
State of California
The Resources Agency
Department of Water Resources

**ASSESSMENT OF REGIONAL RECREATION
AND BARRIERS TO RECREATION**

FINAL

R-14

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



FEBRUARY 2004

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The Resources Agency
Department of Water Resources**

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FERC Project No. 2100**

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REPORT SUMMARY

The California Department of Water Resources (DWR) operates the Oroville Facilities, a multipurpose water supply, flood control, power generation, recreation, fish and wildlife enhancement, and salinity control project. The hydroelectric facilities operate under a license from the Federal Energy Regulatory Commission (FERC). The license expires on January 31, 2007. Pursuant to the Federal Power Act, DWR is required to file an application for a new license on or before January 31, 2005. Seventy-two background studies are being conducted, 19 related to recreation and socioeconomic resources, in order to assess the present and future conditions of the Oroville Facilities.

This report presents results from Relicensing Study R-14 – *Assessment of Regional Recreation and Barriers to Recreation*. This study is needed to meet the FERC's direction for preparing recreation reports during the relicensing process. FERC guidelines recommend that the licensee cooperate with local, State, and federal agencies in planning for recreational use of public lands administered by those agencies adjacent to the Project area. FERC requires that licensees develop suitable public recreational facilities with adequate public access. This is best accomplished by evaluating recreation demand in a regional context.

The objectives of this study are to evaluate regional recreational opportunities in Northern California (and adjacent Nevada) and to identify potential barriers, if any, to increasing existing and future recreational uses within the Project area.

When making decisions about where to recreate, visitors often evaluate alternative locations and opportunities within a geographic region. Therefore, understanding recreation supply and demand issues in a regional context is a critical part of identifying and possibly mitigating potential barriers arising from Project operation to increased recreational use. This study examines possible barriers and incentives to visiting the Project area and provides an assessment of regional recreational opportunities.

Supply and demand information for the Project area and the region was gathered from various sources including existing reports, which include past and current recreation visitor surveys. Regional resources were defined as similar lakes and reservoirs in Northern California. Both qualitative and quantitative data were utilized.

PROJECT AREA SUPPLY

The Project area provides numerous facilities for various recreation activities. These facilities compare favorably in development and quantity to similar projects in California (DWR 2001). There are three major campgrounds that include group camping and equestrian camping. There are also seven boat-in campgrounds (BIC) and ten floating campsites. There are 15 boat ramps, numerous day use areas (DUAs) and other facilities such as a boat storage facility (the "Aquatic Center"), a fish hatchery, and trails. These facilities provide opportunities for diverse recreational activities.

PROJECT AREA DEMAND

In spite of an increase in population in both Butte County (Table 5.2-3) and California (Table 5.2-2), and the development of many new recreation facilities pursuant to an updated recreation plan, the best available data suggest that visitation has generally dropped slightly at the Oroville Facilities over the last three decades (Table 5.2-1).

REGIONAL SUPPLY

Twenty-two lakes and reservoirs in northern California were selected for comparison with Lake Oroville (Table 1.1-2). Table 5.3-2 summarizes jurisdiction, surface area, miles of shoreline, facilities, and lake elevation for each of the selected regional lakes and reservoirs.

REGIONAL DEMAND

Existing and projected future demand for each of the selected regional sites is summarized in Table 5.3-4. Visitation is expected to increase by varying degrees at the following sites:

- € Antelope Lake;
- € Black Butte Reservoir;
- € Bucks Lake;
- € Butt Valley Reservoir;
- € Clear Lake;
- € East Park Reservoir;
- € Englebright Lake;
- € Lake Almanor;
- € Lake Berryessa;
- € Lake Pillsbury;
- € Lake Tahoe;
- € Shasta Lake;
- € Little Grass Valley Reservoir;
- € Stony Gorge Reservoir; and
- € Trinity Lake.

Visitation is not expected to increase at the following sites:

- € Bullard's Bar Reservoir;
- € Folsom Lake;
- € Frenchman Lake;
- € Indian Valley Reservoir;
- € Lake Davis;
- € Lake Spaulding; and
- € Whiskeytown Lake.

The most visited lake, based on Household Survey (conducted as part of Relicensing Study R-13 – *Recreation Surveys*) respondents, was Lake Tahoe (which 61.8 percent of respondents had visited) while Lake Oroville ranked fifth (31.5 percent) among the 37 regional lakes, reservoirs and rivers (Table 5.3-5). Demand for setting types was nearly

equal between natural areas (45.8 percent) and developed areas (42.8 percent) among the Household Survey respondents (Table 5.2-6).

Recreationists at three similar sites—Lake Berryessa, Shasta Lake, and Black Butte Lake—were surveyed for their preferences, experiences, and barriers to visiting Lake Oroville. Among Black Butte Lake, Lake Berryessa and Lake Oroville, ease of access was the most frequent reason (43 percent to 49 percent) visitors chose the reservoir at which they were surveyed. Quality of experience (19 percent) and ease of access (18 percent) were the top two reasons visitors gave for choosing Shasta Lake.

On a four-point scale of “not a problem” to “a big problem,” visitors were asked to rate various conditions at each of the similar sites and at Lake Oroville. Visitors cited water level-related issues at Shasta Lake and Lake Oroville as “slight problems” (Table 5.5-7).

Of those surveyed at the three similar sites, 49 percent of Black Butte visitors, 80 percent of Lake Berryessa visitors, and 68 percent of Shasta Lake visitors had never been to Lake Oroville.

VISITATION, SATISFACTION, AND RECREATION ATTENDANCE FACTORS

Several categories of potential barriers and incentives to visiting Lake Oroville were identified based on survey data, literature review, expert consultation, and Relicensing Work Group meetings. These categories include factors regarding proximity and access, information, conditions at the lake, facilities, special events, and visitor experience.

Proximity and Access. Since one of the main reasons for visiting lakes and reservoirs (based on the Similar Site Survey) is proximity to home, the ability of Lake Oroville to attract many new visitors may be somewhat limited due to its geographic location in relation to population centers. Lake Oroville is accessible by three State highways.

Information. Lack of information was one of the top two reasons that respondents to the Household and Similar Sites Surveys have not visited the Lake Oroville area. Information regarding recreation facilities at the Lake Oroville Facilities is available on the Internet at both DPR and DWR websites.

Conditions. Lake level, weather, and scenery are conditions that affect visitor satisfaction:

- € Lake Oroville was rated nearly equivalent to the other lakes in the Similar Site Survey in scenic appeal (Table 5.4-9);
- € Of the 2.4 percent of Household Survey respondents who were dissatisfied with their last visit to Lake Oroville, 44.4 percent gave “low lake level” as the cause (Table 5.5-7); and

- € Of the 11.3 percent of boaters who were dissatisfied with their last boating experience, 46.1 percent gave “lake level” as the reason.

Facilities. The majority of visitors are satisfied with the existing facilities at Lake Oroville, but some preferences exist for new facilities such as more swimming areas and new attractions such as a floating restaurant or water park. Survey respondents gave a variety of answers as to what would motivate them to visit Lake Oroville for the first time, or more frequently if they had visited before. Written responses indicate that visitors would like better or more access to the water’s edge for swimming, boating, and fishing (Section 5.6.5).

Special Events. While some current visitation can be attributed to existing special events, new special events are not expected to attract a large number of new visitors. For example, according to the Household Survey, approximately 62 percent of water-based recreationists in the region who had never been to Lake Oroville stated that a special event would not motivate them to visit Lake Oroville for the first time (Table 5.5-18). However, special events may be an opportunity to disseminate information about other recreational opportunities in the Lake Oroville area.

CONCLUSIONS

There are numerous recreation activities and facilities available within the Project area, many of which are similar to those available at the other regional lakes and reservoirs included in the study. Lake Oroville offers several uncommon recreation opportunities such as boat-in camping, equestrian camping, and a designated OHV area. Within the Project area, there appears to be some unmet or latent demand for swimming and beach areas. Visitation is expected to increase at most of the regional lakes and reservoirs, and therefore, demand for recreational facilities, activities and opportunities will increase as well.

Comparing the three reservoirs included in the Similar Site Survey and Lake Oroville, proximity, resource conditions, and good facilities/maintenance were the top three reasons given for visiting each lake. Generally, survey respondents were satisfied with their last visit to the Lake Oroville area. Dissatisfied respondents felt that poor or not enough facilities, access issues and lake level were the cause of their dissatisfaction.

The most significant factors that may prevent people from visiting the Lake Oroville area include proximity (especially distance from home to the lake), lack of information, and low lake level. Facilities and special events do not appear to be factors which would motivate many respondents to visit the Lake Oroville area more often or for the first time. Recommendations to help overcome these potential barriers include disseminating more information outside of Butte County about the Lake Oroville area, which highlights the unique opportunities provided at Lake Oroville.

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ACRONYMS & ABBREVIATIONS

AADT	average annual daily traffic
ADA	Americans with Disabilities Act
af	acre-feet
ATV	all-terrain vehicle
BIC	boat-in campground
BLM	U.S. Bureau of Land Management
BR	boat ramp
Caltrans	California Department of Transportation
cfs	cubic feet per second
DFG	California Department of Fish and Game
DPR	California Department of Parks and Recreation
DUA	day use area
DWR	California Department of Water Resources
FERC	Federal Energy Regulatory Commission
FRSA	Feather River Service Area
I-5	Interstate 5
I-80	Interstate 80
ISO	Independent System Operator
LOS	level of service
LOSRA	Lake Oroville State Recreation Area
maf	million acre-feet
mph	miles per hour
msl	mean sea level
MW	megawatt
NOAA	National Oceanic and Atmospheric Administration
OHV	off-highway vehicle
OWA	Oroville Wildlife Area
PG&E	Pacific Gas and Electric
PWC	personal water craft
RD	recreation day
RV	recreational vehicle
RVD	recreation visitor day
SR	State Route
SRA	State Recreation Area
SVRA	State Vehicular Recreation Area
SWP	State Water Project
USACE	U.S. Army Corps of Engineers
USBR	U.S. Department of the Interior Bureau of Reclamation
USDA – FS	U.S. Department of Agriculture – Forest Service

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1.0 INTRODUCTION

The California Department of Water Resources (DWR) is responsible for planning for the recreation use supported by its operation of the Oroville Facilities as part of a Relicensing application to be submitted to the Federal Energy Regulatory Commission (FERC). One part of this planning includes an evaluation of the relationship of the Oroville Facilities' recreation opportunities to similar opportunities within the Northern California region. This study evaluates the overall supply of recreation resources at the regional level in order to identify the relative role of Project recreation facilities and opportunities in the region. The study also investigates potential factors limiting recreation use at Lake Oroville and select similar regional reservoirs. Variables that may contribute to potential barriers such as visitors' awareness level of what an area has to offer; access to facilities; evaluations of the area's attractiveness; and visitors' satisfaction levels were analyzed as part of this study.

1.1 STUDY AREA

The study area includes the Project area and twenty-one regional lakes and reservoirs. The Project area includes Lake Oroville, the lands and waters within and adjacent to (1/4 mile) the FERC Project Boundary (Figure 1.2-1). Section 1.1.1 describes Project area sites; regional resources are described in Section 1.2.1.

1.1.1 Recreation Sites within the Project area

Recreation sites within the Project area include campgrounds, boat-in campsites (BICs), day use areas (DUAs), and boat ramps (BRs). Table 1.1-1 lists the recreation sites in the Project area.

1.1.2 Regional Recreation Resources

Regional lakes and reservoirs were analyzed in order to compare them to Lake Oroville. Table 1.1-2 lists the reservoirs and lakes included in this study. Figure 5.3-1 (Chapter 5) shows the location of each of the regional sites.

1.2 DESCRIPTION OF FACILITIES

The Oroville Facilities are located on the Feather River at the foothills of the Sierra Nevada in Butte County, California. The Oroville Facilities were developed as part of the SWP, a water storage and delivery system of reservoirs, aqueducts, power plants, and pumping plants. The main purpose of the SWP is to store and distribute water to supplement the needs of urban and agricultural water users in Northern California, the San Francisco Bay area, the San Joaquin Valley, and Southern California. The Oroville Facilities are also operated for flood control power generation, to improve water quality in the Sacramento–San Joaquin Delta (Delta), enhance fish and wildlife, and provide recreation.

Table 1.1-1. Recreation sites in the Project area.

Campgrounds and Campsites	
<ul style="list-style-type: none"> € Bidwell Canyon Campground € Bloomer Cove BIC € Bloomer Knoll BIC € Bloomer Point BIC € Bloomer Group BIC € Craig Saddle BIC € Foreman Creek BIC € Goat Ranch BIC € Floating Campsites € Floating Restrooms 	<ul style="list-style-type: none"> € Lime Saddle Campground € Lime Saddle Group Campground € Loafer Creek Campground € Loafer Creek Group Campground € Loafer Creek Equestrian Campground € Oroville Wildlife Area (OWA) Primitive Camping Areas € North Thermalito Forebay Recreational Vehicle (RV) "en route" Campground
Day Use Areas (DUAs) and Other Facilities	
<ul style="list-style-type: none"> € Aquatic Center € Bedrock Park € Bidwell Canyon Marina € Brad P. Freeman Trail € Clay Pit State Vehicular Recreation Area (SVRA) € Dispersed use areas along the upstream and downstream reaches of the Feather River € Diversion Pool DUA € Feather River Fish Hatchery € Lake Oroville State Recreation Area (LOSRA) 	<ul style="list-style-type: none"> € Lake Oroville Visitors Center € Lakeland Blvd. Trailhead Access (TA) € Lime Saddle Marina € LOSRA Hiking/Equestrian Trails € Model Aircraft Flying Area € Oroville Dam/Overlook DUA € OWA € Riverbend Park € Saddle Dam TA
Boat Ramps (BRs) and Day Use Areas (BR/DUAs)	
<ul style="list-style-type: none"> € Bidwell Canyon BR/DUA € Dark Canyon Car-top BR € Enterprise BR € Foreman Creek Car-top BR € Larkin Road Car-top BR € Lime Saddle BR/DUA € Loafer Creek BR/DUA € Monument Hill BR/DUA 	<ul style="list-style-type: none"> € Nelson Bar Car-top BR € North Thermalito Forebay BR/DUA € South Thermalito Forebay BR/DUA € Spillway BR/DUA € Stringtown Car-top BR € Vinton Gulch Car-top BR € Wilbur Road BR

Table 1.1-2. Regional lakes and reservoirs in the study area.

<ul style="list-style-type: none"> € Black Butte Lake € Bucks Lake Recreation Area € Bullard's Bar Reservoir € Butt Valley Reservoir € Clear Lake € East Park Reservoir € Englebright Lake € Folsom Reservoir € Indian Valley Reservoir € Lake Almanor € Lake Berryessa 	<ul style="list-style-type: none"> € Lake Pillsbury € Lake Tahoe € Shasta Lake € Lake Spaulding € Little Grass Valley Reservoir € Stony Gorge Reservoir € Trinity Lake € Upper Feather River Reservoirs (Antelope, Frenchman, Davis) € Whiskeytown Lake
--	--

FERC Project No. 2100 encompasses 41,100 acres and includes Oroville Dam and Reservoir, three power plants (Hyatt Pumping-Generating Plant, Thermalito Diversion Dam Power Plant, and Thermalito Pumping-Generating Plant), Thermalito Diversion Dam, the Feather River Fish Hatchery and Fish Barrier Dam, Thermalito Power Canal, the OWA, Thermalito Forebay and Forebay Dam, Thermalito Afterbay and Afterbay Dam, transmission lines, and a relatively large number of recreational facilities. An overview of these facilities is provided in Figure 1.2-1. Oroville Dam, along with two small saddle dams, impounds Lake Oroville, a 3.5-million-acre-foot (maf) capacity storage reservoir with a surface area of 15,810 acres at its maximum normal operating level of 900 feet above mean sea level (msl).

The hydroelectric facilities have a combined licensed generating capacity of approximately 762 megawatts (MW). The Hyatt Pumping-Generating Plant is the largest of the three power plants with a capacity of 645 MW. Water from the six-unit underground power plant (three conventional generating and three pumping-generating units) is discharged through two tunnels into the Feather River just downstream of Oroville Dam. The plant has a generating and pumping flow capacity of 16,950 and 5,610 cubic feet per second (cfs), respectively. Other generation facilities include the 3-MW Thermalito Diversion Dam Power Plant and the 114-MW Thermalito Pumping-Generating Plant.

Thermalito Diversion Dam, 4 miles downstream of Oroville Dam, creates a tail water pool for the Hyatt Pumping-Generating Plant and is used to divert water into the Thermalito Power Canal. Thermalito Diversion Dam Power Plant is a 3-MW power plant located on the left abutment of the diversion dam. The power plant releases a maximum of 615 cfs of water into the river.

The power canal is a 10,000-foot-long channel designed to convey generating flows of 16,900 cfs to the Thermalito Forebay and pump-back flows to the Hyatt Pumping-Generating Plant. Thermalito Forebay is an offstream regulating reservoir for the 114-MW Thermalito Pumping-Generating Plant. The Thermalito Pumping-Generating Plant is designed to operate in tandem with the Hyatt Pumping-Generating Plant and has generating and pump-back flow capacities of 17,400 cfs and 9,120 cfs, respectively.

When in generating mode, the Thermalito Pumping-Generating Plant discharges into Thermalito Afterbay, which is contained by a 42,000-foot-long earthfill dam. The Afterbay is used to release water into the Feather River downstream of the Oroville Facilities, helps regulate the power system, provides storage for pump-back operations, provides recreational opportunities, and provides local irrigation water. Several local irrigation districts also receive Lake Oroville water via the Afterbay.

