Fence vernal pool Areas	Currently, all of the capacity indicators are below capacity and there are no limiting factors at this site. Existing site lands and adjacent lands are categorized as high for future recreation development (DWR Recreation Suitability Analysis)	BELOW CAPACITY
Larkin Road Car-top Boat Ramp	APPROACHING CAPACITY	Facility	Parking capacity constraints are considered a limiting factor in the future.	LOW	Constructed 5-10 new family picnic sites Provide a swim beach area.	Additional Facility capacity (parking) will likely not be required until 2050 Adjacent lands to the North are categorized as high for future recreation development (DWR Recreation Suitability Analysis) Adding new facilities within the existing footprint of the site may be possible.	AT CAPACITY
Thermalito Afterbay Outlet Boat Ramp and Day-Use Area	AT CAPACITY	Ecological / Social / Facility	Soil erosion, soil compaction, poor sanitation , trash of high concern Visitors feel moderately crowded at the site Site is exceeding facility capacity during recreation season weekends.	HIGH	Establish designated camping sites Enhance day-use facilities by adding paved parking, toilets, picnic facilities	Formalized camp sites and day-use enhancements will reduce existing soil erosion and compaction caused by random camping/ day-use and will regulate the numbers of visitors recreating at this location, which will help address ecological, facility and social limitations	AT CAPACITY
Diversion Pool Boat Ramp and Day-Use Area	BELOW CAPACITY	Spatial	Limited areas to physically expand A few marginal areas could be utilized for expansion. A few hardened facilities could be added to the site.	LOW	Construct additional day-use facilities to include picnic tables and car-top boat ramp along Burma Road Provide direct road access from the Lakeland Boulevard Trailhead access to the Diversion Pool Develop a new shoreline day-use site to include parking, restroom, picnic facilities and cartop boat launch.	Proposed land based facilities would be located within the limited and marginal areas determined suitable for expansion to include areas along Burma Road and locations south of the Union Pacific Railroad bridge and would fit within current spatial limitations	APPROACHING CAPACITY
Spillway Boat Ramp and Day-Use Area	APPROACHING CAPACITY	Spatial / Facility	Lack of large areas to physically expand (although minimal facilities and limited expansion could likely be accommodated) Potential access constraints if dam road is closed due to security issues.	MODERATE	Develop self contained RV sites Extend boat ramp below 695 feet msl Encourage concessionaire to provide floating store (gas) Consider new full service marina	Facility proposals would not impact significant quantities of land based space, which is currently a limiting factor. Potential security constraints can not currently be predicted. Proposals assume that the Dam road will remain open throughout the life of the General Plan.	AT CAPACITY
Lake Oroville Visitor Center	APPROACHING CAPACITY	Spatial / Facility	Ability for site expansion is constrained By 2050 recreation season weekend occupancy is likely to exceed the capacity of the current visitor center	MODERATE	If current VC is relocated, the existing VC should be converted to an Environmental Education Center	VC conversion would not require additional spatial requirements Environmental Education center in combination with new VC could alleviate current facility limitations.	APPROACHING CAPACITY
Bidwell Canyon Boat Ramp and Day-Use Area	AT CAPACITY	Spatial / Facility	Lack of large areas to physically expand (although site redesign and limited expansion could likely be accommodated) Existing and projected high levels of recreation season weekend and holiday percent occupancy during high reservoir pool elevations.	HIGH	Modify existing group use meeting hall to a camp activity center Convert Big Pine campground loop (50 campsites) to marina parking. Construct new campground loop (35 sites) next to Gold flat loop Increase boat ramp parking Construct new boat ramp Provide additional boarding docks Upgrade ADA access at marina Provide temporary grandstand space for fishing events	Conversion of existing facilities for other uses and limited site expansion would not dramatically alter the spatial footprint of site facilities. Additional Marina and boat ramp parking, boarding docks would increase facility capacity during season weekend and holiday high pool elevations.	AT CAPACITY
Saddle Dam Trailhead	Not Analyzed by DWR	Not Analyzed by DWR	Not Analyzed by DWR	MODERATE	Construct trails to access the shoreline from trailhead Improve existing equestrian trailhead facilities	It is anticipated that improvements to existing facilities would not impact ecological, facility, spatial or social capacities. Overall, existing recreation use on non-motorized trails in the LOSRA is considered to be “below” capacity	APPROACHING CAPACITY
Loafer Creek Boat Ramp and Day-Use Area	APPROACHING CAPACITY	Facility	Existing, as well as projected high levels of recreation season weekend and holiday use at high pool elevations Reservoir pool level constraints at BR /DUA	MODERATE	Improve existing dirt road Provide additional boarding docks Improve shoreline access and ADA accessibility Consider providing additional parking Improve swimming opportunities Consider providing new fish cleaning facilities	Day-use area could likely accommodate some additional facilities as proposed Additional Parking and boarding docks would assist in addressing existing and future facility capacity limitations	APPROACHING CAPACITY

[1] Existing Carrying Capacity derived from Relicensing Study R-8 – Recreation Carrying Capacity and Relicensing Study R-7– Reservoir Boating. [2] Indicates that this capacity type is considered a primary limiting factor for this facility.
[3] Indicates whether the overall capacity is considered to be a low, moderate, or high priority at this time for management decision-making. High priority would indicate to managers that there is a high probability that a particular facility is close to exceeding its capacity and a high level of caution, study and monitoring should be used when making a management decision for that location

Table 23. LOSRA Recreation Carrying Capacity Analysis (Continued)

Department of Water Resources Relicensing Assessment					**California State Parks Carrying Capacity Assessment**		
EXISTING FACILITY	EXISTING CAPACITY[1]	LIMITING FACTOR(S)[2]	DESCRIPTION OF LIMITING FACTOR(S)	OVERALL CAPACITY PRIORITY[3]	GENERAL PLAN PROPOSAL(S)	ANALYSIS OF PROPOSAL(S) (Based on DWR studies)	ANTICIPATED CAPACITY AFTER IMPLEMENTATION
Loafer Creek Campground	BELOW CAPACITY	Facility	Existing as well as projected high levels of recreation season weekend use	LOW	Consider providing campground activity center Upgrade basic campsites to RV sites Provide new campsites if campsites at Big Pine Loop cannot be constructed Consider constructing and renting cabins or tent cabins	Additional campground facilities would assist in addressing existing and future facility capacity limitations Most existing and adjacent lands are categorized as moderate to high for future recreation development Potential exist to physically expand the campground	APPROACHING CAPACITY
Loafer Creek Equestrian Campground	BELOW	None	N/A	LOW	Expand and improve Loafer Creek Equestrian Campground	No Limiting factors are currently identified for the equestrian camp Most existing and adjacent lands are categorized as moderate to high for future recreation development Potential exist to physically expand the campground	APPROACHING CAPACITY
Loafer Creek Group Camp	APPROACHING CAPACITY	Facility	Existing, as well as projected high levels of recreation season weekend use which exceeds facility capacity	MODERATE	Add new Group camp areas as needed	Additional campground facilities would assist in addressing existing and future facility capacity limitations Most existing and adjacent lands are categorized as moderate to high for future recreation development Potential exist to physically expand the campground	AT CAPACITY
Craig Saddle Boat-in Campground	APPROACHING CAPACITY	Facility	Facility access constraints cause by frequent low reservoir pool levels	MODERATE	Create an appropriately sized Cultural Preserve	It is anticipated that Cultural Preserve designation would not negatively impact Spatial, Facility, Social or Ecological carrying capacities	APPROACHING CAPACITY
Stringtown Car-Top Boat Ramp	AT CAPACITY	Spatial / Facility	Lack of General expansion potential Inability to accommodate added facilities within the existing footprint of site Existing and future percent occupancy constraints Vehicle parking constraints Effects of reservoir pool elevations on site functionality.	HIGH	Repair or replace road within inundation zone.	Road repair would not require additional spatial requirements Road repair would not address facility capacity constraints associated with high percent occupancy, vehicle parking, or effects of reservoir pool elevations.	AT CAPACITY
Enterprise Boat Ramp	APPROACHING CAPACITY	Spatial / Facility	Lack of potential expansion areas adjacent to the site (although a few new facilities could be added to existing site footprint). Boat ramp is unusable at low pool levels	MODERATE	Provide a boarding dock at boat ramp Add launch ramp extension and provide additional parking Add picnic tables	The potential exist to add a few additional facilities (i.e. parking spaces) without exceeding spatial capacity, but increasing the physical area of the site is not feasible. Boat Ramp extension and boarding dock would increase facility capacity without impacting spatial limitations	AT CAPACITY
Foreman Creek Car-top Boat Ramp	AT CAPACITY	Spatial / Facility / Ecological	Lack of adjacent potential expansion areas High levels of existing percent occupancy constraints Large numbers and severity of observed ecological impacts related to public use	HIGH	Create appropriately sized Cultural Preserve Improve existing recreation day-use area to better serve users and protect cultural resources Provide additional visitor interpretation and education regarding cultural preservation	It is anticipated that Cultural Preserve designation would not negatively impact Spatial, Facility, Social or ecological carrying capacities and could help address ecological limitations Recreation improvements and visitor interpretation would not require additional impacts to spatial limitations It is unlikely that proposals would address facility limitations	AT CAPACITY
Nelson Bar Car-top Boat Ramp	APPROACHING CAPACITY	Spatial	Lack of potential areas to expand adjacent to the site and a lack of potential new facilities within the existing footprint of the site.	LOW	Improve road, circulation and boat ramp.	It is anticipated that limited access improvements would replace existing facilities and not dramatically increase the overall footprint of existing facilities, and therefore would not exceed spatial limitations.	APPROACHING CAPACITY
Lime Saddle Boat Ramp and Day-Use Area	APPROACHING CAPACITY	Facility	Existing, as well as projected high levels of recreation season weekend and holiday use at high pool elevations	MODERATE	Encourage concession to rehabilitate marina and add new services Consider constructing additional Parking Extend and widen boat ramp Provide additional boarding/ landing docks Consider providing day-use are at Parrish Cove Improve day-use facilities Expand Parking Develop new trails	Proposals would assist in addressing existing and projected facility capacity limitations. The day-use area overlooking the marina could likely accommodate some additional facilities without affecting spatial limitations Areas to the west and northwest of the site could be used to expanded without affecting spatial limitations Potential acquisitions of adjacent properties could provide additional area for facility expansion.	AT CAPACITY
Lime Saddle Campground	APPROACHING CAPACITY	Spatial / Facility	Expansion is primarily constrained by unfavorable slopes in all directions. However marginal areas could be used to slightly increase the physical size of the facility Future percent occupancy constraints	MODERATE	Add individual/family camping sites Consider constructing new RV/tent campsites Consider providing new group campsite Consider providing new campground activity center Develop campfire center Develop trail to waters edge and create water play area at beach Add fish cleaning station Consider providing shop and storage facility	Proposals would assist in addressing existing and projected facility limitations. Some potential exists to increase the use density at the site by expanding into marginal areas or by converting part of the Lime Saddle BR/DUA into camping areas. Therefore it is possible not to exceed spatial limitations.	AT CAPACITY
Dark Canyon Car-top Boat Ramp	APPROACHING CAPACITY	Spatial	Lack of potential areas for expansion adjacent to the site and lack of potential new facilities within the existing footprint of the site	LOW	Repair or replace existing vault toilet	Vault toilet repair or replacement would not affect spatial capacity limitations.	APPROACHING CAPACITY

The Adaptive Management Process

(Figure 1)

General Plan Vision, Goals, and Guidelines direct the *Park Research and Management Cycle* that identifies *Resource and Experience Standards and Indicators*, monitors conditions, and takes corrective action to meet the goal.

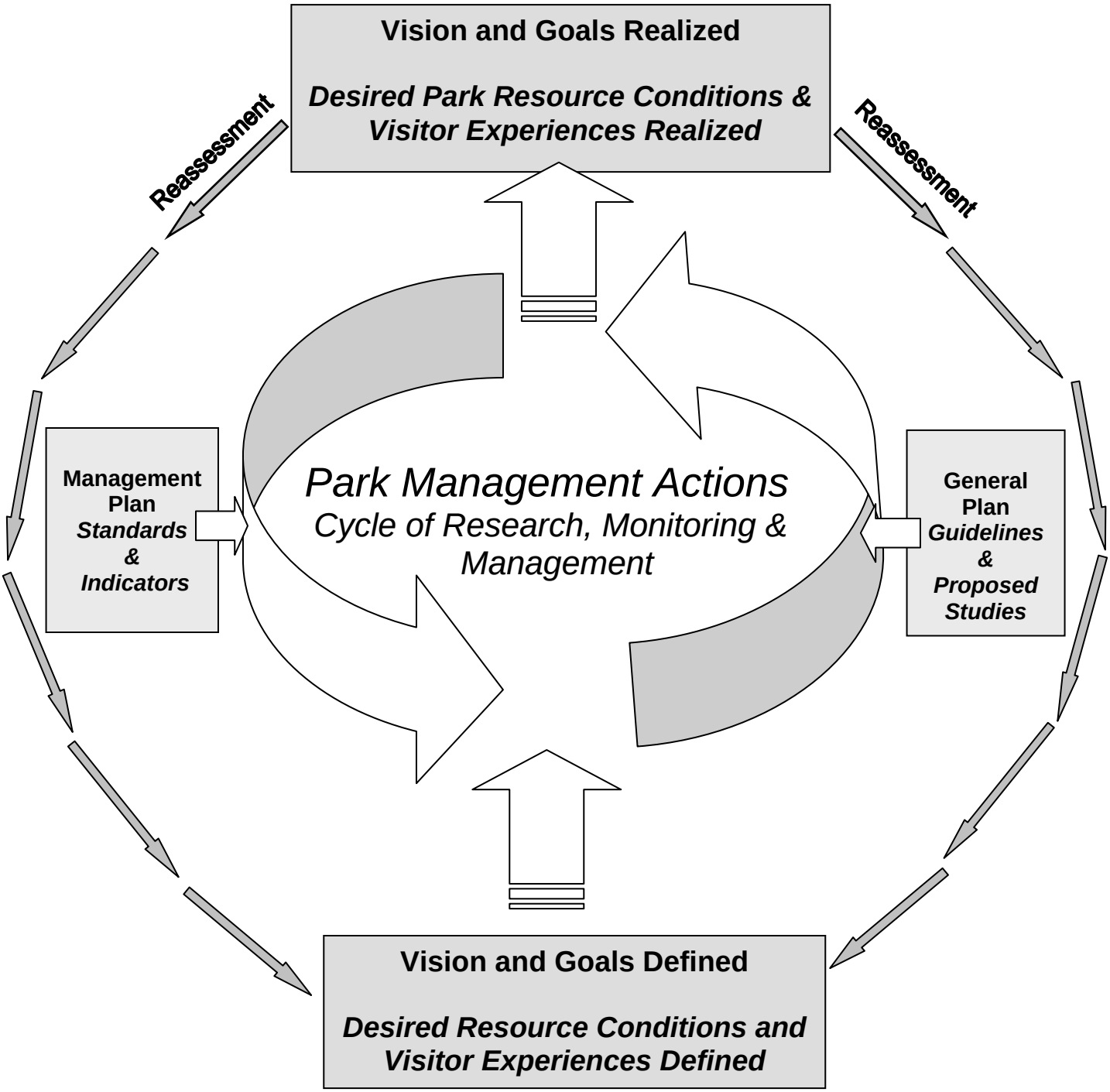
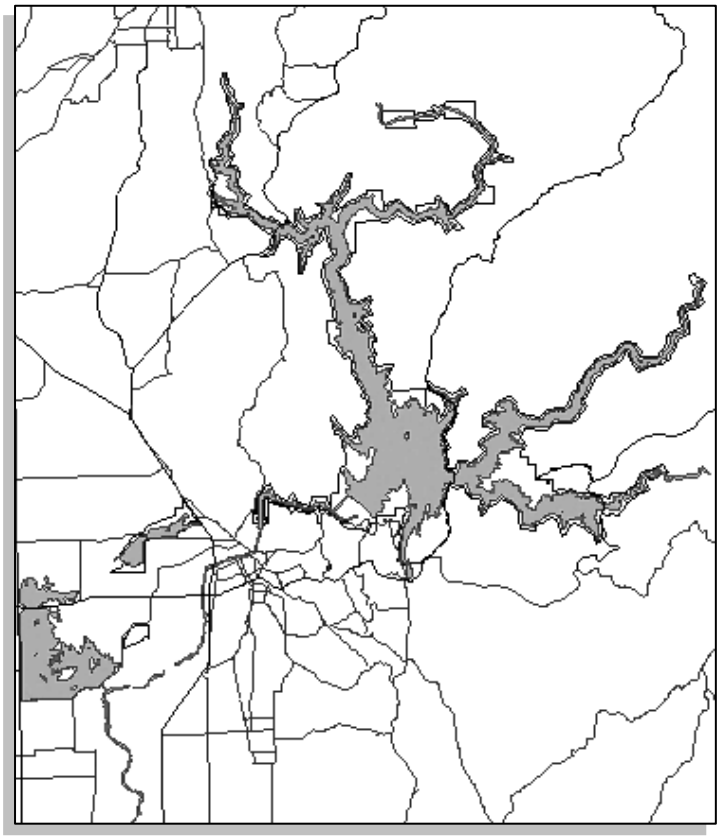


Table 24. The Adaptive Management Process (illustrated with three example issues)
How the General Plan Goals will be realized and Resources protected at Lake Oroville State Recreation Area

General Plan Phase				Future Park Research, Monitoring and Management Actions		
				5. Completion of Management Studies		
1. General Plan Issues (Three Examples)	2. General Plan Goals	3. General Plan Guidelines	4. Recommended Studies	5a. Typical Monitoring Indicators	5b.Typical Monitoring Standards	6. Typical Management Actions if Standards Exceeded
Watercraft Launch Facilities The number of days that watercraft launch facilities are rendered ineffective by low water conditions is an important recreational limitation	Provide an appropriate variety and intensity of recreational opportunities that will allow California's diverse population to enjoy and refresh themselves in a healthful outdoor recreation setting	Enhance the recreational use of watercraft on LOSRA waters by supporting the provision of safe and convenient water access facilities at both high and low lake levels	None recommended	Number of days that boat ramps and launch areas are unusable due to lake levels	Maximum number of days that boat ramps and launch areas are unusable due to lake levels	Notify public of alternative launch areas in LOSRA. Consider modifying boat launch facilities to be usable at more water levels
Archeological Resource Preservation The park's archeological sites are a valuable cultural and educational resource that are vulnerable to erosion and recreational impacts	To provide an appropriate level of protection, stabilization, preservation, interpretation, and community involvement concerning the park's cultural resources, focusing on areas of important cultural significance	Work with DWR to protect important cultural resources as much as possible from adverse effects resulting from park visitor use, development of facilities, resource management programs, fluctuation of lake levels, and natural processes, such as erosion	None recommended	Erosion measured in millimeters per year	Erosion not to exceed 10 millimeters per year	Identify and reduce source of erosion to meet standards
Sensitive Plant Species Preservation Special plant species protection and regeneration are important to the integrity of the park's plant communities	Protect special (rare, threatened, endangered, or endemic) plants within the park and manage for their perpetuation in accordance with applicable State and federal laws and regulations	The Department will protect all special plant species to the degree necessary to maintain or increase populations	None recommended	Number of a certain sensitive plant species per specified area of the park	Minimum number of a certain sensitive plant species per specified area of the park	Identify and reduce cause of loss of regeneration of sensitive plant species in specified area of the park