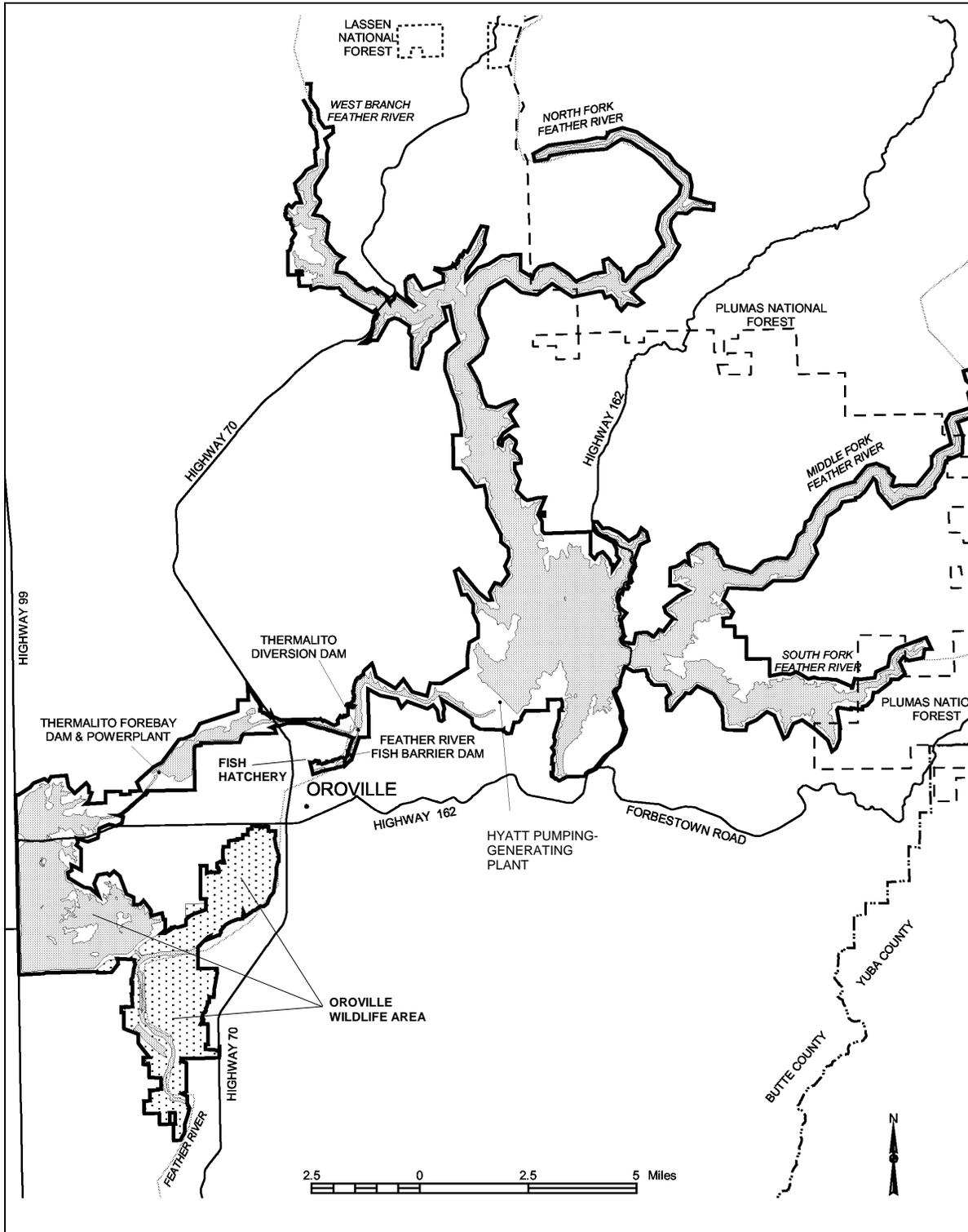


Figure 1.2-1. Oroville Facilities FERC Project 2100 boundary

The Feather River Fish Barrier Dam is downstream of the Thermalito Diversion Dam and immediately upstream of the Feather River Fish Hatchery. The flow over the dam maintains fish habitat in the low-flow channel of the Feather River between the dam and the Afterbay outlet, and provides attraction flow for the hatchery. The hatchery is an anadromous fish hatchery intended to compensate for salmon and steelhead spawning grounds made unreachable by construction of Oroville Dam. Hatchery facilities have a production capacity of 10 million fall-run salmon, 5 million spring-run salmon, and 450,000 steelhead annually (pers. comm., Kastner 2003). However, diseases have reduced hatchery production in some recent years.

The Oroville Facilities support a wide variety of recreational opportunities. They include boating (several types), fishing (several types), fully developed and primitive camping (including boat-in and floating sites), picnicking, swimming, horseback riding, hiking, off-road bicycle riding, wildlife watching, hunting, and visitor information sites with cultural and informational displays about the developed facilities and the natural environment. There are major recreation facilities at Loafer Creek, Bidwell Canyon, Spillway, Lime Saddle, and Thermalito Forebay. Lake Oroville has two full-service marinas, five car-top boat ramps, ten floating campsites, and seven two-stall floating toilets. There are also recreation facilities in the OWA, the Thermalito Afterbay, and at the Lake Oroville Visitors Center.

The OWA comprises approximately 11,000 acres west of Oroville that is managed for wildlife habitat and recreational activities. It includes the Thermalito Afterbay and surrounding lands (approximately 6,000 acres) along with 5,000 acres adjoining the Feather River. The 5,000-acre area is adjacent to or straddles 12 miles of the Feather River, and includes willow and cottonwood-lined ponds, islands, and channels. Recreational opportunities include dispersed recreation (hunting, fishing, and bird watching); recreational activities also take place at developed sites (the Monument Hill Day Use Area (DUA), model airplane grounds, and three boat ramps on the Afterbay and two on the river) and in two primitive camping areas. DFG's habitat enhancement program includes a wood duck nest-box program and dry land farming for nesting cover and improved wildlife forage. Limited gravel extraction also occurs in a few locations.

1.3 CURRENT OPERATIONAL CONSTRAINTS

Operation of the Oroville Facilities varies seasonally, weekly, and hourly, depending on hydrology and the objectives DWR is trying to meet. Typically, releases to the Feather River are managed to conserve water while meeting a variety of water delivery requirements, including flow, temperature, fisheries, diversion, and water quality. Lake Oroville stores winter and spring runoff for release to the Feather River as necessary for Project purposes. Meeting the water supply objectives of the SWP has always been the primary consideration for determining Oroville Facilities operation (within the regulatory constraints specified for flood control, instream fisheries, and downstream uses). Power production is scheduled within the boundaries specified by the water operations criteria

noted above. Annual operations planning is conducted for multi-year carryover storage. The current methodology is to retain half of the Lake Oroville storage above a specific level for subsequent years. Currently, that level has been established at 1.0 maf; however, this does not limit drawdown of the reservoir below that level. If hydrology is drier or requirements are greater than expected, additional water could be released from Lake Oroville. The operations plan is updated regularly to reflect forecast changes in hydrology and downstream operations. Typically, Lake Oroville is filled to its maximum operating level of 900 feet above msl in June and then lowered as necessary to meet downstream requirements, to a minimum level in December or January (approximately 700 msl). During drier years, the reservoir may be drawn down more and may not fill to desired levels the following spring. Project operations are directly constrained by downstream operational demands and flood management criteria as described below.

1.3.1 Downstream Operation

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

1.3.1.1 Instream Flow Requirements

The Oroville Facilities are operated to meet minimum flows in the Lower Feather River as established by the 1983 agreement (see above). The agreement specifies that the Oroville Facilities release a minimum of 600 cfs into the Feather River from the Thermalito Diversion Dam for fisheries purposes. This is the total volume of flows from the diversion dam outlet, diversion dam power plant, and the Feather River Fish Hatchery pipeline.

Generally, the instream flow requirements below Thermalito Afterbay are 1,700 cfs from October through March, and 1,000 cfs from April through September. However, if runoff for the previous April through July period is less than 1,942,000 acre-feet (af) (i.e., the 1911–1960 mean unimpaired runoff near Oroville), the minimum flow can be reduced to 1,200 cfs from October to February and 1,000 cfs for March. A maximum flow of 2,500 cfs is maintained from October 15 through November 30 to prevent spawning in overbank areas that might become dewatered.

1.3.1.2 Temperature Requirements

The Thermalito Diversion Pool provides the water supply for the Feather River Fish Hatchery. The hatchery temperature objectives are 52°F for September, 51°F for October and November, 55°F for December through March, 51°F for April through May 15, 55°F for the last half of May, 56°F for June 1–15, 60°F for June 16 through August 15, and 58°F for August 16–31. In April through November, a temperature range of plus or minus 4°F is allowed for objectives.

There are several temperature objectives for the Feather River downstream of the Afterbay outlet. During the fall months, after September 15, the temperatures must be suitable for fall-run Chinook salmon. From May through August, the temperatures must be suitable for shad, striped bass, and other warmwater fish.

The National Oceanic and Atmospheric Administration (NOAA) Fisheries has also established an explicit criterion for steelhead trout and spring-run Chinook salmon, memorialized in a biological opinion on the effects of the Central Valley Project and the SWP on Central Valley spring-run Chinook and steelhead. As a reasonable and prudent measure, DWR attempts to control water temperature at Feather River mile 61.6 (Robinson's Riffle in the low-flow channel) from June 1 through September 30. This measure attempts to maintain water temperatures at less than or equal to 65°F on a daily average. The requirement is not intended to preclude pump-back operations at the Oroville Facilities needed to assist the State of California with supplying energy during periods when the California Independent System Operator (ISO) anticipates a Stage 2 or higher alert.

The hatchery and river water temperature objectives sometimes conflict with temperatures desired by agricultural diverters. Under existing agreements, DWR provides water for the Feather River Service Area (FRSA) contractors. The contractors claim a need for warmer water during spring and summer for rice germination and growth (i.e., minimum 65°F from approximately April through mid-May, and minimum 59°F during the remainder of the growing season), although there is no explicit obligation for DWR to meet the rice water temperature goals. However, to the extent practical, DWR does use its operational flexibility to accommodate the FRSA contractors' temperature goals.

1.3.1.3 Water Diversions

Monthly irrigation diversions of up to 190,000 af (July 2002) are made from the Thermalito Complex during the May through August irrigation season. The total annual entitlement of the Butte and Sutter County agricultural users is approximately 1.0 maf. After meeting these local demands, flows into the lower Feather River (and outside of the Project 2100 Boundary) continue into the Sacramento River and into the Delta. In the northwestern portion of the Delta, water is pumped into the North Bay Aqueduct. In

the south Delta, water is diverted into Clifton Court Forebay, where the water is stored until it is pumped into the California Aqueduct.

1.3.1.4 Water Quality

Flows through the Delta are maintained to meet Bay-Delta water quality standards arising from DWR's water rights permits. These standards are designed to meet several water quality objectives such as salinity, Delta outflow, river flows, and export limits. The purpose of these objectives is to attain the highest reasonable water quality, considering all demands being made on Bay-Delta waters. In particular, they protect a wide range of fish and wildlife including Chinook salmon, Delta smelt, striped bass, and the habitat of estuarine-dependent species.

1.3.2 Flood Management

The Oroville Facilities are an integral component of the flood management system for the Sacramento Valley. 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 operated to maintain up to 750,000 af of storage space to allow for the capture of significant inflows. Flood control releases are based on the release schedule in the flood control diagram or the emergency spillway release diagram prepared by USACE, whichever requires the greater release. Decisions regarding such releases are made in consultation with USACE.

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

2.0 NEED FOR STUDY

This study is needed to meet FERC direction for preparing recreation exhibits. Specifically, FERC guidelines recommend that the licensee should cooperate with local, State, and federal agencies in planning for recreational use of public lands administered by those agencies adjacent to the Project area. FERC also requires licensees to develop suitable public recreational facilities with adequate public access. Evaluating recreation demand in a regional context is a necessary element of the analysis of Project recreation supply and demand. Other Relicensing studies such as R17– Recreation Needs Analysis will also contribute to the analysis of future development.

When making decisions about where to recreate, visitors often evaluate alternative locations within a geographic region. Therefore, understanding recreation supply and demand issues in a regional context is also a critical part of identifying and potentially removing barriers to increased recreational use.

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3.0 STUDY OBJECTIVE(S)

The objectives of this study are to evaluate regional recreational opportunities in Northern California and to determine potential barriers, if any, to increasing existing and future recreational uses within the Project area. This study examines such barriers within the study area and provides an assessment of regional recreational opportunities.

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4.0 METHODOLOGY

This section describes methodologies used to obtain the results presented in Section 5 and Appendix A Background Report Summaries. Both qualitative and quantitative methods were used.

4.1 REVIEW OF EXISTING SUPPLY AND DEMAND REPORTS

The research team has reviewed several studies (Table 4.1-1) for relevance to supply and demand information. These background studies were selected because they provide information about the key variables that influence recreation supply and demand. Brief summaries of each of the reports are provided in Appendix A. Most of these reports were used for qualitative information; where available, quantitative data from the background reports were used.

Table 4.1-1. Reports reviewed for R-14.

<p>Statewide Report</p> <p><i>Public Opinions and Attitudes on Outdoor Recreation in California</i> (DPR 1998a)</p>
<p>Regional Reports</p> <p><i>A Study of Boater Recreation on Lake Berryessa, CA</i> (Jackson, et al. 1998)</p> <p><i>Poe Hydroelectric Project Recreation Studies</i> (PG&E 2001a-d)</p> <p><i>Upper North Fork Feather River Project Recreation Studies</i> (PG&E 2002)</p>
<p>Lake Oroville Reports</p> <p><i>Lake Oroville Recreation Area (LORA) Attendance Data Summaries 1995–2000</i> (DWR 1997)</p> <p><i>LORA Draft Economic/Recreation Development Plan and Resource Management Plan for the Lake Oroville State Recreation Area FERC Project 2100</i> (LORA 2001)</p> <p><i>Lake Oroville State Recreation Area Resource Management Plan and General Development Plan</i> (DPR 1973)</p> <p><i>DWR Bulletin No. 117-6: Oroville Reservoir Thermalito Forebay, Thermalito Afterbay Recreation Report</i> (DWR 1966)</p> <p><i>Lake Oroville State Recreation Area Recreational Use Study</i> (Guthrie, Penland & Seagle 1997)</p>

Consultation with local experts assisted in identification of previous and current supply and demand levels for the Project area, and for other similar recreation sites. The survey information outlines factors that may constrain or facilitate recreational use in the study area. Some of this information is specific to the Lake Oroville area, while other sources are more regionally focused.

4.2 COLLECTION OF STUDY AREA RECREATION SUPPLY AND DEMAND INFORMATION

Various sites throughout the region offer lake- and river-based recreation opportunities similar to those available at Lake Oroville. Some recreationists visit more than one location within the region. Table 4.2-1 lists regional recreation areas with opportunities similar to Lake Oroville. Supply information was collected for these regional sites, which are representative of the Oroville market area (which was defined by examining previous visitor surveys for the study area). The supply information was collected by interviewing park and recreation/resource area managers, who were asked to provide information regarding the number of current facilities, the level of utilization of these facilities, and the diversity of recreational opportunities that can be pursued in their area. Anecdotal information was also obtained from these managers regarding the perceived adequacy of facilities to meet potential increases in visitation.

Table 4.2-1. Regional recreation sites.

Black Butte Lake	Lake Pillsbury
Bucks Lake Recreation Area	Lake Spaulding
Bullard's Bar Reservoir	Lake Tahoe
Butt Valley Reservoir	Little Grass Valley Reservoir
Clear Lake	Shasta Lake
East Park Reservoir	Stony Gorge Reservoir
Englebright Lake	Trinity Lake
Folsom Reservoir	Upper Feather River Reservoirs (Antelope, Frenchman, Davis)
Indian Valley Reservoir	Whiskeytown Lake
Lake Almanor	
Lake Berryessa	

Project area recreation supply was collected as part of Relicensing Study R10 – *Recreation Facility and Condition Inventory*. Existing visitor use numbers were collected and analyzed as part of Relicensing Study R9 – *Existing Recreation Use*.

4.3 ANALYSIS OF SUPPLY AND DEMAND

The research team analyzed the regional data collected. Gaps between the current and projected supply of and demand for facilities at similar recreation sites were identified. The analysis included a comparison of the types and amounts of recreation facilities within the study area and other recreation sites representative of Lake Oroville's recreation market area. Potential gaps indicative of unmet demand for the market area were identified. To address the potential barriers to use of recreation facilities and programs, the team has identified potential gaps in recreation programs and facilities to address unmet demand for water-related and trail-related activities in the Lake Oroville market area.

4.4 COLLECTION OF BARRIER-RELATED INFORMATION

Information on potential barriers to increased recreational use was collected from responses to questionnaires administered as part of Relicensing Study R-13 – *Recreation Surveys*. To identify potential barriers, these groups were asked a common set of questions regarding their respective levels of experience with visiting the Project area and reasons for visiting, or not visiting. A common set of questions concerning interest in attending special events and programs was also asked.

Another method of identifying potential barriers was to interview visitors to similar recreation sites. These individuals were asked to evaluate their experiences compared with visits to other sites and, if applicable, compare those experiences with any visits to the Project area.

4.5 ANALYSIS OF BARRIER RESULTS FROM STUDY QUESTIONNAIRES

4.5.1 Survey Summary

Table 4.5-1 summarizes the surveys and respondent groups used for this report. The following sections describe each of the surveys, including the type of survey, distribution location, number of total respondents and each survey's purpose.

4.5.1.1 Household Survey

The Household Survey was conducted in late June and early July 2002 via telephone to 100 on-water recreationists in each of four areas: greater Sacramento, greater San Francisco, greater Reno, and Butte County. This survey was used to elicit both local residents' and other surrounding residents' interest in the Project area and to determine what would motivate them to visit the Lake Oroville area. The Lake Oroville area was defined for the purpose of the survey as the area located 60 miles north of Sacramento along Highway 70, and about 20 miles south of Chico, including the Oroville Reservoir, Thermalito Forebay, Thermalito Afterbay, Feather River below Oroville Dam, Oroville Wildlife Area (OWA), and Clay Pit SVRA.

Table 4.5-1. Survey summary.¹

Survey Name	Respondent Group	Total Number of Respondents ²
Household Survey	Water-based recreationists in Northern California	400
Similar Sites Survey	Visitors to Lake Berryessa	112
Similar Sites Survey	Visitors to Shasta Lake	104
Similar Sites Survey	Visitors to Black Butte Lake	77
On-site Survey	Visitors to Lake Oroville	2,583
Mail-back Survey	Follow-up to On-site Survey, sent to visitors who visited Lake Oroville	1,071

¹ EDAW, Inc. 2003 a-d.

² Tables in Section 5.0 reflect various numbers of respondents for individual questions.

4.5.1.2 Similar Site Survey

The Similar Site Survey was conducted at three Northern California reservoirs: Lake Berryessa, Black Butte Lake, and Shasta Lake. There were approximately 100 respondents at each lake. The reservoirs were chosen as comparable alternative recreation destinations for Lake Oroville visitors and as sites where potential Lake Oroville visitors might be contacted. The three reservoirs, all located in the northern Central Valley, also provide a range of size, and development level. One of the sites was selected based on being as similar as possible to the Project area (Lake Berryessa); another was selected that is much less developed (Black Butte Lake); and one was selected that has more facilities than the Project area (Shasta Lake).

The survey was conducted at each lake on one weekend each during July and August 2002. Surveys were conducted at facilities such as boat ramps, trailhead accesses, and campgrounds, which were similar to the facilities where the On-site Survey was conducted at facilities around Lake Oroville. The purpose of the Similar Site Survey was to provide comparable regional data on reservoir recreation conditions and to gather opinions about Lake Oroville from both past and potential visitors.

4.5.1.3 On-site Survey

This survey was administered to 2,583 recreationists at Lake Oroville at several locations including boat ramps, campgrounds, trailhead accesses and day use areas. The survey includes general information as well as specific sections related to angling, trail use and boating. The survey also included a map describing the Lake Oroville area as including the reservoir, the Diversion Pool, Thermalito Forebay, Thermalito Afterbay, OWA, Clay Pit SVRA and Feather River below Oroville Dam. On-site survey efforts were conducted from Memorial Day weekend 2002 to Memorial Day weekend 2003. Lake surface elevation during the 2002 recreation season ranged from 837 feet above msl in mid-May to 725 feet above msl in mid-September (lower than in an average water year).

4.5.1.4 Mail-back Survey

The Mail-back Survey was a follow-up to the On-site Survey and was mailed to all On-site Survey respondents who provided a name and mailing address. Of those that were mailed a survey, 1,071 returned the survey. The Mail-back Survey dealt mainly with visitors' recreation expenditures during their survey visit and general opinions on the quality and number of facilities and other conditions. This survey was distributed from June 2002 to June 2003.

4.5.2 Potential Barrier and Opportunity Results

A list of potential barriers to increasing reservoir-related recreation at Oroville Facilities was generated based on the literature review, expert consultation, and Relicensing Workgroup meetings. This potential barrier list was used as input to the surveys. Information from the recreation visitor questionnaires (On-site, Mail-back, Household,

and Similar Sites Surveys) was then analyzed for potential barriers and incentives. Reasons for visiting and not visiting the Project area, and attractiveness of the Project area relative to the other three similar recreation sites were ranked and analyzed.

Based on survey results, potential barriers to and opportunities for recreation within the Project area fell into several categories, including Access/proximity (distance, location, etc.), Information, Preferences, Conditions, Facilities, and Special Events. These categories were then used to develop general barrier-related questions. The barrier-related questions were used in the Household and Similar Site Surveys. Open-ended questions were also used to discern any potential barriers that were not included in the questions. Relicensing Study R-13 – *Recreation Surveys* reports and discusses the survey questions and of the distribution of responses.

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5.0 STUDY RESULTS

This section summarizes the results of the Assessment of Regional Recreation and Barriers to Recreation. Historic and existing recreation attendance and participation provide the basis for understanding supply, demand, potential barriers, and potential incentives in the study area. Regional recreation facilities and opportunities can provide a basis for comparison of existing opportunities and facilities in the Project area and help outline potential barriers and potential opportunities.

5.1 RECREATION SUPPLY WITHIN THE PROJECT AREA

The local supply of recreation opportunities includes the sites and facilities provided within the Project area. Table 5.1-1 lists the recreation sites and facilities within the Project area. *Oroville Facilities Relicensing Study R-10 – Recreation Facility Inventory and Conditions Report* provides further details regarding these facilities and their condition (DWR 2003c). Figure 5.1-1 shows the location of each recreation site.

Lake Oroville offers a wide variety of existing recreational facilities and opportunities such as camping, boating, and fishing. Camping facilities include developed campgrounds and primitive sites. There are three large developed campgrounds, two group campgrounds and one equestrian campground as well as three primitive camping areas and two RV “en route” camping areas. Boat-in campsites and floating campsites offer unique recreation opportunities. As for boating facilities, there are two full-service marinas, nine boat ramps, six car-top boat ramps, and seven floating toilets. Popular on-water activities in the Lake Oroville area include houseboating, motorboating, waterskiing, wakeboarding, and personal watercraft (PWC) use, as well as some sailing, canoeing, kayaking, and windsurfing. Other recreation opportunities at the Lake Oroville area include picnicking, swimming, horseback riding, hiking, off-road biking, wildlife watching, OHV use and hunting. There is also a visitors center located near the lake. Several fishing tournaments are held at the lake, and there are excellent fishing opportunities both on the lake and on the Feather River below the Oroville Dam. The Feather River Fish Hatchery, located below the Diversion Dam, offers fish viewing opportunities with tours and educational signage.

Additional facilities are located at the Thermalito Forebay, Thermalito Afterbay, Diversion Pool, and OWA. The Thermalito Forebay offers two day use areas, two boat ramps, an aquatic center, extensive picnicking facilities, and a swimming area and beach. The Thermalito Afterbay offers two boat ramps, a car-top boat ramp, a PWC/swimming beach, and hunting opportunities, as well as many opportunities to hike, bike, or horseback ride on trails surrounding the Afterbay. The Diversion Pool offers a day use area, non-motorized boating and many trail use opportunities. The OWA encompasses parts of the Feather River below Highway 162 and provides opportunities for hunting, fishing, primitive camping, river boating, target shooting, and wildlife watching.

Table 5.1-1. Recreation sites in the Project area.

Campgrounds and Campsites	
€ Bidwell Canyon Campground	€ Lime Saddle Campground
€ Bloomer Cove BIC	€ Lime Saddle Group Campground
€ Bloomer Knoll BIC	€ Loafer Creek Campground
€ Bloomer Point BIC	€ Loafer Creek Group Campground
€ Bloomer Group BIC	€ Loafer Creek Equestrian Campground
€ Craig Saddle BIC	€ OWA (Primitive Campgrounds)
€ Foreman Creek BIC	€ North Thermalito Forebay RV "en route" Campground
€ Goat Ranch BIC	
€ Floating Campsites	
Day Use Areas (DUAs) and Other Facilities	
€ Aquatic Center	€ LOSRA
€ Bedrock Park	€ LOSRA Hiking/Equestrian Trails
€ Bidwell Canyon Marina	€ Lake Oroville Visitors Center
€ Brad P. Freeman Trail	€ Lakeland Blvd. TA
€ Clay Pit SVRA	€ Lime Saddle Marina
€ Dispersed use areas along the upstream and downstream reaches of the Feather River	€ Model Aircraft Flying Area
€ Diversion Pool DUA	€ Oroville Dam/Overlook DUA
€ Feather River Fish Hatchery	€ OWA
€ Floating Restrooms	€ Riverbend Park
	€ Saddle Dam TA
Boat Ramps (BRs) and Day Use Areas (DUAs)	
€ Bidwell Canyon BR/DUA	€ Foreman Creek Car-top BR
€ Lime Saddle BR/DUA	€ Nelson Bar Car-top BR
€ Loafer Creek BR/DUA	€ Stringtown Car-top BR
€ North Thermalito Forebay BR/DUA	€ Vinton Gulch Car-top BR
€ South Thermalito Forebay BR/DUA	€ Larkin Road Car-top BR
€ Spillway BR/DUA	€ Monument Hill BR/DUA
€ Enterprise BR	€ Wilbur Road BR
€ Dark Canyon Car-top BR	

5.2 RECREATION DEMAND WITHIN THE PROJECT AREA

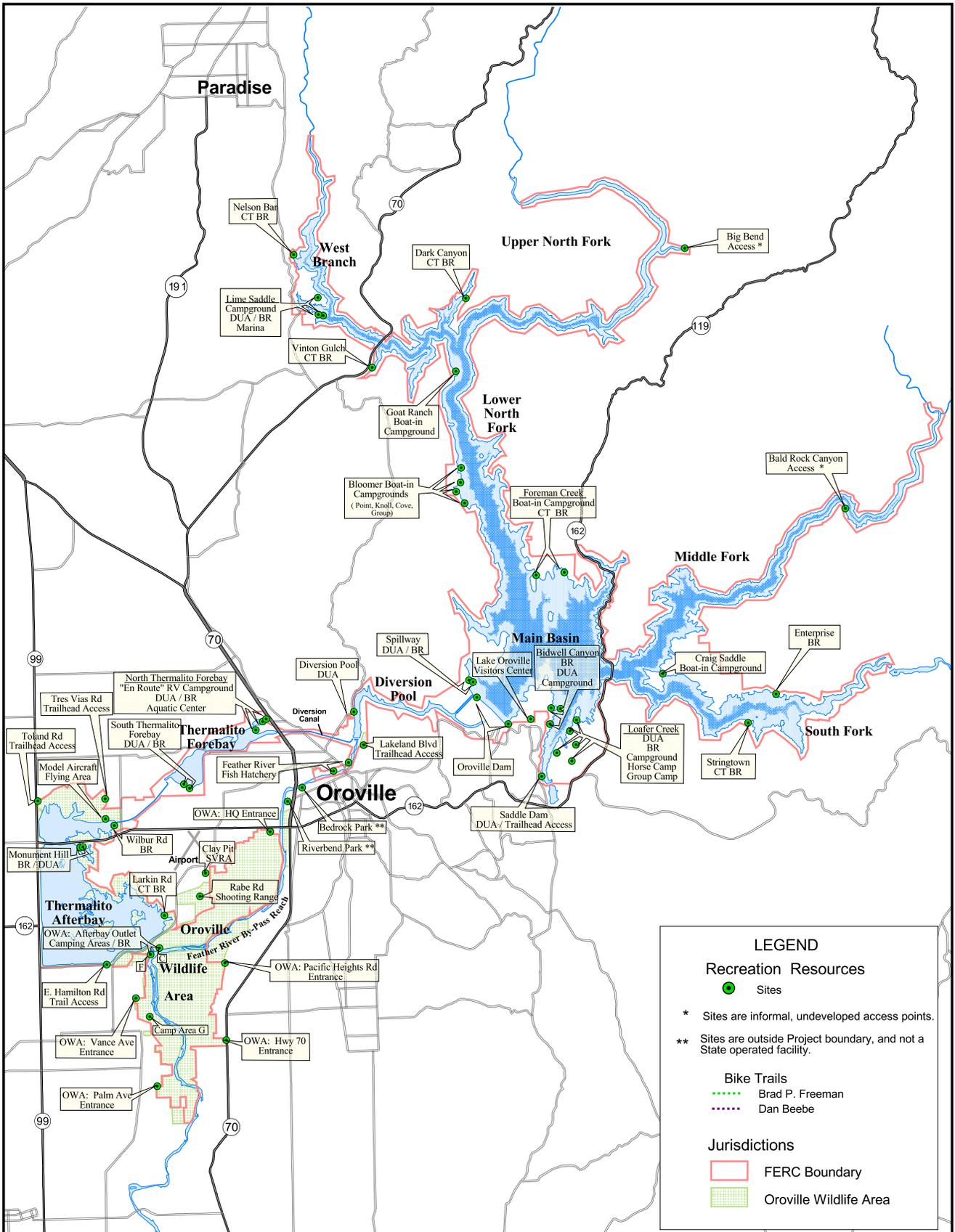
Recreation demand within the Project area can be examined by reviewing existing and past attendance and activity preferences. Unmet demand exists when there are more potential users than facilities allow.

5.2.1 Existing and Past Attendance

Attendance numbers are expressed as the number of recreationists in number of days. A recreation day (RD) is usually defined as use of a facility or attendance at a site by an individual during all or part of one calendar day. The statistical analysis described in Relicensing Study R-12 – *Projected Recreation Use*, Appendix B indicates that there has been an irregular but general downward trend in recreation use at Lake

Figure 5.1-1. Project area and associated recreation sites.

[Insert 11x17 figure]



LEGEND

Recreation Resources

- Sites
- * Sites are informal, undeveloped access points.
- ** Sites are outside Project boundary, and not a State operated facility.

Bike Trails

- ⋯ Brad P. Freeman
- ⋯ Dan Beebe

Jurisdictions

- ▭ FERC Boundary
- ▨ Oroville Wildlife Area

Source: DWR GIS / EDWA 2003



Scale 1 : 142,560
1" = 2.25 miles

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

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

Figure 5.1-1
(R-14)

**Project Area
Recreation Sites**



Backside of Figure 5.1-1 (11x17)

Oroville since 1974, the first year attendance data were collected and suitable for statistical analysis, (DWR 2003b) despite the development of many new facilities pursuant to an updated recreation plan. Generally, attendance has also been dropping at other reservoirs in California since the 1980s (USBR 1997). The reason for this modest but discernable drop in attendance has not been clearly identified, but it may be influenced by several factors such as reservoir water levels, economic changes, and shifts in recreational interest.

The statistical regression model indicates that there may be a positive relationship between reservoir surface water elevation levels and attendance. The model indicates that the higher the water level, the more recreationists visit Lake Oroville. Conversely, the lower the water level, the less desirable the recreation setting, and the less people visit the reservoir. Table 5.2-1 provides average annual use numbers for the LOSRA overall by decade.

Table 5.2-1. Past use at the LOSRA by decade.

Decade	Average Annual Use Numbers (RDs)	LOSRA Attendance Percent Change
1970s	682,602	Baseline year
1980s	654,431	- 4.1
1990s	630,878	- 3.6
Cumulative Change	-51,724	- 7.6

Source: DWR 1997.

According to Relicensing Study R-9 – *Existing Recreational Use*, there were more than 1.7 million recreation days within the Project area between May 15, 2002 and May 14, 2003, which includes the 2002 recreation season (May 15, 2002 to September 15, 2002) and off-season (September 16, 2002 to May 14, 2003). Within the Project area, use was almost evenly split between the recreation season and the off-season. The sites that contributed the most to overall use in the Project area were the Bidwell Canyon BR/DUA/Marina, Lime Saddle BR/DUA/Marina, and the Oroville Dam/Overlook DUA. The Lake Oroville sites contributed about half of the use within the Project area, followed by the OWA, which contributed about 20 percent. The Thermalito Afterbay, Thermalito Forebay, Diversion Pool and dispersed use sites contributed the rest of the use. However, these existing use data are not comparable with historic California Department of Parks and Recreation (DPR) attendance information due to differences in the time period included in calculations (DPR uses a fiscal year), methodology, and sites included in total use calculations. Therefore, the figure of 1.7 million RDs is not comparable to the average annual use data listed in Table 5.2-1.

5.2.2 Local and State Population and Visitor Origin

Table 5.2-2 shows that population in the State of California increased 72 percent from 1970 to 2000, while visitation at LOSRA by decade has decreased 7 percent (Table 5.2-1). A summary of annual attendance is included in Appendix A.

Table 5.2-2. California State population change for selected decades.

Decade	State Population	California Population Change (percent)
1970	20,000,000	Baseline year
1980	23,670,000	+ 18.3
1990	29,760,000	+ 25.7
2000	34,480,000	+15.9
Cumulative Change	14,480,000	+72.4

Source: CA Department of Finance 2003.

Like California as a whole, Butte County’s population grew dramatically, roughly doubling between 1970 and 2000 (Table 5.2-3).

Table 5.2-3. Butte County population change for selected decades.

Decade	Butte County Population	Butte County Population (Percent Change)
1970	101,969	Baseline year
1980	143,851	+41.1
1990	182,120	+26.6
2000	207,158	+13.7
Cumulative Change	105,189	+103.2

Source: U.S. Census 2003.

Approximately 68 percent of respondents from the 2002–03 On-site Survey (EDAW, Inc. 2003a) were from counties within a 70-mile range of Lake Oroville and from the Sacramento area, as described in Table 5.2-4.

Table 5.2-4. LOSRA respondent county and region of residence.

Region	County	Percentage of Respondents	Region	County	Percentage of Respondents
Northern California	Del Norte	< 1	Central and Central Coast	Alpine	0
	Glenn	< 1		Calaveras	< 1
	Humboldt	< 1		Fresno	< 1
	Lake	< 1		Inyo	< 1
	Lassen	< 1		Kings	< 1
	Mendocino	< 1		Madera	< 1
	Modoc	0		Mariposa	< 1
	Nevada	1		Merced	< 1
	Plumas	< 1		Mono	0
	Shasta	< 1		Monterey	< 1
	Sierra	< 1		San Benito	< 1
	Siskiyou	< 1		San Joaquin	1
	Tehama	< 1		Santa Cruz	< 1
Trinity	1	Stanislaus		< 1	
Lake Oroville Area	Butte	49	Tulare	< 1	
	Colusa	< 1	Southern and Southern Coast	Imperial	< 1
	Sutter	5		Kern	< 1
Yuba	3	Los Angeles		1	
Sacramento Area	Amador	< 1		Orange	< 1
	El Dorado	1		Riverside	< 1
	Placer	4		San Bernardino	< 1
	Sacramento	5		San Diego	< 1
Yolo	1	San Luis Obispo		< 1	
San Francisco Bay Area	Alameda	2		Santa Barbara	< 1
	Contra Costa	3		Ventura	< 1
	Marin	< 1			
	Napa	< 1			
	San Francisco	1			
	San Mateo	1			
	Santa Clara	2			
	Solano	2			
Sonoma	1				

Note: There were 2,071 respondents
Source: EDAW, Inc. 2003a (Recreation On-site Survey).

Table 5.2-5 lists the cities in which most survey respondents reside. Approximately 27 percent of Lake Oroville area respondents reside in Oroville. The second-largest respondent group, comprising 9.4 percent of respondents, resides in Chico. The 15

cities in the table account for 64.8 percent of the total Project area respondent visitation, showing that a substantial proportion of Lake Oroville visitors are from the surrounding Lake Oroville area and nearby metropolitan areas including Sacramento and San Francisco.