MAPS



MAP 1: LAKE OROVILLE REGION

REFER TO ELECTRONIC MAP FILE

MAP 2: LAKE OROVILLE AREA

REFER TO ELECTRONIC MAP FILE

MAP 3: THERMALITO FOREBAY AREAS

REFER TO ELECTRONIC MAP FILE

MAP 4: DIVERSION POOL AREA

REFER TO ELECTRONIC MAP FILE

MAP 5: SPILLWAY TO CRAIG SADDLE AREAS

REFER TO ELECTRONIC MAP FILE

MAP 6: STRINGTOWN AND ENTERPRISE AREAS

REFER TO ELECTRONIC MAP FILE

MAP 7: FOREMAN CREEK AND BLOOMER AREAS

REFER TO ELECTRONIC MAP FILE

MAP 8: NELSON BAR TO GOAT RANCH AREAS

REFER TO ELECTRONIC MAP FILE

MAP 9: TRAILS

REFER TO ELECTRONIC MAP FILE

MAP 10: RECREATION FACILITY PROPOSALS

REFER TO ELECTRONIC MAP FILE

REFERENCES

The following Department of Water Resources *Oroville Facilities Project 2100 Studies* were consulted for the LOSRA General Plan (EDAW 2003-2004):

Recreation Studies
R-1-*Public and Private Vehicular Access*
R-2-*Recreation Safety Assessment*
R-3-*Assess Relationship of Project Operations and Recreation*
R-4-*Assess Relationship of Fish & Wildlife Management and Recreation*
R-5-*Assess Recreation Areas Management*
R-6-*ADA Accessibility Assessment*
R-7-*Reservoir Boating Survey*
R-8- *Carrying Capacity*
R-9-*Exisiting Recreation Use Study*
R-10-*Recreation Facility and Condition Inventory*
R-11-*Recreation and Public Use Impact Assessment*
R-12-*Projected Recreation Use*
R-13-*Recreation Surveys*
R-14-*Assess Regional Recreation and Barriers to Recreation*
R-15-*Recreation Suitability Study*
R-16-*Whitewater and River Boating*
R-17-*Recreation Needs Analysis*
Cultural Resources Studies
C1- *Cultural Resources Inventory*
C2- *Cultural Resources Evaluation*
C3- *Cultural Resources Management*
C4- *Cultural Resources Interpretive Evaluation*
Environmental Studies
Fish
F1- *Project Effects on Non-fish Aquatic Resources*
F3.1 FR-T2A & T3A- *Fish Species In Lake*
F3.1-T3B- *Project Effects on Fish & Habitats in Lake Oroville*
Geomorphology
SP-G1- *Draft Final Report: Effects of Project Operations on Geomorphic Processes Upstream of Oroville Dam*
SP-G2- *Task 1.1: Effects of Project Operations on Geomorphic Processes Downstream of Oroville Dam*

Terrestrial
T1 - *Effects of Project Features and Operation on Wildlife and Wildlife Habitat*
T2 - *Project Effects on Special Status Species: Wildlife*
T2 - *Projects Effects on Special Status Species: Plants*
T3/5 – *Draft Final Report: Project Effects on Riparian Resources, Wetlands, and Associated Floodplains*
T4 - *Biodiversity, Vegetation Communities, and Wildlife Habitat Mapping*
T6 - *Interagency Wildlife Management Coordination and Wildlife Management Plan Development*
T7- *Project Effects on Noxious Terrestrial and Aquatic Plant Species*
T8 - *Project Effects on Non-Native Wildlife*
T9 – *Recreation and Wildlife*
T10 - *Effects of Project Features, Operations and Maintenance on Upland Plant Communities*
T11 - *Effects of Fuel Load management and Fire Prevention on Wildlife and Plant Communities*
Water Quality
W3 – *Task 1A Interim Report: Recreational Facilities and Operations Effects on Water Quality*
W5 – 1 *Phase, 1 Draft Report: Project Effects on Groundwater, Inventory Existing Wells and Assessment of Existing Groundwater Data and Current Groundwater Monitoring Activities*
W7/Task 1A- *Land & Watershed Management Effects on Water Quality*
Physiographic Description of the SP-G1 and SP-G2 Study Areas
Land Use, Management & Aesthetics Studies
L-1 – *Land Use*
L-2 – *Land Management*
L3- *Comprehensive Plans Evaluation*
L4- *Aesthetic/ Visual Resources*
L5- *Fuel Load Management Evaluation*

In addition, the following sources were consulted in developing this General Plan:

Butte County Association of Governments, 2001. *Butte County Bicycle Plan, Butte County 2001 Regional Transportation Plan*.

Butte County Association of Governments, 1998. *Countywide Bikeway Master Plan.*

Butte County, 1977, *Butte County General Plan*. Seismic Safety Element.

Butte County, 2000. *Butte County General Plan.*

California Department of Fish and Game, 1978. *Oroville Wildlife Management Area Management Plan.*

California Department of Parks and Recreation, 2002. *California Outdoor Recreation Plan.*

California Department of Parks and Recreation, 1997. *Public Opinions and Attitudes on Outdoor Recreation in California.*

California Department of Parks and Recreation, 1973. *Lake Oroville State Recreation Area Resource Management Plan and General Development Plan.*

California Department of Parks and Recreation, 1988. *Lake Oroville State Recreation Area General Plan Amendment.*

California Department of Parks and Recreation, 2004; *website*: http://www.parks.ca.gov

California Department of Parks and Recreation, 2004a. *Yearly Attendance, Lake Oroville SRA.*

California Department of Water Resources, 1993. *Recreation Plan for Lake Oroville State Recreation Area.*

California Department of Water Resources, 1993-1994. *Lake Oroville Siltation Study*.

California Department of Water Resources, 2001. *Initial Information Package*, Relicensing of the Oroville Facilities.

California Department of Water Resources, 2003. *Ethnographic and Ethnohistoric Inventory of Konkow Maidu Cultural Places.*

California Department of Water Resources, 2003a. *Oroville Facilities Archaeological and Historical Resources Inventory Report.*

California Geological Survey (CGS) 2001. DMG Note 36, California Geomorphic Provinces; *website*: http://www.consrv.ca.gov/dmg/pubs/motes/36/index.html

Central Valley Regional Water Quality Control Board, 1998, *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region*, Fourth Edition, The Sacramento River Basin and the San Joaquin River Basin

City of Oroville, 1998. Bicycle Transportation Plan.

City of Oroville Chamber of Commerce

City of Oroville, 1995. *General Plan*

Eng, L. L.,D. Belk, and C.H. Eriksen, 1990. *California Anostraca: Distribution, Habitat, and Status*. Journal of Crustacean Biology 10: 247-277.

Feather River Recreation & Park District; *website*: http://www.frrpd.com

Hickman, James C. (ed.), 1993. *The Jepson Manual, Higher Plants of California.* University of California Press, Berkeley and Los Angeles, California. 1400 pp.

Holland, Robert F., 1986. *Preliminary Description of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Nongame-Heritage Program, Sacramento. 156 pp.

Jewell, D. P., 1964. Arche*ology of the Oroville Dam Spillway, Part 1*. Department of Parks and Recreation Archeological Report 10.

Manning, R. E., 1999. *Studies in Outdoor Recreation: Search and Research for Satisfaction* (2nd Ed.). Oregon State University Press. Corvallis, Oregon.

Mayfield, J. D., and Day, H. W., 2000. *Ultramafic Rocks in the Feather River Belt, Northern Sierra Nevada, California, in Field Guide to Geology and Tectonics of the Northern Sierra Nevada*, California Geological Survey Special Publication 122.

McCool, S.F., 1996. *Limits of Acceptable Change: A Framework for Managing National Protected Areas: Experiences from the United States*. Paper presented at Workshop on Impact Management in Marine Parks, sponsored by Maritime Institute of Malaysia. August 13-14, 1996. Kuala Lumpur, Malaysia.

United States Bureau of Land Management, 1993. *Redding Resource Management Plan.*

United States Forest Service,1988 (as amended). *Plumas National Forest Land and Resource Management Plan*.

United States Soil Conservation Service, 1989. *The East Branch North Fork Feather River Erosion Inventory Report*.

Paradise Recreation and Park District, *Paradise Recreation & Park District Master Plan 2001-2016*; *website*: http://www.paradiseprpd.com

Sawyer, J. O. and T. Keeler-Wolf, 1995. *A Manual of California Vegetation*. California Native Plant Society. 471 pp.

Shelby, B. and T.A. Heberlein, 1986. *Carrying Capacity in Recreation Settings*. Oregon State University Press. Corvallis, Oregon.

State Water Quality Control Board, 1998. *Central Valley Region Water Quality Control Plan (Basin Plan).*

United States Forest Service, 1988. *Plumas National Forest Land and Resource Management Plan.*

United States Forest Service, 2004. *Sierra Nevada Forest Plan Amendment.*

Zeiner, D. C., W. F. Laudenslayer Jr., K. E. Mayer, M. White eds. 1990a. *California's Wildlife Volume II: Birds*. State of California, The Resources Agency, Department of Fish and Game, Sacramento, CA. 732 pp.

APPENDICES

APPENDIX A: GLOSSARY OF GEOLOGICAL TERMS

Definitions in this glossary are from the American Geology Institute (AGI) Dictionary of Geological Terms and the USGS Geologic Glossary webpage.

Alluvium – sand, gravel, silt, and clay deposited by rivers and streams in valley bottoms.

Asbestos – a mineral of the asbestos group, such as chrysotile, a white, gray, or greenish serpentine mineral with formula $Mg_3Si_2O_5(OH)_4$. Other less common asbestos-forming minerals are amosite and crocidolite (riebeckite) which belong to the amphibole family.