Table 5.2-5. Top 15 Lake Oroville area visitor cities of residence.

Region	County	City	Percentage of Visitors
Lake Oroville Area	Butte	Oroville	27.7
		Chico	9.4
		Paradise	6.3
		Gridley	2.6
		Magalia	2.4
		Biggs	1.1
		Berry Creek	1.0
		Palermo	1.0
	Sutter	Yuba City	4.4
		Live Oak	1.0
Sacramento Area	Sacramento	Sacramento	2.3
		Placer	Roseville
San Francisco Bay Area	Santa Clara	San Jose	1.7
	Solano	Vacaville	1.2
Total			64.8

Note: There were 2,071 respondents.

Source: EDAW, Inc. 2003a (Recreation Visitor On-site Survey).

5.2.3 Setting and Social Preferences

Mail-back Survey participants were asked to state their preferences for five various aspects of the setting and social opportunities that contribute to the recreational experience at Lake Oroville solitude/affiliation, risk, use of outdoor wilderness skills, sights and sounds of civilization and appearance of the landscape (Table 5.2-6).

The mean response for solitude/affiliation (3.50) on a seven point scale fell halfway between “solitude and affiliation are equally important” (4.00) and “solitude is important” suggesting that the average visitor is comfortable with both solitude and social contact. This also indicates that on average, visitors tend to want some element of solitude in their recreational experience at Lake Oroville. A range of experiences from solitude to affiliation are available within the Project area.

The mean score for opportunity to experience risk and challenge from the natural environment (2.51) on a five point scale fell halfway between “important” and “very

important.” This suggests that Lake Oroville visitors tend to want risk and challenge as part of their recreational experience. The environment in the Project area provides a range of possible challenges from activities such as whitewater rafting and water skiing to those that are lower risk such as sightseeing and walking.

In terms of the opportunity to use outdoor wilderness skills, the average score (2.75), on a five point scale, fell between the responses “very important” and “important.” This suggests that visitors to Lake Oroville generally want the opportunity to use outdoor wilderness skills as part of their recreational experience.

The mean score for setting preferences for the sights and sounds of civilization (2.53), on a five point scale, fell between the responses “rare” and “unusual,” indicating that visitors generally prefer a setting that is quieter and not highly developed.

The mean score for preference for landscape appearance (2.13), on a four point scale, fell between the responses “predominantly natural in appearance” and “modified on a small scale.” This suggests that Lake Oroville visitors generally prefer a more natural setting to a developed landscape setting.

Table 5.2-6. Setting and social preferences at Lake Oroville facilities.

Opportunity for Solitude versus Affiliation with Other Groups ¹	Opportunity for Risk and Challenge from the Natural Environment ²	Opportunity to Use Outdoor Wilderness Skills ³	Preference for Sights and Sounds of Civilization ⁴	Preference for Appearance of Landscape ⁵
Mean Score				
3.50	2.51	2.75	2.53	2.13

¹ Scale for solitude 1 to 7: 1=Solitude is extremely important, 3=Solitude is important, 4=Solitude and affiliation are equally important, 7=Affiliation with other groups is extremely important. There were 1,008 responses to this question.

² Scale for risk 1 to 5: 1=Extremely important, 2=Very important, 3= Important, 5=Not important. There were 1,038 responses to this question.

³ Scale wilderness skills 1 to 5: 1=Extremely important, 2=Somewhat important, 3=Important, 5=Not important. There were 1,040 responses to this question.

⁴ Scale for civilization 1 to 5: 1=Absent, 2=Rare, 3=Unusual, 5=Dominant. There were 1,032 responses to this question.

⁵ Scale for landscape 1 to 4: 1=Totally natural in appearance, 2=Predominantly natural, 2=Predominantly natural in appearance, 4=Significantly modified. There were 1,041 responses to this question.

Source: EDAW, Inc. 2003c (Recreation Visitor Mail-back Survey).

5.2.4 Visitor Perceptions of Crowding

The level of perceived crowding at recreation sites can indicate potential unmet demand. Table 5.2-7 lists crowding scores for 21 sites. The mean crowding score fell between “not at all crowded” and “slightly crowded.” At 16 sites, the mean crowding score fell between “slightly crowded” and “moderately crowded.” Only one site, the

Thermalito Afterbay outlet was rated between “moderately crowded” and “extremely crowded.” According to local boaters and anglers, during the salmon and steelhead runs, this site is extremely crowded with both bank and boat fisherman due to the large number of fish that congregate below the outlet outflow structure. This site has also been called a “combat” fishing area because there can be more than 200 fisherman at this site during peak times (pers. comm., See 2004). Other than the Thermalito Afterbay outlet, the mean crowding scores indicate that at most sites, crowding is not a major problem.

Table 5.2-7. Visitor perception of crowding at various Oroville Facilities recreation sites.

Survey Location	Mean Crowding Score	Survey Location	Mean Crowding Score
Campgrounds		Monument Hill BR/DUA	3.11
Bidwell Canyon Campground	3.24	North Thermalito Forebay BR/DUA	3.43
Bloomer BIC	5.00	South Thermalito Forebay BR/DUA	1.97
Craig Saddle BIC	3.25	Spillway BR/DUA	2.94
Foreman Creek BIC	1.50	DUAs and Other Facilities	
Lime Saddle Campground	2.30	Clay Pit SVRA	1.27
Loafer Creek Campground & Group Campground	2.54	Diversion Pool DUA	1.20
Loafer Creek Equestrian Campground	2.29	Feather River Fish Hatchery	3.49
BRs		Lakeland Boulevard TA	1.14
Dark Canyon Car-top BR	1.67	Lake Oroville Visitors Center	2.00
Enterprise BR	3.41	Loafer Creek DUA	2.59
Foreman Creek Car-top BR	2.42	Model Aircraft Flying Area	1.67
Larkin Car-top BR	3.17	Oroville Dam/Overlook DUA	1.55
Loafer Creek BR	4.36	OWA Headquarters Entrance	4.00
Nelson Bar Car-top BR	3.14	Powerhouse Road TA	1.25
Stringtown Car-top BR	3.20	Rabe Road Shooting Range	2.26
Vinton Gulch Car-top BR	1.00	Riverbend Park	2.13
Wilbur Road BR	3.72	Saddle Dam TA	1.79
BRs with DUAs		South OWA East Levee Road (east side of the Feather River)	4.44
Bidwell Canyon BR/DUA	3.62	South OWA West Levee Road (west side of the Feather River)	5.08
Lime Saddle BR/DUA	2.66	Thermalito Afterbay outlet	6.42

Note: The number of respondents varies by site, from 1 to 230 respondents. Crowding was rated on a scale of 1 to 9, 1 = not at all crowded, 3 = slightly crowded, 6 = moderately crowded, 9 = extremely crowded.

Source: EDAW, Inc. 2003a. (Recreation Visitor On-site Survey).

5.2.5 Existing and Past Activity Participation

Statewide surveys indicate that Californians value and realize the importance of public recreation areas and facilities. They want both highly developed areas and natural, undeveloped areas. Californians enjoy a wide range of recreational activities, walking being the most popular Statewide. Beach activities and picnicking are also some of the most participated-in activities in California (DPR 1998b). In the area around Lake Oroville, both water and shore activities are popular. Resting, fishing, water-skiing, boating, swimming, and picnicking were identified as popular activities in surveys conducted in 1996 (Guthrie et al. 1997). Activity participation surveys were also conducted at the Oroville Facilities in 2002–03, with results from both survey efforts shown in Table 5.2-8. Forty-two activities were listed on the 2002–03 survey; the top 15 are listed below. Surveys conducted in 1996 listed 20 activities to choose from, and multiple activities could be listed as the primary activity. In the 2002–03 survey, 40 activities were listed, and only one activity could be listed as the primary activity. This tends to lessen the percentage response for any one activity as compared to the 1996 survey because there were twice as many activities and only one could be listed.

Table 5.2-8. Top 15 activities participated in at Oroville facilities.

Activity	Respondents in 1996¹ (%)	Respondents in 2002-03⁶ (%)
Bank fishing	7.6	16.6
Motor boating	18.3	11.2
Swimming	17.0	11.0
Boat fishing	25.2	10.8
Water-ski/wakeboard	20.9	9.4
Relaxing	14.5	5.8
Horseback riding	NA ²	3.9
Personal watercraft use	8.6	3.8
House boating	9.4	3.6
Tent camping	6.0 ³	3.3
Picnicking	10.1	2.7
RV camping	NA ³	1.8
Hiking	4.8 ⁴	1.7
Sightseeing	4.1	1.3
Mountain biking on trails	1.5 ⁵	1.1

¹ Based on 1996 Survey (Guthrie et al. 1997). There were 1,361 respondents. Respondents could list multiple activities.

² Horseback Riding did not fall in the top 20 primary activities.

³ Tent Camping and RV Camping were not separated in the 1996 survey.

⁴ This activity was listed as Walking and Jogging in the 1996 survey.

⁵ This activity was listed as Bicycle Riding in the 1996 survey.

⁶ There were 2,365 respondents to this question from the Recreation Visitor On-site Survey. Respondents could list only one activity as their primary activity.

Source: EDAW, Inc. 2003a (Recreation Visitor On-site Survey).

5.2.5.1 Activity Participation Within the Project Area

Table 5.2-9 lists the top activities for those who visit at various intervals, according to the Recreation Visitor On-site Survey. The top activity for each frequency of visitation was bank fishing. Relaxing and tent camping were more common activities for first-time visitors than for other users. Both types of fishing (bank and boat) had less participation for first-time visitors than the other activities. Boat fishing ranked in the top five activities for regular visitors only. Those who visit at different frequencies may have slightly different needs for various activities. First-time visitors may need more information than those who have already discovered Lake Oroville’s opportunities through repeated visits. Such information could improve the likelihood that a first-time visitor would become a regular visitor.

Table 5.2-9. Primary activity participation within the Project area by frequency of visitation.

	Percentage of respondents						
	Bank fishing	Swimming	Water-ski/wake board	Motor boating	Boat fishing	Relaxing	Tent camping
Regular Visitor ¹	17.0	11.6	9.1	10.7	12.9	4.4	1.6
Occasional Visitor ²	16.2	10.5	10.8	15.3	4.8	7.8	4.8
Infrequent Visitor ³	15.8	11.6	9.5	10.5	5.3	10.5	7.4
First Time Visitor ⁴	13.1	8.2	11.6	9.7	2.6	10.4	9.3

¹ Regular visits = 3 or more times per year. There were 1,463 respondents in this visitor category.

² Occasional visits = 1-2 times per year. There were 333 respondents in this visitor category.

³ Infrequent visits = Less than 1 time per year. There were 95 respondents in this visitor category.

⁴ First visit to the area. There were 268 respondents in this visitor category.

Source: EDAW, Inc. 2003a (Recreation Visitor On-site Survey).

Recreation Visitor Mail-back Survey respondents were asked if there were any activities that they would like to participate in that are not currently offered in the Lake Oroville area. Table 5.2-10 lists those responses. About 21 percent of visitors surveyed felt the Lake Oroville area did not offer the activities or events that they wanted. Access to beach and swimming areas was the activity for which visitors would most like more opportunity. This is consistent with survey findings that swimming is the third most popular activity overall (Table 5.2-8). Currently, there are swimming areas at Loafer Creek DUA, North Thermalito Forebay BR/DUA, and Monument Hill BR/DUA; however, surveys indicated that visitors find Loafer Creek unattractive at pool levels below approximately 850 feet. Swimming ranked sixth with first-time visitors (Table 5.2-9). If more swimming areas were offered, first-time visitors’ participation in this activity might increase, as swimming is the third-most popular activity overall.

Table 5.2-10. Visitor preference for new activities within the Project area.

Activity	Percent Response
Beach area/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, Inc. 2003c (Recreation Visitor Mail-back Survey).

5.3 REGIONAL RECREATION SUPPLY AND DEMAND: LAKES AND RESERVOIRS

Lakes and reservoirs are abundant in Northern California, offering recreationists a wide range of destinations and activities. To understand what might motivate recreationists to visit any given recreation resource, it is important to analyze the supply of recreation facilities available in the region, and to determine demand levels for activities and facilities.

5.3.1 Regional Lakes and Reservoirs

Regional recreation supply includes lakes and reservoirs and their facilities that provide recreation opportunities similar to the Lake Oroville Facilities. Table 5.3-1 lists the regional reservoirs or lakes that were included in this study. These reservoirs and lakes are located in Northern California near the Project area, but not within it (Figure 5.3-1). The following section describes recreation resources within the vicinity and the region of the Project. Table 5.3-2 summarizes facilities available at each site, and Table 5.3-3 provides more detailed information on each site. Table 5.3-4 lists the current visitation and anticipated demand for each lake or reservoir.

Table 5.3-1. Regional lakes and reservoirs.

Black Butte Lake	Lake Pillsbury
Bucks Lake Recreation Area	Lake Tahoe
Bullard's Bar Reservoir	Shasta Lake
Butt Valley Reservoir	Lake Spaulding
Clear Lake	Little Grass Valley Reservoir
East Park Reservoir	Stony Gorge Reservoir
Englebright Lake	Trinity Lake
Folsom Reservoir	Upper Feather River Reservoirs (Antelope, Frenchman, Davis)
Indian Valley Reservoir	Whiskeytown Lake
Lake Almanor	
Lake Berryessa	

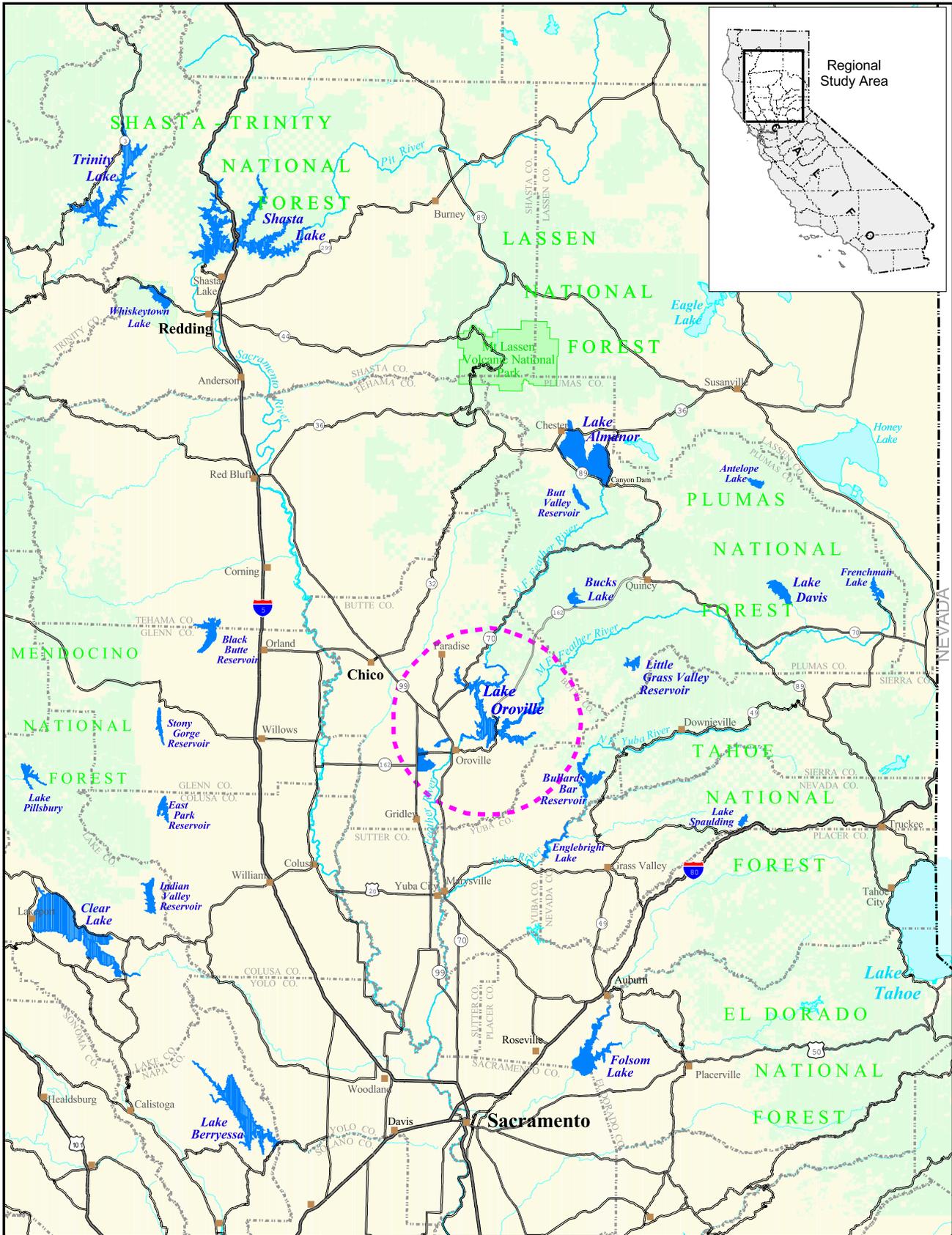
Table 5.3-2. Summary of regional resources.

Reservoir or Lake	Boat Ramps	Camping Facilities	Boat-in Camping	DUA/Picnicking facilities	Marina	Swimming beach	Other
Black Butte Lake	X	X		X			X
Bucks Lake Recreation Area	X	X		X			
Bullard's Bar Reservoir	X		X	X	X		
Butt Valley Reservoir	X	X		X			
Clear Lake	X	X		X	X		X
East Park Reservoir	X	X		X			
Englebright Lake	X		X	X	X		
Folsom Reservoir	X	X		X	X		
Indian Valley Reservoir	X	X			X		
Lake Almanor	X	X		X			
Lake Berryessa	X	X		X			
Lake Oroville	X	X	X	X	X	X	X
Lake Pillsbury	X	X	X	X	X		
Lake Tahoe	X	X	X	X	X	X	
Shasta Lake	X	X	X	X	X		
Lake Spaulding	X	X		X			
Little Grass Valley Reservoir	X	X		X		X	
Stony Gorge Reservoir	X	X					
Trinity Lake	X	X		X	X		
Upper Feather River reservoirs:							
Antelope	X	X	X	X			
Frenchman	X	X	X				
Davis	X	X	X				
Whiskeytown Lake	X	X		X			
TOTAL	23/23	19/23	8/23	17/23	10/23	3/23	3/23

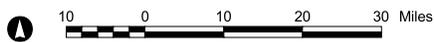
Source: EDAW, Inc. 2003.

Figure 5.3-1. Regional recreation resources.

[insert 11x17 figure]



Source: CA Spatial Data Library / EDAW, Inc. 2003



Scale 1 : 1,013,760
1" = 16 miles

DRAFT

LEGEND

- Featured Reservoirs
- Project Vicinity

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

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

Figure 5.3-1
(R-14)



Regional Recreation Resources

back of figure 5.3-1

Table 5.3-3. Facilities at regional lakes and reservoirs.

Reservoir or Lake	Jurisdiction	Surface Acres	Miles of Shoreline	Facilities	Lake elevation (feet)
Black Butte Lake	USACE	4,460	40	<ul style="list-style-type: none"> ☒ 3 paved boat ramps ☒ 2 campgrounds ☒ DUA ☒ picnic areas ☒ 75-acre off-highway vehicle (OHV) area ☒ trails 	500
Bucks Lake Recreation Area	Pacific Gas and Electric (PG&E)/U.S. Forest Service (USDA – FS)	2,084	20	<ul style="list-style-type: none"> ☒ 7 paved boat ramps ☒ 10 developed campsites 	5,157
Bullard's Bar Reservoir	USDA – FS	4,700	55	<ul style="list-style-type: none"> ☒ 2 paved boat ramps ☒ marina ☒ 2 boat-in campgrounds 	1,931
Butt Valley Reservoir	PG&E	1,600	15	<ul style="list-style-type: none"> ☒ 1 boat ramp ☒ 2 campgrounds 	4,140
Clear Lake	Various (private resorts and public agencies)	40,000	100	<ul style="list-style-type: none"> ☒ 13 paved boat ramps ☒ numerous marinas ☒ numerous campgrounds ☒ numerous resorts 	1,326
East Park Reservoir	U.S. Bureau of Reclamation (USBR)/USDA – FS & Orland Unit Water Users Association	1,820	25	<ul style="list-style-type: none"> ☒ 1 unimproved boat ramp ☒ dispersed picnic area ☒ dispersed camping 	1,205
Englebright Lake	USACE	815	24	<ul style="list-style-type: none"> ☒ 2 boat ramps ☒ boat-in camping ☒ marina 	500

Table 5.3-3 (continued). Facilities at regional lakes and reservoirs.

Reservoir or Lake	Jurisdiction	Surface Acres	Miles of Shoreline	Facilities	Lake elevation (feet)
Folsom Reservoir	DWR	12,000	75	<ul style="list-style-type: none"> ∅ 4 boat ramps ∅ picnic areas ∅ marina ∅ 2 campgrounds 	435
Indian Valley Reservoir	Yolo County Flood Control District/Bureau of Land Management (BLM)	4,000	39	<ul style="list-style-type: none"> ∅ marina ∅ 3 camping areas ∅ 2 boat ramps 	1,475
Lake Almanor	PG&E	27,064	52	<ul style="list-style-type: none"> ∅ 5 paved boat ramps ∅ 2 campgrounds 	4,500
Lake Berryessa	USBR	21,000	165	<ul style="list-style-type: none"> ∅ 39 boat lanes ∅ 2 DUAs ∅ picnic sites ∅ 6 campgrounds 	440
Lake Oroville ¹	DWR/California Department of Parks and Recreation (DPR)/DFG	15,810	167	<ul style="list-style-type: none"> ∅ 6 paved boat ramps ∅ 3 campgrounds ∅ dispersed camping ∅ boat-in camping ∅ 2 marinas ∅ 11 picnicking areas 	900
Lake Pillsbury	USDA – FS	2,000	65	<ul style="list-style-type: none"> ∅ 3 paved boat ramps ∅ campgrounds ∅ boat-in camping ∅ marina 	1,800
Lake Tahoe	USDA – FS, DPR, Nevada Division of State Parks	122,200	72	<ul style="list-style-type: none"> ∅ 15 marinas ∅ 14 paved boat ramps ∅ 23 developed beaches ∅ 2 undeveloped beaches ∅ 11 campgrounds ∅ boat-in camping ∅ picnic areas 	6,225

Table 5.3-3 (continued). Facilities at regional lakes and reservoirs.

Reservoir or Lake	Jurisdiction	Surface Acres	Miles of Shoreline	Facilities	Lake elevation (feet)
Lake Spaulding	USDA – FS	698	9	<ul style="list-style-type: none"> ∅ 1 paved boat ramp ∅ 1 picnic area ∅ 1 campground 	5,000
Little Grass Valley Reservoir	USDA – FS, OWID	16,000	16	<ul style="list-style-type: none"> ∅ 3 paved boat ramps ∅ 9 campgrounds ∅ 2 swimming beaches ∅ 2 picnic areas 	5,046
Shasta Lake	USDA – FS	29,500	370	<ul style="list-style-type: none"> ∅ 14 boat ramps ∅ 12 marinas ∅ 12 campgrounds ∅ primitive camping 	1,000
Stony Gorge Reservoir	USBR, USDA – FS, Orland Water Users Association	1,300	25	<ul style="list-style-type: none"> ∅ 1 paved boat ramp ∅ free camping 	800
Trinity Lake	USDA – FS, USBR	16,535	147	<ul style="list-style-type: none"> ∅ 8 boat ramps ∅ 2 marinas ∅ 1 campground 	2,300
Upper Feather River Reservoirs: Antelope Frenchman Davis	USDA – FS, DWR	930 1,580 4,000	15 21 32	<ul style="list-style-type: none"> ∅ 5 boat ramps ∅ 3 campgrounds ∅ 5 boat-in campsites 	5,000 5,550 5,775
Whiskeytown Lake	National Park Service, USBR	3,220	36	<ul style="list-style-type: none"> ∅ 3 paved boat ramps ∅ 3 campgrounds ∅ picnic area 	1,200

¹ Lake Oroville is included for comparison purposes.
Source: Stienstra 2003 and DWR 2001.

Table 5.3-4. Demand at regional lakes and reservoirs.

Recreation Site	Visitation per Year (Approximate)	Visitation expected to increase	Existing facilities able to meet future demand	Facility Deficiencies	Facilities that can accommodate increased visitation	What will be needed to meet future demand	Planned expansion/projects	Currently under construction
Antelope Lake ¹	24,500	Yes	Limited	Campsites	All except for campsites	More boat ramps & campsites, phones & power	None	Amphitheater
Black Butte Reservoir ²	350,000	Yes	Yes	None	All	Regular maintenance & repairs	None	ADA upgrades
Bucks Lake ³	80,700 ⁴	Yes	Overall yes, though a few sites may be nearing capacity by 2035.	Routine operation and maintenance and periodic repair and replacement of site facilities.	All facilities are expected to accommodate increased visitation, except for 1 campground which may reach 70 percent capacity by 2035.	No large-scale new facilities are expected to be needed in the future (through 2035). Some new camping opportunities and facilities may be needed.	No, however PG&E may be doing some site redevelopment of a USDA – FS site.	No
Bullard's Bar Reservoir ⁵	60,000	No: the current facilities are not designed for any future growth.	No	None	None	Planning does not include growth at this time.	Repeating and re-striping a boat ramp is in the design phase right now.	Yes: repaving parking lots, constructing a new parking lot, and repaving 2 campgrounds.

Table 5.3-4 (continued). Demand at regional lakes and reservoirs.

Recreation Site	Average Visitation per Year (Approximate)	Visitation expected to increase	Existing facilities able to meet future demand	Facility Deficiencies	Facilities that can accommodate increased visitation	What will be needed to meet future demand	Planned expansion/ construction projects	Currently under construction
Butt Valley Reservoir ⁶	Estimate of existing use in 2001 was 37,500 recreation days (RDs).	Yes	Yes	ADA deficiencies at boat ramps & campgrounds	Campgrounds	Constructing 10-20 new primitive campsites	Conversion of an overflow primitive campsite to a developed campsite, formalizing fishing access at powerhouse, adding ADA trail around 30-40 percent of shoreline, adding 10-20 parking spots	No
Clear Lake ⁷	100,000	Yes	No	Not enough campsites	None	Acquire more acreage, build more campsites and day-use areas	One restroom to be upgraded to meet ADA requirements	No
East Park Reservoir ⁸	53,000 RDs	Yes	No	Campgrounds, bathrooms, tables, safety	None	Construct more facilities	None	No

Table 5.3-4 (continued). Demand at regional lakes and reservoirs.

Recreation Site	Average Visitation per Year (Approximate)	Visitation expected to increase	Existing facilities able to meet future demand	Facility Deficiencies	Facilities that can accommodate increased visitation	What will be needed to meet future demand	Planned expansion/construction projects	Currently under construction
Englebright Lake ⁹	105,000	Yes	Yes	Unsure	Campgrounds to an extent	Encourage more weekday use as opposed to weekend use	Potentially a seawall, landscaping in picnic area, hardening pathways, ADA accessibility improvements	No
Folsom Lake ¹⁰	1 million RDs	No	No	Boat ramps, group camping, picnic sites	Day use sites	Boat ramp improvements & better parking delineation	New visitor center & new bathrooms	Yes: New bathroom
Frenchman Lake ¹¹	240,000 ¹²	No	Limited	Boating access, roadways	All except boating access, roadways	Building another campground & upgrading the water and sewer systems	Expansion of overflow area	No
Indian Valley Reservoir ¹³	Less than 50,000	No	No	Restrooms, RV pump stations, lack of hook-ups	None	New restrooms, RV pump stations, hook-ups	No	No
Lake Almanor ¹⁴	185,600 ¹⁵	Yes	Yes	Shortage of campgrounds and day use facilities	The USDA – FS campground	Develop more campgrounds & day use facilities	If FERC approves the application – day use facilities & one new campground	No: but bathrooms were recently upgraded to meet ADA standards

Table 5.3-4 (continued). Demand at regional lakes and reservoirs.

Recreation Site	Average Visitation per Year (Approximate)	Visitation expected to increase	Existing facilities able to meet future demand	Facility Deficiencies	Facilities that can accommodate increased visitation	What will be needed to meet future demand	Planned expansion/construction projects	Currently under construction
Lake Berryessa ¹⁶	1.5 to 2 million	Yes	No	Restrooms, potable water facilities, roads, parking, trails & foot-bridges	Campsites	Regular maintenance	New visitor center and maybe an education center	Yes: Trail work & parking lot coating and striping
Lake Davis ¹¹	145,000 ¹²	No	Limited	Boating access, roadways	All except boating access, roadways	Upgrading the water and sewer systems	Installment of water permit toilets	Yes: ADA toilets
Lake Oroville ¹⁷	0.7 to 1.7 million ¹⁸	Pending	Pending	Overall, most of the developed recreation facilities are in good condition. Few exceptions: basic facilities maintenance, signage				Upgrades to facilities for ADA accessibility
Lake Pillsbury ¹⁹	10,000 ²⁰	Yes	Yes	None	Campgrounds	General maintenance	None	No: but bathrooms were recently replaced/modernized & roads were repaved w/in campground areas
Lake Spaulding ²¹	27,600	No	Yes	Potentially the RV parking lots	All	General maintenance	None	No: but a boat ramp was recently installed

Table 5.3-4 (continued). Demand at regional lakes and reservoirs.

Recreation Site	Average Visitation per Year (Approximate)	Visitation expected to increase	Existing facilities able to meet future demand	Facility Deficiencies	Facilities that can accommodate increased visitation	What will be needed to meet future demand	Planned expansion/ construction projects	Currently under construction
Lake Tahoe ²²	4.4 million ²³	Yes	TRPA in process of evaluating. Many facilities reach capacity during peak use times of day and off season..	TRPA in process of evaluating. There has been no major facility development in the last 10 -15 years	TRPA in process of evaluating. Facilities can accommodate during non-peak times and off season.	TRPA in process of evaluating. Communication among providers and facility expansions are expected to be needed.	Tahoe City Marina is planning an expansion. Nevada and California State Parks are in the process of creating master plans	None
Little Grass Valley Reservoir ²⁴	25,000	Yes	Yes	Roadways, campgrounds, accessibility	All except for roadways & camp-grounds	Relicensing with FERC which will help the reservoir make improvements	Lakeshore trail paving and widening	No: but all of the boat ramps were redone last year
Shasta Lake ²⁵	2 million	Yes	No	No computer hookups, roads too narrow, accessibility poor	Most	Resolving user conflicts: speed limits, safety, dam. Capacity studies & installing computer hookups, widening roads and better accessibility	Boat ramp and walkway upgrades	Yes: BIC improvements, new restrooms, new tables, replacing signs & lighting, boat ramp & land facility upgrades

Table 5.3-4 (continued). Demand at regional lakes and reservoirs.

Recreation Site	Average Visitation per Year (Approximate)	Visitation expected to increase	Existing facilities able to meet future demand	Facility Deficiencies	Facilities that can accommodate increased visitation	What will be needed to meet future demand	Planned expansion/ construction projects	Currently under construction
Stony Gorge ⁸	50,000	Yes	Yes with maintenance	May need a new boat ramp	Unknown	Unknown	None	No
Trinity Lake ²⁶	750,000	Yes, by 5 percent	Yes – for the next 10 years	Water system	Boat ramps, parking & camp-grounds	Completion of construction projects	Low water boat-ramp, rehab campgrounds, widen roads	No, not yet.
Whiskeytown Lake ²⁷	750,000	Weather dependent	No	Parking lots, campsites, bathrooms, visitor center, staffing	None that exist now	More staff, larger bathrooms, expanded visitor center, larger parking lots	None; would like to replace existing facilities. Expect to keep same level of service	No

¹ Source: pers. comm., Dyer 2003.

² Source: pers. comm., Long 2003.

³ Source: EDAW, Inc. 2002.

⁴ Estimate of existing use in 2002 was 80,700 annually at all PG&E, USDA – FS, and private resorts.

⁵ Source: pers. comm., Burton 2003.

⁶ Source: pers. comm., Mintz 2003.

⁷ Source: pers. comm., Woods 2003.

⁸ Source: pers. comm., Trout 2003 and DWR 2000.

⁹ Source: pers. comm., Seebertson 2003.

¹⁰ Source: pers. comm., Nakaji 2003.

¹¹ DWR 2000

¹² Source: pers. comm., Schaber 2003.

¹³ Source: DWR 2002.

¹⁴ Source: pers. comm., Barton 2003.

¹⁵ Source: pers. comm., Sanford 2003.

¹⁵ Estimate of existing use in 2001 was 185,600 RD during the managed use season (season during which facilities were open for public use—generally considered to be mid-May through mid-September). Source: PG&E 1997.

¹⁶ Source: pers. comm., Shoester 2003.

¹⁷ Projected use (R12–Projected Recreation Use), capacity of facilities (R8–Carrying Capacity) and future recreation needs (R17–Recreation Needs Analysis) are currently being studied for Oroville Facilities Relicensing.

¹⁸ Source: EDAW, Inc. 2004.

¹⁹ Source: pers. comm., Drury 2003 & White 2003.

²⁰ Source: pers. comm., Macintosh 2003.

²¹ Source: pers. comm., Jackson 2003.

²² Source: pers. comm., Eichar 2004.

²³ Source: TRPA 2002.

²⁴ Source: pers. comm., Braxton 2003

²⁵ Source: pers. comm., Adcock 2003.

²⁶ Source: pers. comm., Grigsbee 2003.

²⁷ Source: pers. comm., Wheeler 2003.

5.3.1.1 Black Butte Lake

Located at the northern end of the Central Valley on Stony Creek west of Orland, Black Butte Lake is managed by USACE. When full, the reservoir has a surface area of 4,460 acres, is 7 miles long, and has 40 miles of shoreline surrounded by dark volcanic buttes. Black Butte Lake is located at 500 feet above msl (USACE Website).

Supply

A variety of boating takes place at the reservoir, including water-skiing, PWC use, and windsurfing. There are three paved boat ramps. There are two developed campgrounds as well as day use and picnic areas. Many campsites can accommodate recreational vehicles (RVs) up to 35 feet in length. No electrical hookups are available. The Buckhorn Campground is open all year and contains 92 campsites. Orland Buttes Campground has 35 campsites and is open April through July. There is a full-service marina. A 75-acre off-highway vehicle (OHV) area is open June through February on the north side of the reservoir. A variety of hills and trails are available for exploration by all-terrain vehicles (ATVs) and motorcycles (USACE Website).

Demand

Approximately 350,000 people visit Black Butte Lake each year. Although most of the facilities are 25 to 30 years old, they are generally in good condition and are expected to be able to carry an increase in visitor demand. The lake is not heavily used during the week, only on the weekends. Americans with Disabilities Act (ADA) upgrades were implemented in 2003 (pers. comm., Long 2003).

5.3.1.2 Bucks Lake Recreation Area

The Bucks Lake Recreation Area, located approximately 70 miles northeast of the Oroville Facilities, includes Grizzly Forebay, Three Lakes, Lower Bucks Lake, and Bucks Lake, together offering approximately 2,084 water surface acres and approximately 20 miles of shoreline for public recreation (EDAW, Inc. 2002).

Supply

The Bucks Lake Recreation Area provides recreational opportunities ranging from primitive camping to resort areas providing rental cabins and restaurant services. Other facilities at Bucks Lake include areas for group and family camping, picnicking, boating, water-skiing, fishing, and swimming. The Bucks Lake Recreation Area provides a total of 139 campsites (136 individual sites and three group sites). Pacific Gas and Electric (PG&E) owns about half of the shoreline, and the other half is managed by the U.S. Forest Service (USDA – FS), Plumas National Forest (EDAW, Inc. 2002).

Demand

In 2002, there were an estimated 80,700 visitors at all PG&E, USDA – FS, and private resorts at Bucks Lake, with visitation expected to increase in the future. Overall, existing facilities are expected to be able to meet this future demand, however, a few

sites may be nearing capacity by 2035. No large-scale new facilities are expected to be added through 2035; however, some camping opportunities and facilities may be needed (EDAW, Inc. 2002).