Basalt – A fine-grained, dark extrusive igneous rock with low silica content (40% to 50%), rich in iron, magnesium and calcium. Basalt generally occurs in flows and also as dikes. It is the most abundant volcanic rock in the Earth's crust and makes up most of the ocean floor.

Breccia – a sedimentary rock made up of angular fragments of other rocks held together by mineral cement or a fine-grained matrix. Volcanic breccia is made of volcanic rock fragments generally blown from a volcano or eroded from it.

Cenozoic – the latest of the four eras into which geologic time is divided; it extends from the close of the Mesozoic Era, about 65 million years ago, to the present. It is subdivided into the Tertiary and Quaternary periods.

Chert – a hard, dense, microcrystalline variety of quartz that forms in a marine environment from the altered silica shells of radiolarians.

Clay – A particle of sediment less than 1/256 of a millimeter in diameter. Also, a family of platy silicate minerals that commonly form as a product of weathering.

Conglomerate – a coarse-grained sedimentary rock composed of rounded to subangular fragments larger than 2 millimeters in diameter (gravel, cobbles, boulders) in a finer-grained matrix of sand and/or silt, cemented with calcium carbonate, iron oxide, silica, or hardened clay.

Cretaceous – the final period of the Mesozoic Era, from 135 to 65 million years ago.

Diorite – an intrusive igneous rock made up of plagioclase feldspar and amphibole or pyroxene. Similar to gabbro, but with less dark (mafic) minerals and more silica.

Feldspar – a group of silicate minerals containing varying amounts of potassium, sodium, and calcium along with aluminum, silicon, and oxygen. Potassium (alkali) feldspars contain considerable potassium. Plagioclase feldspars contain considerable sodium and calcium.

Geomorphology - the study of the classification, description, nature, origin, and development of landforms and their relationships to the underlying geologic structures, and the history of geologic changes as recorded by these surface features.

Granite – a light-colored, coarse-grained igneous rock consisting of alkali feldspar (orthoclase) and quartz, with lesser amounts of sodic plagioclase feldspar, micas, and hornblende.

Granitic – of, pertaining to, or composed of granite or granite-like rock.

Granodiorite – a group of coarse-grained intrusive igneous rocks intermediate in composition between quartz diorite and quartz monzonite, containing quartz, oligoclase or andesine (plagioclase), and potassium feldspar, with lesser amounts of biotite or hornblende.

Gravel – all sedimentary particles (rock or mineral) larger than 2 millimeters and smaller than 64 millimeters in diameter.

Greywacke – a dark grey, well indurated, coarse-grained sandstone that consists of poorly sorted angular to subangular grains of quartz, feldspar, and rock fragments embedded in a compact clayey matrix with the general composition of shale.

Holocene – An epoch of the Quaternary Period, from the end of the Pleistocene, approximately 8,000 years ago to the present time.

Igneous Rock – a rock or mineral that solidified from molten or partly molten material, i.e. from a magma. Extrusive igneous, or volcanic rocks, are erupted onto the earth's surface and are usually fine-grained with some larger crystals. Intrusive igneous, or plutonic rocks, cool and solidify at depth and are usually coarse-grained.

Jurassic – the second period of the Mesozoic Era, covering the time span from 190 to 135 million years ago.

Liquefaction - In cohensionless (sand and silt) soil, the transformation from solid to a liquid state due to increased pore water pressure and resulting reduction of effective stress (loss of soil strength). Often induced by earthquake shaking.

Magma – naturally occurring molten rock material, generated within the earth and capable of intrusion and extrusion, from which igneous rocks have been derived through cooling and solidification.

Mesozoic – One of the eras of geologic time, following the Paleozoic and succeeded by the Cenozoic Era. The Mesozoic comprises the Triassic, Jurassic, and Cretaceous periods, from 245 to 66.4 million years ago.

Metamorphic Rock -- Any rock derived from pre-existing rocks by chemical, mineralogical, chemical and/or structural changes, essentially in the solid state, resulting from changes in pressure, temperature, chemical environment, and shearing stress, generally at depth in the earth's crust.

Metamorphism – the mineralogical, chemical, and structural adjustment of solid rocks to physical and chemical conditions imposed at depth below the earth's surface. Increases in temperature and pressure cause new minerals to grow.

Nevadan Orogeny - a mountain-building event in the Sierra Nevada region of eastern California, believed to have taken place in the latest Jurassic time (about 144 million years ago). The term now is generally expanded for numerous orogenic pulses in the western portion of the Cordilleran Geosyncline of western North America that range in age from Late Jurassic to Early Cretaceous.

Ophiolite – An assemblage of mafic and ultramafic igneous rocks ranging from spilite and basalt to gabbro and peridotite, including rocks rich in serpentine, chlorite, epidote, and albite derived from them by later metamorphism. They are found in association with sedimentary rocks like greywackes and cherts, formed in deep marine environments. Ophiolites are pieces of oceanic plate that have been thrust onto the edge of continental plates by tectonic processes.

Orogeny – Literally, the process of the formation of mountains. In present usage, orogeny is the process by which structures within fold-belt mountainous areas were formed, including thrusting, folding, and faulting in the outer and higher layers, and plastic folding, metamorphism, and plutonism in the inner and deeper layers.

Paleozoic - One of the eras of geologic time, following the Precambrian and succeeding the Mesozoic. The Paleozoic comprises the Cambrian, Ordovician, Silurian, Devonian, Carboniferous, and Permian periods, 570 to 245 million years ago.

Plagioclase – a member of the feldspar mineral family. Plagioclase feldspars are silicates that contain considerable sodium and calcium.

Pleistocene – an epoch of the Quaternary Period, after the Pliocene of the Tertiary and before the Holocene. It began 1.6 million years ago and lasted until about 8,000 years ago (Holocene).

Pliocene – The latest epoch of the Tertiary period, beginning about 5.3 million years ago and ending 1.6 million years ago. See geologic time scale at end of glossary.

Pluton – an igneous intrusion of rock formed by emplacement of magma at depth.

Quartz Diorite– a group of plutonic igneous rocks having the composition of diorite, but with an appreciable amount of quartz (5-20 % light-colored constituents). Quartz diorite grades into granodiorite as the alkali feldspar content increases. Same as tonalite or trondhjemite.

Quaternary – The most recent period of the Cenozoic era, encompassing the time interval of 1.6 million years ago through today.

Sand – loose particles of rock that range from 0.0625-2.0 millimeters in diameter.

Sandstone – a clastic sedimentary rock composed of grains of sand-sized particles (usually quartz or feldspar) in a matrix of silt and/or clay and cemented to some degree by silica, iron oxide, or calcium carbonate.

Sedimentary rock - A layered rock formed by the accumulation and cementation of mineral grains transported by wind, water, or ice to the site of deposition or chemically precipitated at the depositional site.

Seiche – an oscillation of a body of water in an enclosed or semi-enclosed basin that varies in period, depending upon the physical dimensions of the basin, from a few minutes to several hours, and in height from several centimeters to a few meters.

Shale – a fine-grained detrital sedimentary rock, formed by the compaction of clay, silt, or mud. It has a finely laminated structure, which gives it a fissility along which the rock tends to split readily.

Silt - loose particles of rock ranging from 0.002-0.0625 millimeters in diameter.

Subduction Zone – an elongate region along which a crustal block descends relative to another crustal block, such as the descent of the Pacific plate beneath the Andean plate along the Andean trench.

Superjacent Series – a stratum situated upon a lower stratum or unconformity.

Turbidity - the amount of suspended sediment (or other particles) in water.

Ultramafic rock - An igneous rock consisting dominantly of mafic (iron and magnesium-rich) minerals, containing less than 10 percent feldspar. Includes dunite, peridotite, amphibolite, and pyroxenite.

Watershed - 1) All lands enclosed by a continuous hydrologic drainage divide and lying upslope from a specified point on a stream. Also referred to as *Water Basin* or *Drainage Basin*. 2) The area that drains into a stream river or body of water from

the ridgeline and includes the waterbody. (3) A ridge of relatively high land dividing two areas that are drained by different river systems.

Volcanic rock – an igneous rock that solidifies at or very near the Earth's surface.

Volcanic arc – an arcuate chain of volcanoes formed above a subduction zone. The arc forms where the descending plate becomes hot enough to release water and gases into the overlying mantle and cause it to melt.

APPENDIX B: SPECIAL STATUS PLANT SPECIES POTENTIALLY OCCURRING WITHIN THE FERC STUDY AREA

Note: Species known to occur in LOSRA are shown in bold.