5.3.1.3 Bullard's Bar Reservoir

Bullard's Bar Reservoir is located in Tahoe National Forest at an elevation of 2,300 feet. The lake encompasses 4,700 surface acres and has 55 miles of shoreline (Stienstra 2000).

Supply

There are two developed boat-in campgrounds and many primitive boat-in sites. In addition to these camping facilities, boaters are allowed to make their own primitive campsites anywhere along the shore (a chemical toilet is required). The lake has two paved boat ramps, one day use area and a full-service marina. Common activities include swimming, PWC use, camping, boating, fishing, and hiking (Stienstra 2000). Facilities here are the responsibility of Yuba County Water Agency and were in large part originally constructed by a Davis-Grunsky grant administered by DWR (pers. comm., Burton 2003).

Demand

Approximately 60,000 people per year visit Bullard's Bar Reservoir. Management expect to manage visitation to campgrounds is to keep visitation at current levels. Currently, facility improvements include constructing a new parking lot, repaving existing parking lots, and repaving two campgrounds (pers. comm., Burton 2003).

5.3.1.4 Butt Valley Reservoir

Butt Valley Reservoir is located approximately 46 miles northeast of the Oroville Facilities and 4 miles south of Lake Almanor at an elevation of 4,140 feet above msl. At maximum pool level, the reservoir has 1,600 surface acres (Plumas County 1999).

Supply

Opportunities for recreation at Butt Valley Reservoir include camping, fishing, hiking, and swimming. Recreation facilities developed by PG&E at the reservoir are comprised of two campgrounds on the east side: Cool Springs and Ponderosa Flat. Cool Springs is a fee campground with 25 campsites and 5 walk-in sites. It is located 2.5 miles south of Ponderosa Flat Campground on the east shore of Butt Valley Reservoir. Located on the north end of Butt Valley Reservoir, Ponderosa Flat is also a fee campground and contains 63 campsites. There is a boat ramp and DUA at the facility. Powerboats are allowed on the reservoir; however, a Plumas County ordinance limits boat speeds to a maximum of 25 mph (Plumas County 1999).

Demand

In 2001, an estimated 37,500 people visited Butt Valley Reservoir, with visitation expected to increase in the future. Overall, the existing facilities are expected to meet

future demand. There are some ADA deficiencies at the boat ramps and campgrounds (pers. comm., Mintz 2003).

Construction of 10 to 20 primitive campsites would need to occur to meet future demand levels. Planned construction projects include the conversion of overflow primitive campsites to developed campsites, formalizing fishing access at the powerhouse, adding an ADA accessible trail around 30–40 percent of the shoreline, and adding 10–20 new parking spots (pers. comm., Mintz 2003).

5.3.1.5 Clear Lake

Located north of Santa Rosa, California, this is the most expansive natural lake within California's borders, covering 40,000 surface acres. There are numerous resorts, full-service marinas with lodging, and private campgrounds on more than 100 miles of shoreline (Stienstra 2000).

Supply

Clear Lake, due to its size, offers many recreation facilities. The adjacent Clear Lake State Park hosts camping and provides picnicking and lake access for boaters and others. There are several beaches around the lake. Popular activities include boating, water-skiing, PWC use, fishing, windsurfing, camping, and swimming (Stienstra 2000).

Demand

An estimated 100,000 people visit Clear Lake State Park per year on average, with visitation expected to increase in the future. Existing facilities are at capacity on a regular basis and can not accommodate all of the people who wish to utilize them. The acquisition of additional acreage would need to occur, followed by the development of new campgrounds and day use facilities, to meet future demand levels. A planned construction project includes replacing a restroom with one that will be ADA accessible restroom (pers. comm., Woods 2003).

5.3.1.6 East Park Reservoir

Owned by the U.S. Bureau of Reclamation (USBR), East Park Reservoir is situated in the rolling foothills of the Mendocino National Forest on Little Stony Creek in Colusa County, about 33 miles southwest of Orland, California. USBR built the reservoir, which is now operated by the Orland Unit Water Users Association. The reservoir was designed for the storage of surplus water for irrigation. The reservoir capacity is 50,900 af with 1,820 surface acres at full pool (DWR 2003b). The reservoir is part of the Orland Project which includes three reservoirs: East Park, Stony Gorge and Black Butte (USBR 2003).

Supply

Recreation opportunities include camping, picnicking, hiking, wildlife viewing, fishing, boating, swimming, and windsurfing. An unimproved boat ramp, picnic area, and several dispersed camping areas are provided. Camping and picnicking areas at the

reservoir are semi-primitive and scattered throughout the park. The campsites have vault and portable toilets but no water or other amenities. A group campground is available (USBR 2003).

Demand

East Park Reservoir has recently experienced an increase in visitation over the previous three years and is not always able to meet visitor demand (pers. comm., Trout, 2003). During the 10-year period between 1987 and 1997, the average annual visitation to EPR was 79,000 (DWR, 2000). Based on a recreation survey conducted in 2000, DWR determined that there were approximately 53,000 recreation days of use at East Park Reservoir in 2000 (DWR, 2000). Most of the existing facilities are in need of replacement or repair. Deficiencies at the reservoir include campground availability and organization, dilapidated bathrooms and tables, and a lack of law enforcement (pers. comm., Trout, 2003).

5.3.1.7 Englebright Lake

Englebright Lake, located in the Sierra foothills northeast of Marysville at an elevation of 500 feet, resembles a water snake going through the Yuba River Canyon. Created for the purpose of storing hydraulic gold mining debris, the lake is formed by Englebright Dam, a massive, 260-foot high, 1,142-foot long concrete arch structure (USACE Website).

Supply

Englebright Lake has 24 miles of shoreline, although it only covers 815 acres. This reservoir provides boat-in camping only. There are two boat ramps and a full service marina at the lake, along with houseboat, patio boat, ski boat, fishing boat, canoe, and paddleboat rentals available. The lake offers boat-in camping, group boat-in camping, boating, PWC use, waterskiing, fishing, and picnicking (Stienstra 2000) Picnic facilities are located at the Narrows Recreation Area (USACE Website).

Demand

Englebright Lake receives approximately 105,000 visitors per year. Visitation is expected to increase; however, existing facilities are expected to be able to meet foreseeable future demand. There are no facilities currently under construction; however, some future construction is planned. Management would like to potentially build a seawall, provide landscaping in the picnic area, harden pathways, and make ADA accessibility improvements (pers. comm., Seebertson 2003).

5.3.1.8 Folsom Reservoir

Located at the base of the Sierra foothills northeast of Sacramento, California, in the Folsom Lake State Recreation Area, this reservoir covers 12,000 acres, with 75 miles of shoreline (Stienstra 2000).

Supply

Popular activities at Folsom Reservoir include boating (15 ramp lanes), water-skiing, PWC use, fishing, windsurfing, picnicking (190 sites), camping (two campgrounds with a total of 170 sites), and swimming. There is one full-service marina. The State Recreation Area (SRA) is managed by DPR and has a vast network of horseback riding, hiking, and jogging trails (Stienstra 2000).

Demand

Annual visitation at Folsom Reservoir is estimated in recreation visitor days (RVDs) at approximately 1 million (DWR 2001). A recreation visitor day is a unit of measure that represents an aggregate of twelve visitor hours at a site or area. This figure does not include the undocumented walk-in visitors, which could be several hundred or thousands more. Visitation is not expected to exceed 2 million people per year in the near future. The day use facilities are in good condition. Facilities such as boat ramps, group campgrounds, parking, and picnic sites are not adequate to meet demand. Construction of a new visitor center and new restrooms are planned for the future (pers. comm., Nakaji 2003).

5.3.1.9 Indian Valley Reservoir

Indian Valley Reservoir is located in Lake County, east of Clear Lake and 27 miles west of Williams, California. The reservoir is owned and operated by the Yolo County Flood Control District. The reservoir is a source of water for Yolo County residents, for irrigation, recreation, and flood prevention. The reservoir has a capacity of 300,000 af with 4,000 surface acres when full. There are 39 miles of shoreline (DWR 2003a).

Supply

The reservoir provides opportunities for camping, hiking, fishing, boating, and swimming. Two boat launching areas are available, one at the north end and one at the south end. A privately owned full-service marina and store are located at the dam. Indian Valley Reservoir has three camping areas managed by the U.S. Bureau of Land Management (BLM): Blue Oaks Camp, Wintun Camp, and Kowalski Camp. The only campground located on the edge of the reservoir, Kowalski Camp, is on the west shore and has primitive camping with hike-in or boat-in access only. Blue Oaks Camp has six campsites with water and vault toilets, but no hookups. Wintun Camp is a single site with pit toilets, but no water hookups. Kowalski trail offers the hiker 2.5 miles of trails following the reservoir's west edge (DWR 2003a).

Demand

Indian Valley Reservoir receives approximately 50,000 visitors per year. Most of the existing facilities at the reservoir are in need of replacement or repair. Deficiencies at the reservoir include aging bathrooms and RV pump stations and a lack of electrical hookups (pers. comm., Barton and Lopez 2003).

5.3.1.10 Lake Almanor

Lake Almanor is located approximately 50 miles northeast of the Oroville Facilities in a scenic mountain setting at an elevation of 4,500 feet in the Plumas National Forest. Lake Almanor covers 27,064 water surface acres when full with 52 miles of shoreline. PG&E operates a hydropower facility here (USDA – FS 2003a).

Supply

PG&E also manages many recreation facilities at Lake Almanor, and has provided a number of family and large group camping areas and picnicking/day use facilities around and adjacent to the reservoir. The area offers public recreation opportunities for camping (approximately 600 sites total) fishing, swimming, picnicking (55 sites), boating (five boat ramps), water-skiing, rental cabins, and summer homes. Lake Almanor Campground has 130 developed campsites for tents or motor homes (PG&E 2000). The USDA – FS, Lassen National Forest, also manages Almanor Campground containing 103 campsites for tents or motor homes, piped-in potable water, vault toilets, picnic tables, and fireplaces (DWR 2001, USDA – FS 2003a). Lake Almanor also offers an archery range and a paved bicycle trail (DWR 2001).

Demand

An estimate of 185,600 people visited Lake Almanor in 2001 during the “managed use season” (season during which facilities were open for public use - generally considered to be mid-May through mid-September). Campgrounds and day use facilities at Lake Almanor receive an estimated annual usage of more than 130,000 RVDs (PG&E 1997). Visitor numbers are expected to increase in the future. Existing facilities are generally in good condition; however, a shortage of campgrounds and day use facilities is expected as demand increases in the future. However, the USDA – FS campground should be able to cope with increased visitation as it rarely reaches capacity. Restrooms at the lake were recently upgraded to meet ADA accessibility standards (pers. comm., Sanford 2003).

5.3.1.11 Lake Berryessa

Located northeast of the Napa Valley and east of Santa Rosa, California, Lake Berryessa stores 1.6 maf of water and is one of the largest reservoirs in California. The reservoir covers approximately 21,000 surface acres and has 165 miles of shoreline (DWR 2001, Stienstra 2000).

Supply

The USBR provides two large DUAs (Oak Shores and Smittle Creek), Capell Cove boat ramp, and many smaller dispersed DUAs. There are several private campgrounds with picnic areas and bathrooms. There are seven marinas, several with full service including boat rentals, fuel services, and groceries. Popular activities include boating (39 boat ramp lanes), water-skiing, PWC use, fishing, windsurfing, camping (six campgrounds with 635 sites), picnicking (83 sites), and swimming. The USBR and the

DFG jointly manage a 2,000-acre wildlife area along the east side of the reservoir (DWR 2000).

Demand

This is a popular recreation location because of its proximity to Sacramento and the Bay Area, and receives considerable boating and water-skiing activity on summer holidays and weekends. Lake Berryessa receives an average of 1.5 to 2 million visitors a year, and visitation is expected to increase. Existing boat ramps and campsites are in generally good condition. Restrooms, potable water facilities, roads, parking, trails and footbridges are in need of maintenance and/or repair. Construction is planned for a new visitor center and possibly an education center as well. Currently, trail work and parking lot coating and striping is talking place (pers. comm., Shoester 2003).

5.3.1.12 Lake Pillsbury

Located north of Ukiah, California, within the Mendocino National Forest, Lake Pillsbury is the largest reservoir in this National Forest. The reservoir elevation is 1,800 feet, covers 2,000 surface acres, and has 65 miles of shoreline (Stienstra 2000).

Supply

There are three boat ramps, picnic areas, several campgrounds including primitive boat-in camps, lodging, a restaurant, and a full-service marina. Fishing boats, paddleboats, and canoes are available for rent. Popular activities include boating, water-skiing, PWC use, fishing, windsurfing, camping, and swimming (Stienstra 2000).

Demand

Lake Pillsbury receives approximately 10,000 visitors annually. Visitation has been increasing annually and is expected to continue. Campgrounds, however, do not usually reach capacity except on some peak use weekends. Within the campground areas, bathrooms were recently replaced and modernized and the roads were repaved (pers. comm., Drury 2003 and Wright 2003).

5.3.1.13 Shasta Lake

Shasta Lake is a 29,500-acre reservoir and is one of the most popular water-based recreation areas in California. It is the largest reservoir in the State and the keystone of the federal Central Valley Project. Shasta lake has 370 miles of shoreline (DWR 2001).

Supply

One of three reservoirs within the Whiskeytown-Shasta-Trinity National Recreation Area, most of the recreation facilities at Shasta are operated by the USDA – FS, with the exception of several marina facilities that operate under special use permits. There are 750 developed campsites (including group sites) at the reservoir in addition to many other primitive boat-in camping areas scattered around the shoreline. Popular activities include non-motorized and motorized boating (notably house-boating), swimming, fishing, camping, picnicking, and hiking. Overall, visitor use at Shasta Lake is

considered high, particularly on summer weekends (DWR 2001, Stienstra 2000). Shasta Lake also offers an OHV area (DWR 2001).

Demand

Shasta Lake is one of the most popular areas for house-boating in California. Shasta Lake receives an average of three million visitors per year, and visitation is expected to increase. Most of the facilities are generally in good condition, however, some of the campgrounds are 30 years old and have narrow roads that cannot accommodate larger vehicles. To meet future visitation demand, user conflict issues such as speed limits and safety will need to be resolved. Capacity studies are also needed. Upgrades to boat ramp facilities and walkways are planned, and improvements are now being made to the boat-in campgrounds. Currently, new restrooms are being constructed, new tables are being installed, signs and lighting are being replaced, and upgrades to land facilities at boat ramps are also being made (pers. comm., Adcock 2003).

5.3.1.14 Lake Spaulding

Located near Emigrant Gap in the Tahoe National Forest, the reservoir is at 5,000 feet elevation and has 698 surface acres. This reservoir is managed by the Forest Service (Stienstra 2000).

Supply

There is one paved boat ramp, a picnic area, and a campground. Common activities include boating, water-skiing, fishing, windsurfing, camping, and swimming. There are several hiking trails in the area as well (Stienstra 2000).

Demand

Lake Spaulding receives an average estimated 27,600 visitors per year. Visitation levels have appeared to stabilize over the past several years, and nothing is expected to occur that would dramatically increase the lake's use. The RV parking lot is becoming more heavily used than the campgrounds; however, it does not appear that it will reach its maximum capacity. All of the facilities are in good condition, and a new boat ramp was recently installed (pers. comm., Jackson 2003).

5.3.1.15 Lake Tahoe

Lake Tahoe is located on the California-Nevada border in the Sierra Nevada Mountains. The lake is 22 miles long and 12 miles wide with 72 miles of shoreline. Lake Tahoe has a surface elevation of 6,225 feet and is the second deepest lake in the United States (USGS 2003). The USDA – FS manages over 70 percent of the land surrounding the Lake. The lake is also surrounded by several California and Nevada State parks, which offer campgrounds, trails, fishing areas, beaches, and picnic areas (Wildernet 2003).

Supply

There are 15 marinas, 14 paved boat ramps, 23 developed beaches, and two undeveloped beaches. There are 11 campgrounds on the lake with tent and RV sites at

most of them. Lake Tahoe also offers and some boat-in camping as well as additional campgrounds in the vicinity of the lake (Stienstra 2003). Lake Tahoe is different from other regional lakes in terms of the activities available. Lake Tahoe offers a very broad spectrum of activities from hot air ballooning to snowboarding that other regional lakes do not offer. Popular summer activities at the lake include camping, boating, fishing, backpacking, hiking, biking, and horseback riding. Winter activities in the Lake Tahoe vicinity include downhill skiing, cross-country skiing, snowshoeing, snowboarding, and snowmobiling (Wildernet 2003). PWC are not permitted on Lake Tahoe (TRPA 2003).

Demand

Approximately 4.4 million people visit the Lake Tahoe Basin each year for a variety of tourist and recreation opportunities. Many of the recreation facilities in the region are in need of renovation or repair as many of the facilities are almost 30 years old. These facilities are not expected to be able to handle future increased demand. It is anticipated that new development of residential and tourist accommodation units will generate demand for recreation opportunities that currently do not exist. The Summer 2000 Recreation User Survey shows that the majority of respondents already feel the existing facilities are too crowded (TRPA 2003). However, it is unknown at this time which facilities will not be able to meet demand and what will be done to meet future demand. The Tahoe Regional Planning Agency is currently conducting studies to identify facility needs. There are several planned construction projects including a proposed expansion to the Tahoe City Marina. Long-term master plans are being prepared by the California and Nevada State Parks Departments. No known construction projects are currently taking place (pers. comm., Eichar 2004).

5.3.1.16 Little Grass Valley Reservoir

Located in the Plumas National Forest approximately 20 miles northeast from the Oroville Facilities, Little Grass Valley Reservoir is at elevation 5,046 feet above msl and covers 1,615 acres with a 16-mile shoreline. This reservoir is managed by the Forest Service (USDA – FS 2003a).

Supply

The recreation facilities here are operated by a USDA – FS concessionaire, but are ultimately the responsibility of the Oroville-Wyandotte Irrigation District, which built original facilities using a Davis-Grunsky grant administered by DWR. Campgrounds at Little Grass Valley Reservoir offer a variety of sites and services. Fishing, water-skiing, swimming, boating, hunting, hiking, sightseeing, and winter sports such as snowmobiling and cross-country skiing are popular activities. Developed campgrounds include Little Beaver Campground (120 sites), Red Feather Campground (60 sites), Running Deer Campground (40 sites), Horse Camp (10 sites), Peninsula Tent Campground (25 sites), Wyandotte Campground (26 family campsites), Black Rock Tent Campground (20 sites), Black Rock Vehicle Camp (20 sites), and Tooms Vehicle Camp (20 sites). Swimming beaches with picnic areas are available near two of the campgrounds, and there are three paved boat ramps (USDA – FS 2003a).

Demand

Approximately 25,000 people visit the reservoir each year. Most of the facilities are generally in good condition and are expected to be able to cope with expected increase in visitor demand. Some deficiencies at the reservoir include campground accessibility and other poor road conditions. Lakeshore trail paving and widening is planned for 2004 (pers. comm., Braxton 2003).

5.3.1.17 *Stony Gorge Reservoir*

Located 21 miles west of Willows, California, Stony Gorge Reservoir is on Stony Creek about 18 miles downstream from East Park Dam and 5 miles west of Fruto in western Glenn County. The reservoir is operated by the USBR in coordination with the Orland Unit Water Users Association. The reservoir is located at an elevation of 800 feet, has 1,300 surface acres when full, and has a 25-mile shoreline (USBR 2003a).

Supply

Three campgrounds and two picnic areas are provided. Camping is free except for a group camping area. There is no piped-in potable water. One paved boat ramp is useable most of the summer, depending on water level. Popular recreation activities include camping, picnicking, boating, fishing, windsurfing, and swimming. The reservoir provides a warm-water fishery known for bass fishing (USBR 2003a).

Demand

Approximately 50,000 people visit Stony Gorge each year. Most of the facilities at the reservoir are in adequate condition. A new boat ramp could potentially be needed if visitor levels increase (pers. comm., Trout 2003).

5.3.1.18 *Trinity Lake*

Set at the eastern base of the Trinity Alps, Trinity Lake is at an elevation of 2,300 feet. Trinity Lake is the third largest reservoir in the State after Shasta Lake and Lake Oroville. Recreation facilities are managed by the USDA – FS, its concessionaires and permittees. The reservoir has 16,535 surface acres when full but can fluctuate dramatically (DWR 2001).

Supply

The area is known for its water and land-based recreation opportunities, such as boating and camping (802 sites). There are five full-service marinas, six boat ramps, and three boat-in camps. The reservoir offers several types of camping, boat-in, group, and family, with more than 450 campsites. The reservoir has dozens of picnic sites and several private resorts (DWR 2001).

Demand

On average, approximately 750,000 people visit Trinity Lake each year, and visitation is expected to increase by about 5 percent within the next 10 years. Most of the existing

facilities are in good condition and should be able to meet future visitation demand; however, the water systems need constant repair. Planned construction projects include a new low water boat ramp, rehabilitation of the campgrounds, and widening of the roads (pers. comm., Grigsbee 2003).

5.3.1.19 Upper Feather River Reservoirs

Antelope Lake, Frenchman Lake, and Lake Davis, located northeast of the Oroville Facilities, are situated within the Plumas National Forest at the headwaters of the SWP. USDA – FS concessionaires operate all recreational facilities at the three reservoirs (USDA – FS 2003a).

Supply – Antelope Lake

Antelope Lake and Dam are located on Indian Creek, a tributary of the North Fork Feather River. Recreational opportunities on and around the reservoir included camping, fishing (including an accessible pier), picnicking, boating, water-skiing, swimming, hunting, hiking, snow-skiing, and snowmobiling are recreational activities occurring on or around the reservoir. Sanitation and trailer dumpsites are available (USDA – FS 2003A).

Demand – Antelope Lake

Antelope Lake receives an average of approximately 24,500 visitors per year on average, with visitation expected to increase. Existing facilities are generally in good condition; however, there is no electricity, only one phone, and one boat ramp. Increased visitation will likely create a shortage of campgrounds. Currently, an amphitheatre is under construction (pers. comm., Dryer 2003).

Supply – Frenchman Lake and Lake Davis

Frenchman Lake and Dam are located on Little Last Chance Creek, a tributary of the Middle Fork of the Feather River. The area offers similar activities and services found at Antelope Lake but receives the majority of its visitors from the Reno, Nevada area. Lake Davis and Grizzly Valley Dam are located on Big Grizzly Creek, a tributary of the Middle Fork of the Feather River. The area offers similar activities and services found at Antelope and Frenchman reservoirs, however no water-skiing is allowed at Lake Davis (USDA – FS 2003A).

Demand – Frenchman Lake and Lake Davis

The existing facilities at both Frenchman and Davis Lakes are in generally good condition; however, they will need to be upgraded. Roadways are too narrow, and boating access is limited. In 2000, there were 240,000 visitor days at Frenchman Lake and 145,000 at Lake Davis (DWR 2002). To meet future demand, a new campground will need to be constructed at Frenchman Lake and water system upgrades will be needed at both lakes. An overflow campground at Frenchman Lake is being proposed, and the installation of restrooms is planned for Lake Davis in 2005. Currently, ADA accessible toilets constructed in 2003 at Lake Davis (pers. comm., Schaber 2003).

5.3.1.20 Whiskeytown Lake

Whiskeytown Lake is located near the town of Redding, California, in the Shasta-Trinity National Forest. It is one of three reservoirs in the Whiskeytown-Shasta-Trinity National Recreation Area and is managed by the National Park Service. At an elevation of 1,200 feet, the reservoir has 3,220 surface acres and 36 miles of shoreline (Stienstra 2000).

Supply

Facilities at Whiskeytown Lake include a visitor center, three boat ramps, three campgrounds, a few large sandy beaches and popular picnicking areas, as well as two full-service marinas. Opportunities for recreation include boating, water-skiing, PWC use, fishing, windsurfing, camping, and swimming (Stienstra 2000).

Demand

For the last five years, visitation to Whiskeytown Lake has been averaging 750,000 people per year. Most of the existing facilities are over 40 years old and are not expected to meet future demand. Specifically, parking lots, campsites, bathrooms, visitor center, and staffing are expected to prove inadequate in the future. Although there are no construction projects planned, it is the goal of the facilities manager to replace many of the facilities rather than adding new ones, thereby keeping the same level of service the same (pers. comm., Wheeler 2003).

5.3.1.21 Summary of Regional Lakes and Reservoirs

As stated, Northern California is abundant with lakes and reservoirs. Lake Oroville is the second largest after Shasta Lake. Facilities listed in Table 5.3-2 show that Lake Oroville is one of only three reservoirs/lakes offering swimming beaches. Less than half of the reservoirs/lakes have marinas and boat-in camping both of which are offered at Lake Oroville. None but Lake Oroville offer floating campsites. Regional activity supply is discussed further in Section 5.3.4. Existing and projected future demand for each of the selected regional sites is summarized in Table 5.3-4. Visitation is expected to increase by varying degrees at the following sites:

- € Antelope Lake;
- € Black Butte Reservoir;
- € Bucks Lake;
- € Butt Valley Reservoir;
- € Clear Lake;
- € East Park Reservoir;
- € Englebright Lake;
- € Lake Almanor;
- € Lake Berryessa;
- € Lake Pillsbury;
- € Lake Tahoe;
- € Shasta Lake;
- € Little Grass Valley Reservoir;
- € Stony Gorge Reservoir; and
- € Trinity Lake.

Visitation is not expected to increase significantly at the following sites:

- € Bullard's Bar Reservoir;
- € Folsom Lake;
- € Frenchman Lake;
- € Indian Valley Reservoir;
- € Lake Davis;
- € Lake Spaulding; and
- € Whiskeytown Lake.

5.3.2 Visitation to Regional Lakes and Rivers

Of the regional lakes and rivers that Household Survey respondents (on-water recreationists) stated they visit, 14 of the 23 lakes included in this study were listed as having been visited. Table 5.3-5 shows the total percentages of Household Survey respondents who visited each water body. The columns in Table 5.3-5 list the percentage of respondents from each sub-region surveyed who have visited each water body. Respondents could list more than one water body; therefore, columns were not totaled.

The most visited lake among Household Survey respondents in the surveyed region is Lake Tahoe, while Lake Oroville ranked fifth. Among those surveyed in Butte County, Lake Oroville was visited by 82 percent of respondents, the most-visited lake for that survey region. Among surveyed Reno-area residents, Lake Tahoe was the most visited water body (86 percent). San Francisco area respondents' largest category of attendance was "other lakes" (60 percent), which does not specify which ones they visited. Survey respondents from the Sacramento area listed the American River, which runs through the City of Sacramento, as the most visited water body (72 percent). These responses indicate that respondents tend to visit the water bodies nearest to or in the vicinity of where they live. In Table 5.3-5, water bodies are listed in the order of most visited to least visited by the total number of respondents.

Visitation to Lake Oroville was low among residents outside of Butte County. Even though Sacramento is relatively close to Lake Oroville, only 17 percent of respondents had visited within the last 12 months. Of lakes and reservoirs, Folsom Reservoir received the highest percentage of visitation (67 percent) from the Sacramento area.

Table 5.3-5. Visitation to regional lakes, reservoirs, and rivers by Household Survey respondents.

Water Body	Percentage of Respondents				
	Total	Butte County	Reno	San Francisco	Sacramento
Lake Tahoe	63.5	45.0	86.0	55.0	61.0
Sacramento River	49.3	57.0	29.0	48.0	63.0
Other Lakes	33.3	15.0	33.0	60.0	44.0
American River	31.8	9.0	20.0	26.0	72.0
Lake Oroville	31.5	82.0	12.0	15.0	17.0
Feather River	27.0	61.0	28.0	8.0	11.0
Folsom Reservoir	27.3	12.0	11.0	17.0	67.0
Delta rivers or lakes	24.3	12.0	11.0	39.0	34.0
Shasta Lake	22.8	34.0	13.0	23.0	21.0
Lake Almanor	21.8	42.0	26.0	11.0	7.0
Rivers and lakes in Plumas National Forest	20.5	28.0	34.0	7.0	12.0
South Fork Feather River	19.8	44.0	18.0	4.0	13.0
North Fork Feather River	18.8	48.0	14.0	7.0	6.0
Middle Fork Feather River	16.8	41.0	13.0	6.0	7.0
Other Rivers	16.3	10.0	13.0	24.0	18.0
Yuba River	14.5	12.0	25.0	7.0	14.0
Bucks Lake	14.5	29.0	18.0	5.0	5.0
Rivers and lakes in the Lassen National Forest	14.3	27.0	15.0	4.0	11.0
Lake Berryessa	14.3	10.0	3.0	29.0	13.0
Frenchman Lake	13.5	3.0	48.0	0.0	1.0
Eagle Lake	12.8	15.0	24.0	4.0	8.0
Lake Davis	11.8	4.0	35.0	5.0	3.0
West Branch Feather River	10.0	31.0	2.0	4.0	3.0
Black Butte Lake	10.0	34.0	1.0	1.0	4.0
Truckee River	9.0	0.0	33.0	1.0	2.0
Antelope Lake	7.0	7.0	19.0	0.0	2.0
Whiskeytown Lake	6.8	17.0	3.0	3.0	4.0
Little Grass Valley Reservoir	5.5	13.0	3.0	4.0	2.0
Trinity Lake	5.0	11.0	3.0	3.0	3.0
Stoney Gorge Reservoir	4.0	14.0	0.0	2.0	0.0
Russian River	3.8	1.0	1.0	12.0	1.0
Butt Valley Reservoir	3.5	9.0	1.0	3.0	1.0
Pit River	2.8	4.0	2.0	2.0	3.0
Honey Lake	2.5	3.0	7.0	0.0	0.0
Donner Lake	2.5	1.0	6.0	2.0	1.0
Stampede Reservoir	2.3	1.0	8.0	0.0	0.0
Boca Reservoir	2.0	0.0	8.0	0.0	0.0
Clear Lake	1.8	1.0	1.0	4.0	1.0
Lake Britton	0.5	1.0	1.0	0.0	0.0
Don't know	0.8	0.0	0.0	0.0	1.0

Note: **Bold** indicates lakes and rivers included for comparison with Lake Oroville in this study. There were a total 100 respondents per regional sub-group (Butte County, Reno area, San Francisco area, and Sacramento area).
Source: EDAW, Inc. 2003b (Household Survey).

5.3.3 Setting Preferences

Recreation demand includes preferences for various types of settings. Household Survey participants were asked which type of setting they preferred. Natural and undeveloped areas in remote locations near lakes and rivers (natural areas) was the category preferred by 45.8 percent of respondents (Table 5.3-6). Developed nature-oriented parks and recreation areas in or near lakes and rivers (developed areas) was the category preferred by 42.8 percent of respondents. Most respondents preferred one of the two previously mentioned settings, with highly developed parks and historic or cultural sites preferred by only 6.8 percent and 4.8 percent of respondents, respectively.

Table 5.3-6. Recreational setting preferences.

Setting Type	Percentage of Respondents				
	Total	Butte County	Reno	San Francisco	Sacramento
Natural and undeveloped areas in remote locations near lakes and rivers	45.8	37.0	55.0	44.0	47.0
Developed nature-oriented parks and recreation areas in or near lakes or rivers	42.8	46.0	38.0	50.0	37.0
Highly developed parks and recreation areas in or near urban areas near lakes or rivers	6.8	9.0	7.0	4.0	7.0
Historical or cultural buildings, sites or areas	4.8	8.0	0.0	2.0	9.0

*Note: There were a total of 400 respondents, 100 per regional sub-group.
Source: EDAW, Inc. 2003b (Household Survey).*

At many of the lakes and reservoirs in the region, setting varies by season, with water-level changes, and geographically within each lake. Visitors have the opportunity to take advantage of both natural, undeveloped areas and more-developed facilities.

5.3.4 Regional Activity Supply

Table 5.3-7 lists popular activities available at regional lake and reservoir recreation sites. Each of the 23 reservoirs and lakes in the region offers boating and camping. Trinity Lake and Butt Valley Reservoir are the only areas that do not offer fishing. Only the three drinking water reservoirs—Trinity Lake, Black Butte Lake, and Englebright Lake—do not offer swimming. Opportunities for boat-in camping, windsurfing, and PWC use are the least common, with 10 of the 23 recreation areas supporting these activities. Lake Oroville compares favorably with other regional facilities, offering all of the listed activities except windsurfing. As shown in Table 5.3-7, a wide range of recreation types are popular at Lake Oroville (11) when compared with the other lakes and reservoirs. In addition, Lake Oroville is one of the few areas which offers OHV/ATV use. Of the lakes and reservoirs in the region, only Lake Tahoe offers more of the listed recreation opportunities than Lake Oroville, though it does not offer PWC use.

Table 5.3-7. Popular recreation activities available at regional lakes and reservoirs.

Reservoir or Lake	Boating	PWC use	Water-skiing	Wind-surfing	Camping	Boat-in camping	Group camping	Picnicking	Swimming	Fishing	Hiking	Other	Number of activities at site (of 12)
Black Butte Lake	X	X	X	X	X		X	X		X	X		9
Bucks Lake Recreation Area	X		X		X		X	X	X	X			7
Bullard's Bar Reservoir	X	X			X	X		X	X	X	X		8
Butt Valley Reservoir	X				X			X	X		X		5
Clear Lake	X	X	X	X	X		X	X	X	X			9
East Park Reservoir	X			X	X		X	X	X	X	X	X	9
Englebright Lake	X	X	X		X	X	X	X		X			8
Folsom Reservoir	X	X	X	X	X			X	X	X			8
Indian Valley Reservoir	X				X	X			X	X	X	X	7
Lake Almanor	X		X		X		X	X	X	X			7
Lake Berryessa	X	X	X	X	X			X	X	X			8
Lake Oroville	X	X	X		X	X	X	X	X	X	X	X	11
Lake Pillsbury	X	X	X	X	X	X		X	X	X			9
Lake Tahoe	X	X	X	X	X	X	X	X	X	X	X	X	12
Shasta Lake	X				X		X	X	X	X	X		7
Lake Spaulding	X		X	X	X			X	X	X			7
Little Grass Valley Reservoir	X		X		X			X	X	X	X	X	8
Stony Gorge Reservoir	X			X	X		X		X	X			6
Trinity Lake	X				X	X	X	X					5
Upper Feather River Reservoirs:													
Antelope	X		X		X	X		X	X	X	X	X	9
Frenchman	X		X		X	X		X	X	X	X	X	9
Davis	X				X	X		X	X	X	X	X	8
Whiskeytown Lake	X	X	X	X	X			X	X	X			8
Number of sites offering activity (of 23)	23	10	15	10	23	10	11	19	20	21	12	8	Average: 8

Source: Stienstra 2000.

5.3.5 Regional Activity Demand

This regional activity demand assessment considers the region described in 5.3.1 which stretches from Trinity and Shasta Lakes to the north and to Berryessa and Folsom Lakes to the south. In order to determine the overall regional demand for recreational opportunities and activities, several sources were consulted, several of which cover broader “regions” than this study is intended to represent. The sources include:

- ∄ *Projections of Outdoor Recreation Participation to 2050;*
- ∄ *California Outdoor Recreation Plan, 1993;*
- ∄ *Public Opinions and Attitudes on Outdoor Recreation in California, 1997;*
- ∄ *California Outdoor Recreation Plan, 1998;*
- ∄ *California Outdoor Recreation Plan, 2002;* and
- ∄ *Central and Northern California Outdoor Recreation Market Analysis, 2002.*

The *Central and Northern California Outdoor Recreation Market Analysis* provides data from surveys taken in Northern and Central California, and is particularly applicable to the study area (Tierney et. al. 2002). While the study looked at recreational interests and participation rather than demand, general inferences can be made that reflect upon regional recreation demand. Of the activities discussed in relation to Lake Oroville, the most popular in the Central and Northern California region were reported to be, in order of popularity:

- ∄ Camping;
- ∄ Hiking;
- ∄ Fishing;
- ∄ Sightseeing;
- ∄ Picnicking;
- ∄ Swimming;
- ∄ Non-consumptive wildlife activities;
- ∄ Motorboating;
- ∄ Mountain biking;
- ∄ Bird hunting;
- ∄ Big game hunting; and
- ∄ Horseback riding.