Scientific name Common name	Status FWS[1]/State[2]/ CNPS[3]/PNF[4]	Habitat (elevation)	Flowering Period
FEDERAL OR STATE LISTED			
Chamaesyce hooveri Hoover's spurge	FT/--/1B/--	Vernal pools (25-250m)	Jul-Aug
Limnanthes floccosa ssp. *californica* Butte County meadow foam	FE/SE/1B/--	Valley and foothill grassland (mesic), vernal pools (50-90m)	Mar-May
Orcuttia pilosa Hairy Orcutt grass	FE/SE/1B/--	Vernal pools (55-200m)	May-Sep
Orcuttia tenuis Slender Orcutt grass	FT/SE/1B/--	Vernal pools (35-1760m)	May-Oct
Pseudobahia bahiifolia Hartweg's golden sunburst	FE/SE/1B/--	Cismontane woodland, valley and foothill grassland/ clay (15-150m)	Mar-Apr
Tuctoria greenei Greene's tuctoria	FE/SR/1B/--	Vernal pools (30-1070m)	May-Sep
SPECIES OF CONCERN – CNPS LISTS 1, 2, & 3			
Agrostis hendersonii Henderson's bent grass	SC/--/3/--	Valley and foothill grassland (mesic), vernal pools (70-305m)	Apr-May
Allium jepsonii Jepson's onion	SC/--/1B/--	Cismontane woodland, lower montane conifer forest/ serpentinite or volcanic (300-1160m)	May-Aug
Astragalus tener var. *ferrisiae* Ferris's milk-vetch	SC/--/1B/--	Meadows and seeps (vernally mesic), valley and foothill grassland (subalkaline flats) (5-75m)	Apr-May
Atriplex cordulata Heartscale	SC/--/1B/--	Chenopod scrub, meadows and seeps, valley and foothill grassland (sandy)/ saline or alkaline (1-375m)	Apr-Oct
Atriplex depressa Brittlescale	--/--/1B/--	Chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools/ alkaline, clay (1-320m)	May-Oct
Atriplex minuscula Lesser saltscale	--/--/1B/--	Chenopod scrub, playas, valley and foot- hill grassland/ alkaline, sandy (15-200m)	May-Oct
Atriplex subtilis Subtle orache	--/--/1B/--	Valley and foothill grassland (40-100m)	Aug-Oct
Balsamorhiza macrolepis var. *macrolepis* Big-scale balsamroot	--/--/1B/SI-1	Chaparral, cismontane woodland, valley and foothill grassland/sometimes serpentinite (90-1400m)	Mar-Jun
Calycadenia oppositifolia* **Butte County calycadenia**	--/--/1B/S	Chaparral, cismontane woodland, lower montane conifer forest, meadows and seeps, valley and foothill grassland/ volcanic or serpentinite (215-945m)	Apr-Jul

Calystegia atriplicifolia ssp. *buttensis* Butte County morning glory	SC/--/1B/--S	Lower montane conifer forest (600-1200m)	May-Jul
Cardamine pachystigma* var. *dissectifolia* **Dissected-leaved toothwort**	--/--/3/SI-1	Chaparral, lower montane conifer forest/ usually serpentinite, rocky (255-2100m)	Feb-May
Carex vulpinoidea* **Fox sedge**	--/--/2/--	Marshes and swamps (freshwater), riparian woodland (30-1200m)	May-Jun
Castilleja rubicundula ssp. *rubicundula* Pink creamsacs	--/--/1B/--	Chaparral (openings), cismontane woodland, meadows and seeps, valley and foothill grassland/ serpentinite (20-900m)	Apr-Jun
Clarkia biloba* ssp.*brandegeae* **Brandegee's clarkia**	--/--/1B/S	Chaparral, cismontane woodland/ often roadcuts (295-885m)	May-Jul
Clarkia gracilis* ssp. *albicaulis* **White-stemmed clarkia**	--/--/1B/S	Chaparral, cismontane woodland/ sometimes serpentinite (245-1085m)	May-Jul
Clarkia mildrediae ssp. *mildrediae* Mildred's clarkia	--/--/1B/SI-1	Cismontane woodland, lower montane conifer forest/ sandy, usually granitic (245-1710m)	May-Aug
Clarkia mosquinii* **Mosquin's clarkia**	SC[5]/--/1B/S	Cismontane woodland, lower montane conifer forest/ rocky, roadsides (185-1170m)	May-Jul
Delphinium recurvatum Recurved larkspur	SC/--/1B/--	Chenopod scrub, cismontane woodland, valley and foothill grassland, alkaline (3-750m)	Mar-May
Downingia pusilla Dwarf downingia	--/--/2/--	Valley and foothill grassland (mesic), vernal pools (1-445m)	Mar-May
Eleocharis quadrangulata* **Four-angled spikerush**	--/--/2/--	Marshes and swamps (freshwater) (30-500m)	May-Sep
Fritillaria eastwoodiae* **Butte County Fritillary**	SC/--/3/S	Chaparral, cismontane woodland, lower montane conifer forest (openings)/ sometimes serpentinite (50-1500m)	Mar-May
Fritillaria pluriflora Adobe-lily	SC/--/1B/--	Chaparral, cismontane woodland, valley and foothill grassland/ often adobe (60-705m)	Feb-Apr
Hibiscus lasiocarpus Rose-mallow	--/--/2/--	Marshes and swamps (freshwater) (0-120m)	Jun-Sep
Juncus leiospermus var. *ahartii* Ahart's dwarf rush	SC/--/1B/--	Valley and foothill grasslands (mesic) (30-100m)	Mar-May
Juncus leiospermus var. *leiospermus* Red Bluff dwarf rush	--/--/1B/--	Chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, vernal pools/ vernally mesic (35-1020m)	Mar-May
Lewisia cantelovii Cantelow's lewisia	--/--/1B/S	Broadleaved upland forest, chaparral, cismontane woodland, lower montane conifer forest/ mesic, granitic, serpentinite seeps (385-1370m)	May-Oct
Lupinus dalesiae Quincy lupine	--/--/1B/S	Chaparral, cismontane woodland, lower/ upper montane conifer forest, openings, often in disturbed areas (855-2500m)	May-Aug
Monardella douglasii ssp. *venosa* Veiny monardella	SC/--/1B/--	Cismontane woodland, valley and foothill grassland (heavy clay) (60-410m)	May-Jul
Myosurus minimus ssp. *apus* Little mousetail	SC/--/3/--	Valley and foothill woodland, vernal pools (alkaline) (20-640m)	Mar-Jun

Paronychia ahartii* **Ahart's paronychia**	SC/--/1B/--	Cismontane woodland, valley and foothill grassland, vernal pools (30-510m)	Mar-Jun
Penstemon personatus Closed-throated beardtongue	SC/--/1B/S	Chaparral, lower/upper montane conifer forest, metavolcanic (1065-2120m)	Jun-Sep
Rhynchospora californica California beaked-rush	SC/--/1B/--	Bogs and fens, lower montane conifer forest, meadows and seeps, marshes and swamps (freshwater) (45-1010m)	May-July
Rhynchospora capitellata Brownish beaked-rush	--/--/2/SI-1	Lower/upper montane conifer forest, meadows and seeps, marshes and swamps, mesic (455-2000m)	Jul-Aug
Sagittaria sanfordii Sanford's arrowhead	SC/--/1B/--	Marshes and swamps (assorted shallow freshwater) (0-610m)	May-Oct
Sedum albomarginatum Feather River stonecrop	--/--/1B/S	Chaparral, lower montane conifer forest/ serpentinite (260-1785m)	May-Jun
Senecio eurycephalus* var. *lewisrosei* **Cut-leaved ragwort**	--/--/1B/S	Chaparral, cismontane woodland, lower montane conifer forest/ serpentinite (550-1470m)	Mar-Sep
Sidalcea robusta Butte County checkerbloom	SC/--/1B/--	Chaparral, cismontane woodland (90-1600m)	Apr-Jun
Silene occidentalis ssp. *longistipitata* Long-stiped catchfly	SC--/1B-SI-1	Chaparral, lower/upper montane conifer forest (1000-2000m)	Jul-Aug
Trichocoronis wrightii var. *wrightii* Wright's trichocoronis	--/--/2/--	Meadows and seeps, marshes and swamps, riparian scrub, vernal pools/ alkaline (5-435m)	May-Sep
Trifolium jokerstii Butte County golden clover	--/--/1B/SI-1	Valley and foothill grassland (mesic), vernal pools (50-385m)	Apr-May
Vaccinium coccineum Siskiyou Mountains huckleberry	--/--/3/SI-1	Lower/upper montane conifer forest/ often serpentinite (1095-2135m)	Jun-Aug
Wolffia brasiliensis Columbian watermeal	--/--/2/--	Marshes and swamps (assorted shallow freshwater) (30-100m)	Apr-Dec
Bryophytes			
Bruchia bolanderi Bolander's bruchia moss	--/--/2/S	Lower/upper montane conifer forest, meadows and seeps, damp soil (600-1700m)	
Mielichhoferia elongata Elongate copper moss	--/--/2/SI-1	Cismontane woodland (metamorphic rock, usually vernally mesic) (500-1300m)	
Lichens			
Hydrothyria venosa Waterfan	--/--/--/S	Attached to rocks in cool mountain brooks and streams; submerged	
SPECIES OF CONCERN – CNPS LIST 4			
Allium sanbornii var. sanbornii Sanborn's onion	--/--/4/SI-1	Chaparral, cismontane woodland, lower montane conifer forest/ usually serpentinite, gravelly (260-1410m)	May-Sep
Arenaria "grandiflora" Large-flowered sandwort	--/--/4/SI-1	Granite sand on road banks and openings in woods (500-1000m)	Apr-Aug
Astragalus pauperculus Depauperate milk-vetch	--/--/4/--	Chaparral, cismontane woodland, valley and foothill grassland/ vernally mesic, volcanic (60-855m)	Mar-Jun

Azolla mexicana Mexican mosquito fern	--/--/4/--	Marshes and swamps (ponds, slow water) (30-100m)	Aug
Bulbostylis capillaris Thread-leaved beakseed	--/--/4/SI-2	Lower/upper montane conifer forest, meadows and seeps (395-2075m)	Jun-Aug
Clarkia mildrediae ssp. lutescens Golden-anthered clarkia	--/--/4/SI-1	Cismontane woodland, lower montane conifer forest (openings)/ often roadcuts (275-1750m)	Jun-Aug
Cypripedium fasciculatum Clustered lady's slipper	SC/--/4/S	Lower montane conifer forest, north coast conifer forest/ usually serpentinite seeps and stream beds (100-2435m)	Mar-Jul
Eleocharis parvula Small spikerush	--/--/4/--	Marshes and swamps (1-2530m)	Jun-Sep
Erigeron petrophilus var. sierrensis Northern Sierra daisy	--/--/4/SI-2	Cismontane woodland, lower/upper montane conifer forest/ sometimes serpentinite (300-1980m)	Jun-Oct
Hesperevax caulescens Hogwallow starfish	--/--/4/--	Valley and foothill grassland (mesic, clay) (0-505m)	Mar-Jun
Lasthenia ferrisae Ferris's goldfields	--/--/4/--	Vernal pools (alkaline, clay) (20-700m)	Feb-May
***Lilium humboldtii ssp. humboldtii** **Humboldt lily**	--/--/4/SI-1	Chaparral, lower conifer forest/ openings (30-1800m)	May-Jul
Microseris sylvatica **Sylvan microseris**	--/--/4/--	Chaparral, cismontane woodland, Great Basin scrub, pinyon and juniper woodland, valley and foothill grassland (serpentinite) (45-1500m)	Mar-Jun
Mimulus glaucescens **Shield-bracted monkeyflower**	--/--/4/SI-1	Chaparral, cismontane woodland, lower montane conifer forest, valley and foothill grassland/serpentinite seeps (60-1240m)	Feb-Aug
Mimulus inconspicuus **Small flowered monkeyflower**	--/--/4/--	Chaparral, cismontane woodland, lower montane coniferous forest/mesic (455-760m)	May-Jun
Mimulus laciniatus Cut-leaved monkeyflower	--/--/4/--	Chaparral, lower/upper montane conifer forest/ mesic, granitic (490-2650m)	Apr-Jul
Navarretia cotulifolia Cotula navarretia	--/--/4/--	Chaparral, cismontane woodland, valley and foothill grassland/ adobe (4-1830m)	May-Jun
Navarretia heterandra Tehama navarretia	--/--/4/--	Valley and foothill grassland (mesic), vernal pools (30-945m)	Apr-Jun
Perideridia bacigalupii Bacigalupi's yampah	--/--/4/SI-1	Chaparral, lower montane conifer forest/ serpentinite (450-1000m)	Jun-Aug
Piperia colemanii Coleman's rein orchid	--/--/4/--	Chaparral, lower montane conifer forest/ often sandy (1200-2300m)	Jun-Aug
Sanicula tracyi Tracy's sanicle	SC[6]/--/4/--	Cismontane woodland, lower/upper montane conifer forest, openings (100-1585m)	Apr-Jul
Stellaria obtusa Obtuse starwort	--/--/4/--	Upper montane conifer forest/ mesic (150-2135m)	May-Oct
Streptanthus drepanoides **Sickle-fruit jewel-flower**	--/--/4/--	Chaparral, cismontane woodland, lower montane conifer forest/ serpentinite (275-1660m)	Apr-Jun

[1] United States Fish and Wildlife Service (FWS): FE - federal endangered, FT - federal threatened, SC - federal species of concern (not a formal listing).

[2] California Department of Fish and Game (DFG): SE - State endangered, SR - State rare.

[3] California Native Plant Society (CNPS): List 1B - plants rare, threatened, or endangered in California and elsewhere; List 2 - plants rare, threatened, or endangered in California but more common elsewhere; List 3 - plants about which more information is needed; List 4 - plants of limited distribution.

[4] Plumas National Forest (PNF): S - Sensitive; SI-1 - Special Interest category 1 (Survey and recommend conservation measures); SI-2 - Special Interest category 2 (Report occurrences and recommend conservation measures).
[5] FWS recognizes two subspecies of *Clarkia mosquinii*, ssp. *mosquinii* and ssp. *xerophila*, both as SC.
[6] Although FWS lists this species as within the vicinity of the FERC Project Area, PNF and CNPS consider it to only occur in Humboldt and Trinity counties.
* **Species known to occur in LOSRA**

APPENDIX C: LOSRA GP – KNOWN OCCURRENCES OF RARE PLANT SERIES/ASSOCIATIONS AND SPECIAL STATUS PLANT SPECIES AT RECREATION SITES

Recreation Site	Rare Plant Series/Associations Present	Special Status Plant Species Present	Species Status
South Thermalito Forebay Boat Ramp and Day-use Area	Cottonwood/Black Willow Riparian Forest	Ahart's paronychia	SC/CNPS List 1B
North Thermalito Forebay Boat Ramp Day-use Area, En-route Camping, and Aquatic Center	Valley mixed riparian forest		
Diversion Pool Day-use Areas		Fox sedge	CNPS List 2
Spillway Boat Ramp, Day-use Area, and En-route Camping			
Lake Oroville Visitors Center			
Bidwell Canyon Campground, Marina, and Boat Ramp	Mixed Willow Riparian Forest		
Saddle Dam Day-use area and Trailhead			
Loafer Creek Campgrounds, Day-use Area, and Boat Ramp		Butte County calycadenia	CNPS List 1B/S
Craig Saddle Boat-in Campground	Mixed Willow Riparian Forest	Brandegee's clarkia Butte County fritillary	CNPS List 1B/S SC/CNPS List 3/S
Stringtown Car-top Boat Ramp		Butte County fritillary	SC/CNPS List 3/S
Enterprise Boat Ramp and Day-use Area			
Foreman Creek Car-top Boat Ramp		Butte County calycadenia	CNPS List 1B/S
Foreman Creek Boat-in Campground		Butte County calycadenia shield-bracted monkeyflower	CNPS List 1B/S CNPS List 4/SI-1
Bloomer Boat-in Campgrounds		Butte County calycadenia Butte County fritillary	CNPS List 1B/S SC/CNPS List 3/S
Goat Ranch Boat-in Campground		Butte County fritillary	SC/CNPS List 3/S
Dark Canyon Car-top Boat Ramp			
Vinton Gulch Car-top Boat Ramp			
Lime Saddle Campgrounds, Marina, Boat Ramp, and Day-use Areas		Butte County fritillary	SC/CNPS List 3/S
Nelson Bar Car-top Boat Ramp	Mixed Willow Riparian Forest	Butte County calycadenia cut-leaved ragwort sickle-fruit jewel-flower	CNPS List 1B/S CNPS List 1B/S CNPS List 4

APPENDIX D: LAKE OROVILLE VEGETATION TYPES AND WILDLIFE HABITATS

Note: Rare vegetation series/associations known to occur in LOSRA are shown in bold.

VEGETATION TYPE	VEGETATION SERIES/ASSOCIATION	WHR* HABITAT TYPES
Disturbed/Agriculture		
	Eucalyptus	Eucalyptus
Riparian Forest/Woodland		
	Black willow riparian forest	Valley Foothill Riparian
	Cottonwood/ black willow riparian forest	Valley Foothill Riparian
	Foothill/montane mixed riparian forest	Valley Foothill Riparian
	Mixed willow riparian forest	Valley Foothill Riparian
	Valley mixed riparian forest	Valley Foothill Riparian
Riparian Shrub/Scrub		
	Blackberry scrub	Valley Foothill Riparian
	Mixed riparian scrub	Valley Foothill Riparian
	Mixed willow scrub	Valley Foothill Riparian
Upland Forest/Woodland		
	Black oak woodland	Montane Hardwood
	Blue oak woodland	Blue Oak Woodland
	Blue oak woodland/chaparral	Blue Oak Woodland
	Blue oak-foothill pine woodland	Blue Oak – Digger Pine
	Blue oak-foothill pine woodland/chaparral	Blue Oak – Digger Pine
	Canyon live oak woodland	Montane Hardwood
	Douglas-fir forest	Douglas Fir
	Foothill pine woodland/chaparral	Blue Oak – Digger Pine
	Foothill pine-mixed oak woodland	Blue Oak – Digger Pine
	Foothill pine-mixed oak woodland/chaparral	Blue Oak – Digger Pine
	Mixed conifer-hardwood forest	Montane Hardwood - Conifer
	Mixed oak woodland	Montane Hardwood
	Mixed oak woodland/chaparral	Montane Hardwood
	Mixed pine woodland/chaparral	Blue Oak – Digger Pine
	Mixed pine-mixed oak woodland	Montane Hardwood – Conifer
	Mixed pine-mixed oak woodland/chaparral	Montane Hardwood – Conifer
	Ponderosa pine forest	Ponderosa Pine
	Ponderosa pine-Douglas-fir forest	Sierran Mixed Conifer
	Ponderosa pine-mixed oak woodland	Montane Hardwood – Conifer
	Ponderosa pine-mixed oak woodland/chaparral	Montane Hardwood – Conifer
Upland Herbaceous		
	California annual grassland	Annual Grassland
Upland Shrub/Scrub		
	Mixed chaparral	Mixed Chaparral
	Whiteleaf manzanita chaparral	Mixed Chaparral
Wetland		
	Mixed emergent vegetation	Freshwater Emergent Wetland
	Rush	Freshwater Emergent Wetland
	Seep/wet area	Freshwater Emergent Wetland
*WHR = California Department of Fish and Game's Wildlife Habitat Relationships System		

APPENDIX E: SENSITIVE WILDLIFE SPECIES THAT OCCUR OR HAVE POTENTIAL TO OCCUR IN LOSRA

TYPE	SPECIES	COMMON NAME	STATUS*
AMPHIBIANS	*Rana aurora draytonii*	California red-legged frog	FT, CSC
	Rana boylii	Foothill yellow-legged frog	FSC, CSC, FSS, BLM
	Scaphiopus hammondii	Western spadefoot toad	FSC, CSC, BLM
BIRDS	*Gavia immer*	Common loon	CSC
	Pelecanus erythrorhynchos	American white pelican	CSC
	Phalacrocorax auritus	Double-crested cormorant	CSC
	Ardea herodias	Great blue heron	CDF
	Botaurus lentiginosus	American bittern	FSC
	Ixobrychius exilis	Least bittern	CSC
	Nycticorax nycticorax	Black-crowned night heron	BLM
	Plegadis chihi	White-faced ibis	FSC, CSC
	Bucephala islandica	Barrow's goldeneye	CSC
	Accipiter cooperi	Cooper's hawk	CSC
	Accipiter gentilis	Northern goshawk	FSC, CSC, FSS, CDF
	Accipiter striatus	Sharp-shinned hawk	CSC
	Aquilla chrysaetos	Golden eagle	CSC, CFP
	Buteo regalis	Ferruginous hawk	FSC, CSC, BLM
	Buteo swainsoni	Swainson's hawk	ST, FSC, FSS
	Circus cyaneus	Northern harrier	CSC
	Elanus caeruleus	White-tailed kite	CFP, FSC
	Haliaeetus leucocephalus	Bald eagle	SE, FT(FPD), CFP, CDF
	Pandion haliaetus	Osprey	CSC, CDF
	Falco columbarius	Merlin	CSC
	Falco mexicanus	Prairie falcon	CSC
	Falco peregrinus anatum	American peregrine falcon	SE, CFP, FSC, CDF
	Laterallus jamaicensis coturniculus	California black rail	FSC, ST, CFP
	Grus Canadensis tabida	Greater sandhill crane	ST, FSC, CFP, FSS
	Numenius americanus	Long-billed curlew	CSC
	Chlidonias niger	Black tern	CSC

	Larus californicus	California gull	CSC
	Coccyzus americanus occidentalis	Western yellow-billed cuckoo	SE, FC, FSS
	Asio flammeus	Short-eared owl	CSC
	Asio otus	Long-eared owl	CSC
	Athene cunicularia	Burrowing owl	FSC, CSC, BLM
	Strix occidentalis occidentalis	California spotted owl	FSC, CSC, FSS, BLM
	Cypseloides niger	Black swift	CSC
	Chaetura vauxi	Vaux's swift	CSC
	Empidonax trailii	Willow flycatcher	SE, FSS
	Lanius ludovicianus	Loggerhead shrike	FSC, CSC
	Eremophila alpestris actia	California horned lark	CSC
	Progne subis	Purple martin	CSC
	Riparia riparia	Bank swallow	ST, FSC
	Dendroica petechia brewsteri	Yellow warbler	CSC
	Icteria virens	Yellow-breasted chat	CSC
	Amphispiza belli belli	Bell's sage sparrow	FSC, CSC
	Agelaius tricolor	Tricolored blackbird	FSC, CSC, BLM
	Carduelis lawrencei	Lawrence's goldfinch	FSC
MAMMALS	*Antrozous pallidus*	Pallid bat	CSC, FSS, BLM
	Corynorhinus townsendii pallescens	Pale big-eared bat	FSC, CSC, FSS, BLM
	Corynorhinus townsendii townsendii	Townsend's western big-eared bat	FSC, CSC, FSS, BLM
	Euderma maculatum	Spotted bat	FSC, CSC, BLM
	Lasiurus blossevillii	Western red bat	FSS
	Myotis ciliolabrum	Small-footed myotis	FSC, BLM
	Myotis evotis	Long-eared myotis	FSC
	Myotis occultus	Occult little brown bat	CSC
	Myotis volans	Long-legged myotis	FSC
	Myotis yumanensis	Yuma myotis	FSC, CSC
	Myotis thysanodes	Fringed myotis	FSC,
	Eumops perotis	Western mastiff bat	FSC, CSC
	Dipodomys californicus eximus	Marysville California kangaroo rat	FSC, CSC, BLM
	Perognathus inornatus inornatus	San Joaquin pocket mouse	FSC, BLM

REPTILES	*Clemmys marmorata marmorata* *Phrynosoma coronatum* *Thamnophis gigas*	Northwestern pond turtle Coast horned lizard Giant garter snake	FSC, CSC, FSS FSC, CSC, BLM FT, ST, CFP
INVERTE-BRATES	*Branchinecta conservatio* *Branchinecta longiantenna* *Branchinecta lynchi* *Lepidurus packardi* *Anthicus sacramento* *Cicindela hirticollis abrupta* *Desmocerus californicus dimorphus* *Desmona bethula*	Conservancy fairy shrimp Longhorn fairy shrimp Vernal pool fairy shrimp Vernal pool tadpole shrimp Sacramento anthicid beetle Sacramento Valley tiger beetle Valley elderberry longhorn beetle Amphibious caddisfly	FE FE FT FE FSC FSC FT FSC

*Status Codes: FE = Federal Endangered; FT = Federal Threatened; FC = Federal

Candidate for listing; FPD = Federal Proposed for Delisting; FSC = Federal Species of Concern; SE = State Endangered; ST = State Threatened; CFP = California Fully Protected; CP = California Protected; CSC = California Species of Special Concern; FSS = Forest Service Sensitive; BLM = Bureau of Land Management Sensitive.

APPENDIX F: GOVERNMENT PLANNING INFLUENCES

The following represent government policies, regulations, and plans that may affect future LOSRA planning, development, and operational decisions.

Federal

Federal Energy Regulatory Commission
National Oceanic and Atmospheric Administration National Marine Fisheries Service
United States Army Corps of Engineers
United States Bureau of Indian Affairs
United States Bureau of Land Management
United States Fish and Wildlife Service
United States Forest Service
Americans with Disabilities Act of 1990, Title II and III
Clean Water Act, Section 404
Federal Endangered Species Act
Federal Migratory Bird Treaty Act
National Environmental Policy Act (NEPA)
Secretary of the Interior's Standards for the Treatment of Historic Properties, revised in 1992

State of California

California Air Resources Board
California Department of Boating and Waterways
California Department of Fish and Game
California Department of Forestry and Fire Protection
California Department of Transportation
California Department of Water Resources
California Office of Emergency Services
California Code of Regulations
California Department of General Services, Division of the State Architect, Access Compliance
California Endangered Species Act
California Environmental Quality Act (CEQA)
California Fish and Game Code
California Native Plant Protection Act

California Public Resources Code
Section 5019.50 State Park Classification
Section 5024 Preserving and Maintaining all State-owned Historical Resources
Section 5097.99 Felony Possession of Native American Human Remains and Artifacts
Section 5097.991 Repatriation
Section 5020.1(g) Native American Heritage and Department of Parks and Recreation Gathering Policy
Section 21083.2 Unmitigated Significant Effects on Archeological Sites Natural Communities Conservation Planning Act

California State Parks
California Outdoor Recreation Plan
California State Parks Operations Manual
California State Parks Administrative Manual
California Recreational Trails Plan
California State Park & Recreation Commission Policies, Rules, Regulations & Orders
California State Parks System Plan
California State Parks Planning Handbook
California State Parks Access to Parks Guidelines
California State Parks Mission Statement
California State Parks Concessions Policies
California Department of Parks and Recreation Resource Management Directives

County and Local

County of Butte
Butte County Association of Governments
Butte County Air Quality Management District
Feather River Recreation and Parks District
Paradise Recreation and Park District
Central Valley Regional Water Quality Control Board, Region 5
Butte Water District
City of Oroville
Town of Paradise

APPENDIX G: DWR STUDIES AND MAPS RELATED TO THE LOSRA GENERAL PLAN

The following maps related to the LOSRA General Plan were produced by DWR as part of their Oroville Facilities Relicensing Project. To avoid duplicating this extensive mapping in this General Plan these maps are listed here with the Website address where they are posted under the same category names. They are currently posted at the following Web address: http://orovillerelicensing.water.ca.gov/wg-reports.html

Recreation and Socioeconomic Studies and Maps

R-1-*Public and Private Vehicular Access*

1. Recreation Site Use Levels
2. Access Road Conditions: Reservoir – North
3. Access Road Conditions: Reservoir – South
4. Access Road Conditions: River Below Dam
5. Vinton Gulch Car-top BR parking constraint
6. Lakeland Boulevard Trail Access DUA Shoreline Constraint
7. Constraints to Vehicular Access

R-2-*Recreation Safety Assessment*

1. Location of Lake Oroville Boating Vessel Accidents – 2002
2. Cellular Phone Coverage
3. Communication Radio Coverage
4. Cellular Phone Coverage on Lake Oroville
5. Radio Communication on Lake Oroville
6. Wildfire History in Oroville Relicensing Study Area and Vicinity
7. Wildfire Fuel Hazard Ranking within the Study Area
8. Recreation Site Fuel Management Techniques (CSP 2002)

R-3-*Assess Relationship of Project Operations and Recreation*

1. Lake Oroville daily elevation, May 15–September 15, 2002
2. Lake Oroville end-of-month pool elevations, May–Aug. 1990–2002
3. Lake Oroville yearly high and low elevations, 1990–2002
4. Lake Oroville water temperature sampling sites
5. Thermalito Afterbay daily mean elevations, June 2002
6. Diversion Pool and Thermalito Forebay water temperature data collection locations
7. Thermalito Afterbay water temperature data collection locations
8. Feather River water temperature data collection locations
9. Flows in the Feather River low-flow and high-flow sections, May-Sept 2002
10. Vinton Gulch Car-Top Boat Ramp
11. Dark Canyon Car-Top Boat Ramp
12. Nelson Bar Car-Top Boat Ramp
13. Foreman Creek Car-Top Boat Ramp

14. Stringtown Car-Top Boat Ramp
15. Shoreline use at Stringtown Car-Top Boat Ramp area
16. South Fork access to Craig Saddle Boat-In Campsites
17. Boater access as seen from the Foreman Creek Area Boat-In Campsites

R-4-*Assess Relationship of Fish & Wildlife Management and Recreation*

1. Oroville Wildlife Area

R-5-*Assess Recreation Areas Management*

1. Public Land Jurisdiction, Reservoir – North
2. Public Land Jurisdiction, Reservoir – South
3. Public Land Jurisdiction, River Below Dam

R-6-*ADA Accessibility Assessment*

1. ADA Status of Recreation Facilities – Project Area and Associated Recreation Sites

R-7-*Reservoir Boating Survey*

1. Lake Oroville area reservoir boat count zones
2. Project study area boating facilities
3. Lake Oroville daily pool elevation, May 2002–August 2003
4. Lake Oroville end-of-month pool elevations, May–August, 1990–2002
5. Lake Oroville shoreline at various pool elevations
6. Peak season weekend boating use
7. Peak season holiday boating use
8. Peak season weekend boating traffic densities

R-8- *Carrying Capacity*

1. Project Area and Associated Recreation Sites
2. Oroville Facilities FERC Project 2100 boundary

R-9-*Exisiting Recreation Use Study*

1. Trail Counter Locations
2. Use by activity at the Lake Oroville area
3. Use by activity in the Thermalito Diversion Pool area
4. Use by activity in the Thermalito Forebay area
5. Use by activity in the Thermalito Afterbay area
6. Use by activity in the Oroville Wildlife Area
7. Use by activity at dispersed use sites
8. Use by activity at additional sites outside FERC boundary
9. Average monthly occupancy- Bidwell Canyon Campground
10. Average monthly occupancy- Lime Saddle CG
11. Average monthly occupancy- Lime Saddle Group CG
12. Average monthly occupancy- Loafer Creek CG
13. Average monthly occupancy- Loafer Creek Group CG
14. Average monthly occupancy- Loafer Creek Equestrian CG

R-10-*Recreation Facility and Condition Inventory*

1. Project Area and Associated Recreation Sites with Conditions

R-11-*Recreation and Public Use Impact Assessment*

1. Lake Oroville Dispersed Recreation Sites and Use Areas
2. Lower Project Area Dispersed Recreation Use Areas
3. Developed Recreation Sites and Areas with High Concerns
4. Dispersed Recreation Sites and Areas with High Concerns

R-12-*Projected Recreation Use*

1. Project Area and Associated Recreation Sites
2. Oroville Facilities FERC Project 2100 Boundary

R-13-*Recreation Surveys* (study has no unique maps)

R-14-*Assess Regional Recreation and Barriers to Recreation*

1. Regional recreation resources
2. Road segments on State Route 70
3. Road segments on State Route 99
4. Road segments on State Route 162

R-15-*Recreation Suitability Study*

1. Summary of Opportunities - Reservoir – North
2. Summary of Opportunities - Reservoir – South
3. Summary of Opportunities - River – Below Oroville Dam
4. Summary of Constraints - Reservoir – North
5. Summary of Constraints - Reservoir – South
6. Summary of Constraints - River – Below Oroville Dam
7. Recreation Suitability - Composite – Reservoir – North
8. Recreation Suitability - Composite – Reservoir – South
9. Recreation Suitability - Composite – River – Below Oroville Dam
10. Recreation Suitability - Composite – Reservoir Main Basin – South
11. Recreation Suitability - Composite – Lime Saddle Area
12. Recreation Suitability - Composite – Diversion Pool/ Feather River in Oroville
13. Recreation Suitability - Composite – Foreman Creek Car-top BR
14. Recreation Suitability - Composite – Enterprise BR

R-16-*Whitewater and River Boating*

1. Study area
2. Lower reach segments
3. Description of the Big Bend Run
4. Big Bend Run at various Lake Oroville elevations
5. Runs comparable to the Big Bend Run
6. Access to the Bald Rock Canyon Run
7. Potential locations for whitewater park along the Feather River
8. Potential whitewater park locations between the Thermalito Forebay and Afterbay

R-17-*Recreation Needs Analysis*

1. Regional recreation resources
2. Existing and proposed trails
3. Proposed trail – Lime Saddle area

Cultural Resources Studies and Maps

C1- *Cultural Resources Inventory*

1. Distribution of Randomly Selected Sample Units

C2- *Cultural Resources Evaluation* *(contact DWR for sensitive cultural maps)*

C3- *Cultural Resources Management* *(contact DWR for sensitive cultural maps)*

C4- *Cultural Resources Interpretive Evaluation* *(contact DWR for sensitive cultural maps)*

Konkow Maidu Tribal Presence in the Lake Oroville Area: An Ethnographic and Ethnohistoric Inventory

1. Maidu Tribal Territory
2. Zones 1 and 2
3. Zones 3, 4, and 5
4. Zones 3 and 6

The Archaeological and Historical Site Inventory at Lake Oroville, Butte County

1. Prehistoric Archaeology Study Units in the Oroville Facilities Project Area

Environmental Studies and Maps

Fish

F1- *Project Effects on Non-fish Aquatic Resources* (study has no unique maps)

F3.1 Task 1A: *Assessment of Potential Fish Passage Impediments Above Lake Oroville's High Water Mark*

1. Fish Passage Barriers

F3.1 FR-T2A & T3A- *Fish Species In Lake Oroville* (study has no unique maps)

F3.1-T3B & T3C- *Project Effects on Fish & Habitats in Lake Oroville*

1. Forebay and diversion pool water quality sampling locations
2. Thermalito diversion pool water quality sampling locations

Geomorphology

G1- *Effects of Project Operations on Geomorphic Processes Upstream of Oroville Dam*

1. Feather River Watershed, Lower River, and Hydrology
2. Slope Attitude
3. Appendices A, B, and C contain numerous geology maps

G2- *Task 1.1: Effects of Project Operations on Geomorphic Processes Downstream of Oroville Dam*

1. Geomorphic Study Area and Subreaches, Lake Oroville to Yuba City
2. Atlas contains numerous aerial photos and cartographic maps

Terrestrial Biology

T1 - *Effects of Project Features and Operation on Wildlife and Wildlife Habitat*

1. Bank swallow colony locations
2. Location of barren gravel tailings within Oroville Wildlife Area

T2 - *Project Effects on Special Status Species: Wildlife*

1. Bank swallow colony locations
2. Valley elderberry longhorn beetle habitat
3. California red-legged frog habitat
4. giant garter snake habitat
5. Vernal pool locations
6. Appendix A contains numerous maps detailing wildlife observations in the Project Area
7. Appendix B contains maps detailing federal land parcels and sensitive species in the Project Area

T2 - *Projects Effects on Special Status Species: Plants*

1. Special Status Plant Species – Survey Areas 2002/2003 (4 maps)
2. Vernal Pools in Project Area (3 maps)
3. Serpentine soils/Layne's ragwort habitat (2 maps)
4. Gabbro soils/ Layne's ragwort habitat
5. Appendix C contains numerous Special Status Plant Species – CNPS List 1, 2, and 3 Occurrence Maps
6. Appendix D contains numerous Special Status Plant Species – CNPS List 4 Occurrence Maps

T3/5 – *Draft Final Report: Project Effects on Riparian Resources, Wetlands, and Associated Floodplains*

1. Cottonwood recruitment study sites (10 maps)
2. Slope/riparian vegetation within Lake Oroville fluctuation zone (8 maps)

T4 - *Biodiversity, Vegetation Communities, and Wildlife Habitat Mapping*

1. Vegetation/land use mapping categories
2. Examples of vegetation associations mapped
3. Examples of WHR habitats mapped
4. Appendix B: Project Area Vegetation cover
5. Appendix C: Project Area WHR habitats

T6 - *Interagency Wildlife Management Coordination and Wildlife Management Plan Development* (study has no unique maps)

T7- *Project Effects on Noxious Terrestrial and Aquatic Plant Species*
(study has no unique maps)

T8 - *Project Effects on Non-Native Wildlife* (study has no unique maps)

T9 - *Recreation & Wildlife*

1. Identification of Environmentally Sensitive Areas (8 maps)

T10 - *Effects of Project Features, Operations and Maintenance on Upland Plant Communities* (study has no unique maps)

T11 - *Effects of Fuel Load management and Fire Prevention on Wildlife and Plant Communities*

1. Kelly Ridge Study Area
2. CWHR Habitat Types in the Kelly Ridge Study Area

Water Quality

W3 – *Task 1A Interim Report: Recreational Facilities and Operations Effects on Water Quality* (study has no unique maps)

W5 – 1 *Phase, 1 Draft Report: Project Effects on Groundwater, Inventory Existing Wells and Assessment of Existing Groundwater Data and Current Groundwater Monitoring Activities*

1. Groundwater quality monitoring wells
2. Comparison of groundwater and surface water results

W7/Task 1A- *Land & Watershed Management Effects on Water Quality*

1. Stormwater sampling sites
2. Methoprene and malathion sampling sites
3. Temperature sampling sites

W9 – Project Effects on Natural Protective Processes

1. Riffle water quality sampling locations
2. Riparian habitats
3. Riffle habitats

Land Use, Management & Aesthetics Studies and Maps

L-1 – *Land Use*

1. Existing land ownership in the study area – River – Below Oroville Dam
2. Existing land ownership in the study area – Reservoir – North
3. Existing land ownership in the study area – Reservoir – South
4. Existing land use in the study area – River – Below Oroville Dam
5. Existing land use in the study area – Reservoir – North
6. Existing land use in the study area – Reservoir – South
7. Future land use direction – River – Below Oroville Dam
8. Future land use direction – Reservoir – North
9. Future land use direction – Reservoir – South
10. Projects on record with local planning departments

L-2 – *Land Management*

1. Oroville Relicensing Study Area
2. Land Management Responsibility
3. USFS Management Prescription (3 maps)
4. BLM Land Management Areas
5. DWR Land Management
6. CSP Land Management
7. CDFG Land Management
8. Butte County Zoning (3 maps)
9. City of Oroville Zoning
10. Land Management Direction

L3- *Comprehensive Plan Evaluation* (study has no unique maps)

L4- *Aesthetic/ Visual Resources*

1. Location of Key Observation Points (KOPs)
2. Butte County Scenic Highway zoning

L5- *Fuel Load Management Evaluation*

1. Fire history in the project region
2. Fuel hazard ranking for Butte County
3. Fuel hazard ranking within the study area
4. Frequency of ignitions in the Project region
5. Compilation of CDF data within study area

APPENDIX H: GENERAL PLAN CONTRIBUTORS

Northern Service Center Team Members
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