5.3.5.1 Latent Demand

The *California Outdoor Recreation Plan (CORP)* describes the latent or unmet demand in California for particular outdoor recreation activities (DPR 2002). This was measured using a survey that asked whether Californians would increase their participation in a particular activity if additional recreational opportunities became available. The activities with high demand would most likely see an increase in participation if there was an increase in opportunities or access. Of the recreational activities that are

applicable to the Oroville facilities (in the Project area), the results indicate a high latent recreational demand for:

- € Walking;
- € Camping in developed sites and primitive areas;
- € Hiking;
- € Swimming in lakes, rivers and the ocean;
- € General nature or wildlife study;
- € Freshwater fishing; and
- € Picnicking in developed sites.

Respondents also indicated which of these activities had the most public support for government funding. Again, the 2002 CORP does not indicate which activity had the highest support for government funding. Of the activities occurring in the Project area Oroville, the activities receiving the highest combined scores for public support and latent demand were:

- € Camping in developed sites;
- € Hiking;
- € Nature study;
- € Walking;
- € Picnicking in developed sites; and
- € Camping in primitive sites.

The 1993 CORP conducted a more detailed survey that showed high, medium, and low level of support for new public facilities (DPR 1993). Table 5.3-8 shows the relative demand for project related activities. Note that the top six activities in 1993 were the same as the six activities reported to have high public support for government funding in the 2002 CORP. In 1993, public support for new fishing facilities was high while it does not appear on the list in 2002. This may be a reflection of decreasing public interest in fishing as indicated by annual declines in fishing license sales in California.

Table 5.3-8. California public support for new public facilities by activity.

Activity	Support
Developed Camping	High
Hiking	High
Nature Study	High
Walking	High
Primitive Camping	High
Picnicking	High
Fishing	High
Beach activities	Moderate
Swimming, not in pools	Moderate
Hunting	Low
Mountain Biking	Low
Motorboating	Low
Waterskiing	Low

Source: DPR 1993.

The *Public Opinions and Attitudes on Outdoor Recreation in California* published similar latent demand data (Table 5.3-9) (DPR 1998b). For the project-related activities, the results were very similar with a few exceptions including that swimming and beach activities were given high rather than medium ratings, and that walking received the highest latent demand rating. Walking in this sense may not be completely applicable to the study region, as it includes walking for recreation such as in urban areas and parks.

Table 5.3-9. Latent demand for activities in California.

Activity	Rating
Walking	High
Developed Camping	High
Hiking	High
Swimming, not in pools	High
Nature Study	High
Camping Primitive	High
Beach Activities	High
Fishing	High
Picnicking	High
Horseback Riding	Moderate
Mountain Biking	Low
Hunting	Low
Motorboating	Low
Waterskiing	Low

Source: DPR 1998b.

5.3.5.2 Demand for Recreation Setting Type

In addition to activity based assessments, the 1998 CORP assesses the types of physical, social, and managerial settings that visitors choose for outdoor recreation (DPR 1998b). The data in Table 5.3-10 show that over two-thirds (69 percent) of California residents prefer to use either undeveloped areas or nature-oriented parks and recreation areas. However, relatively few residents actually use these areas on a consistent basis, primarily due to travel time or distance, cost, or lack of time. Based on the desire for a less developed recreational setting expressed by many California residents, overall demand can be characterized as generally high for the type of natural setting that is available in the study area. Demand tends to be much lower for highly developed parks and recreation areas. Ten percent of California residents tend to prefer highly developed parks and recreation areas; however, over 20 percent actually use this type of setting.

Table 5.3-10. Types of desired outdoor recreation areas used in California – preferred and actual.

Type of Area	Preferred Type (Percent)	Actual Use of Preferred Type* (Percent)
Natural and undeveloped areas	39.4	11.7
Nature-oriented parks and recreation areas	30.0	9.7
Highly developed parks and recreation areas	10.2	20.5
Historic or cultural buildings, sites or areas	9.3	2.2
Private, not public, outdoor recreation areas and facilities	11.1	12.9

*Use of an area at least once a week.
 Source: DPR 1998a.

5.3.5.3 Projected Recreation Participation

The *Projections of Outdoor Recreation Participation to 2050*, published in 1999, projects future participation and consumption, expressed in recreation days, for winter, water, wildlife, dispersed land, and developed land activities (Bowker et al. 1999). The study draws broad conclusions and trends, grouping California, Oregon, Washington, Hawaii and Alaska into a single region (Pacific Region). The results were based on a model estimating the probability that an individual will participate in a given recreational activity based on the individual’s characteristics and the recreation activities in the vicinity. Combined with population trend data including age, race or ethnicity, sex, income, and education, the model is designed to project the future participation of various activities. The results of the study are summarized in Table 5.3-11.

Table 5.3-11. Projected change (%) in number of recreation days, from a 1995 baseline.

Recreational Activity	Percent Projected Change in Recreation Days from 1995 (Pacific Region)	
	2020	2050
Boating		
Motorboating	69	209
Day Use		
Canoeing	29	80
Visiting beaches and waterfronts	39	92
Picnicking	35	62
Family gathering	29	71
Hunting	-4	-19
Fishing		
Fishing	25	44
Swimming		
Non-pool swimming	23	56
Camping		
Developed Camping	39	88
Primitive Camping	46	108
Interpretation and Education		
Non-consumptive wildlife activities	58	114
Sightseeing	67	59
Trails		
Hiking	31	62
Horseback Riding	21	70

Source: Bowker et al. 1999.

Because the model is designed to project activities for the entire Pacific Region, including Washington and Oregon, they may be significantly different for the more localized regional trends relating to Lake Oroville. Differences in population size, average income, ethnicity, and age would all affect the results of the model. Still, some of the data might apply to the study area.

Several factors related to population trends influence the results of the Bowker et. al. study. Overall, an increase in State and county populations will likely increase the demand for and use of recreation facilities in the study area. In California, a population increase of 32 percent and 60 percent from the population in 1995 is expected to occur by the years 2020 and 2050, respectively (US Census 2003). During the same periods, average income, after accounting for inflation, is expected to increase by 36 percent and 89 percent, respectively. Income and population size together account for a large portion of the recreation demand forecasts, although average age and ethnicity also play an important role in recreational trends. For example, in one study, Hispanics and

non-Hispanics differed in terms of public support for trail hiking, with non-Hispanics responding with a “high” ranking, and Hispanics recording a “low” rating (DPR, 1998b). The percent of the population that is Caucasian is expected to decrease by 5 percent by 2020 and by 10 percent by 2050. Meanwhile, the average age in California is expected to increase by 9 percent by 2020 and 12 percent by 2050 (US Census 2003).

The results in Table 5.3-11 indicate that the recreational uses that are expected to experience the largest short term (out to 2020) growth in the Pacific Region are motorboating (69 percent), sightseeing (67 percent), non-consumptive wildlife use (58 percent), camping (39–46 percent), visiting beaches and waterfronts (39 percent), and picnicking (35 percent). All of these are expected to grow faster than the population (32 percent). Recreational uses that are expected to grow at a slower rate than the population include hiking (31 percent), canoeing (29 percent), family gathering (29 percent), fishing (25 percent), non-pool swimming (23 percent), and horseback riding (21 percent). Hunting was the only recreational activity expected to decrease (by four percent). While motorboating is projected to increase by a large amount in the Pacific region including Oregon, California, Washington, Alaska, and Hawaii, it has low latent demand (Table 5.3-9) and low public support for new facilities (Table 5.3-8) when surveyed more locally.

5.3.5.1 Fishing Licenses Sold in California

In order to help assess existing regional fishing demand, fishing license data were acquired from DFG and are presented in Table 5.3-12. These data indicate that the number of fishing licenses sold in California has decreased considerably over the last 6 years (by 16 percent). These data are not presented in Recreation Days. These study area results are not consistent with the Bowker, et al. study, which predicts growth (25 percent increase by 2020) in recreational fishing in the Pacific region comprised of Oregon, Washington, California, Alaska and Hawaii.

Table 5.3-12. Fishing license purchases in California (1996-2001).

Type of Fishing License	Number of Fishing Licenses Sold by Year							Percent Change 1996-2002
	1996	1997	1998	1999	2000	2001	2002	
Resident	1,403,126	1,385,421	1,289,657	1,271,930	1,265,344	1,228,836	1,179,511	-15.90%
Non-resident (1 year)	12,448	12,070	11,441	11,659	11,663	11,564	11,253	-9.60%
Non-resident (10-day)	16,752	20,430	20,951	14,611	14,418	13,867	12,256	-26.80%
Total Licenses:	1,432,326	1,417,921	1,322,049	1,298,200	1,291,425	1,254,267	1,203,020	-16.01%

Source: DFG 2003.

5.3.6 Regional Demand Conclusions

Due to the varying study-area sizes and locations for the reports reviewed in this section, the disparity in reporting methods (latent demand, support for new facilities, or predicted growth), and the range of years over which surveys were taken, it is difficult to draw detailed conclusions as to the current and future state of recreation demand in the study region. However, several broad statements can be made that reflect trends common to all or most of the reports. Camping in developed sites seems to be in very high demand, and is expected to grow rapidly in the future. Hiking and walking have similarly high demand despite predictions that they are expected to grow more slowly than the population. Nature study, picnicking, and primitive camping all have high latent demand, high support for new facilities, and are expected to grow relatively quickly. Swimming and beach-related activities fall somewhere in the middle, with either high or moderate latent demand or support for additional facilities. Consistently low on the list were hunting, mountain biking, and horseback riding (Bowker et al. 1999).

National recreation projections are inconsistent with regional demand analyses for motorboating and fishing. While the Pacific region model indicated low latent demand for motorboating and low support for new motorboating facilities, a national assessment of demand trends projects it to grow significantly (209 percent by 2050) (Bowker et al. 1999). As demonstrated, there are many reservoirs available for boating in Northern California. Demand may increase without an increase in latent demand meaning that the existing facilities are expected to be able to meet demand. Respondents expressed generally high latent demand and high support for new facilities for fishing, but fishing was projected to grow relatively slowly, and license sales in California declined 16 percent between 1996 and 2002.

5.4 COMPARISON OF LAKE OROVILLE FACILITIES WITH OTHER SIMILAR SITES

This section compares survey results from the Similar Sites Survey (Black Butte Lake, Lake Berryessa and Shasta Lake) to survey results from Lake Oroville to identify reasons why visitors chose a particular lake or reservoir. Additionally, survey results investigate what visitors identified as problems and how minor or severe they felt those problems were. Visitors were also asked of which facilities they thought there were “too few” at each of the four reservoirs. Some of the Household Survey results are also utilized for this discussion. Tables 5.3-2, 5.3-3 and Table 5.3-4 in section 5.3 Regional Recreation Supply and Demand: Lakes and Reservoirs present information that can be used to compare Lake Oroville in general to various regional resources. Facilities at Lake Oroville compare favorably in development and quantity to similar projects in California.

Information from surveys conducted at three lakes similar to Lake Oroville provides a basis for comparing visitor experiences and preferences. The survey conducted at these three additional lakes is referred to as the Similar Site Survey. Results from the Household Survey also contribute to a comparison study of Lake Oroville versus other

regional lakes. The Household Survey and the Lake Oroville On-site Survey provides results that may be compared with the Similar Sites Survey. Analysis of these survey results can help identify possible barriers and opportunities to increasing visitation at Lake Oroville (Section 5.5) and potential solutions (Section 6.0) to minimize or alleviate any potential barriers arising from Project operation.

In general, at Black Butte Lake, Lake Berryessa, Shasta Lake, and Lake Oroville, proximity was the most popular reason for visiting. This reinforces the earlier data in Section 5.3.3 that shows the locations Household Survey respondents prefer. Most visitors choose to recreate at water bodies near their residences. Other popular reasons to visit these four lakes include resource conditions, facilities and regular maintenance. Respondents choose to recreate at beautiful places that are clean with quality facilities. Visitors also identified familiarity and comfort as reasons for going to their preferred lake on a regular basis (EDAW, Inc. 2003).

5.4.1 Similar Recreation Site Visitor Preferences

Visitors to four lakes—Lake Berryessa, Shasta Lake, Black Butte Lake and Lake Oroville—were surveyed for their preferences at the lakes where they were surveyed.

Visitors were asked why they had chosen to visit the lake where the survey was administered. The question was asked in an open-ended manner, and responses were individually written. Tables 5.4-1 to 5.4-4 list the top ten reasons why people chose to visit each lake. The reasons provided by respondents were positive. In the table, categories such as *resource* or *social conditions* mean that the respondent was pleased with that aspect of the lake or environment, and that was the reason or part of the reason for visiting that particular lake. Some respondents listed more than one reason. Respondents could provide more than one answer; therefore, the percentages are not totaled.

Proximity included such reasons as location, “close to home,” or convenience. This was the number one reason visitors chose to visit a lake. *Access* represents reasons for visiting such as good or easy water/boating access or the site was easy to get to.

Fishing, boating and land activities represent reasons such as “I like to fish there,” “came to jet ski,” and “the camping is good.” These categories encompass reasons people like to go to the lake for that activity or that the lake is “good” for that activity.

Friends/family there represents reasons for visiting such as family or friends are located in the area. Responses included: “my parents live there,” “our friends invited us,” or “came to visit my family.”

Familiar/favorite includes reasons that refer to familiarity with the site (“been going there for years”) or preference for the area (“it’s nice,” “it is my favorite,” and “we like it there”).

Low cost represents comments that refer to the comparably inexpensive or no cost to use the facilities at the site.

Good facilities/maintenance includes reasons that refer to the quality of facilities on-site, the cleanliness of the site or facilities, or continued maintenance of the area.

New/change of pace represents reasons for visiting such as the respondent had never been there before, wanted to go somewhere different, was “checking out” the area, or heard about the area from a friend or the Internet.

Social conditions include reasons such as the low level of crowding, friendly staff, or the area is child-friendly.

Resource conditions include reasons for visiting such as the beauty of the area, size of the lake, cleanliness of the water, or temperature of the water.

5.4.1.1 Reasons for Visiting Black Butte Lake

At Black Butte Lake, 50 percent of the respondents chose to visit the lake because of the *proximity* of the lake to their residence (Table 5.4-1). Other popular reasons for visiting Black Butte Lake included the *good facilities and maintenance* of those facilities (20 percent), and the *resource* and *social conditions* (15 percent each). *Boating* was mentioned by 10 percent of respondents as a reason for visiting Black Butte Lake. Many respondents also commented on the frequent ranger visits, cleanliness and lack of crowds.

Table 5.4-1. Reasons for visiting Black Butte Lake.

Reason	Percentage of Respondents
Proximity	50.8
Good facilities/maintenance	20.3
Resource conditions ¹	15.3
Social conditions ¹	15.3
Boating	10.2
Other water-based recreation	8.5
New/change of pace	8.5
Familiar/favorite	6.8
Fishing ¹	5.1
Friends/family there ¹	5.1
Land activities ¹	5.1
Low cost ¹	5.1

¹ Twelve (rather than ten) reasons were included because the last four were equivalent in percentage of respondents.

Note: There were 59 respondents.

Source: EDAW, Inc. 2003d (Similar Site Survey).

5.4.1.2 Reasons for Visiting Lake Berryessa

Proximity was also the reason almost half of the respondents gave as to why they visited Lake Berryessa (Table 5.4-2). The *resource conditions* at Lake Berryessa were a reason for visiting given by over 25 percent of respondents. *Familiar/favorite* was also a popular reason for visiting Lake Berryessa (15 percent) as was boating (11 percent). Many respondents commented on the water, beauty, and size of the lake.

These findings are consistent with the 1998 Lake Berryessa boating study (Jackson et al. 1998). Boaters listed both their favorite locations on the lake as well as those most likely to be avoided due to overcrowding. Good water quality, calm water, beautiful scenery, and lake size were cited as the most attractive features associated with the lake setting.

Table 5.4-2. Reasons for visiting Lake Berryessa.

Reason	Percentage of Respondents
Proximity	48.5
Resource conditions	26.2
Familiar/favorite	15.5
Boating	11.7
Social conditions ¹	10.7
New/change of pace ¹	10.7
Good facilities/maintenance	8.7
Friends/family there	5.8
Access	4.9
Fishing	3.9

¹These two reasons had the same number of respondents
 Note: There were 103 respondents.
 Source: EDAW, Inc. 2003d (Similar Site Survey).

5.4.1.3 Reasons for Visiting Shasta Lake

At Shasta Lake, the most frequent reason for visiting was *familiar/favorite* (Table 5.4-3). Many respondents commented that they have been going to the lake for a long time and really like it there. The second most common reason for visiting Shasta Lake was the *proximity* of the lake to respondents' residence, the top reason for visiting Lake Berryessa and Black Butte Lake. The *resource conditions* were also a frequent reason for visiting (19 percent). Respondents made several comments about the size of the lake, beautiful scenery, and cleanliness of the water at Shasta Lake. Respondents also chose to visit Shasta Lake based on the *good facilities and maintenance* of the facilities (9 percent).

Table 5.4-3. Reasons for visiting Shasta Lake.

Reason	Percentage of Respondents
Familiar/favorite	26.2
Proximity	23.8
Resource conditions	19.0
Good facilities/maintenance	9.5
Fishing	8.3
New/change of pace	7.1
Boating ¹	6.0
Land activities ¹	6.0
Friends/family there ¹	6.0
Social conditions	3.6

¹These three reasons had the same percentage of respondents.

Note: There were 84 respondents.

Source: EDAW, Inc. 2003d (Similar Site Survey).

5.4.1.4 Reasons for Visiting Lake Oroville

The top reason respondents visited Lake Oroville was its *proximity* to respondents' residence (Table 5.4-4). *Fishing* was the second most frequent response as to why visitors chose Lake Oroville (19 percent), a reason that was not as popular at the other lakes. As was the case with the other three lakes, the *resource conditions* were also a popular reason for visiting Lake Oroville (13 percent) as were the *good facilities and maintenance* of those facilities (9 percent).

Table 5.4-4. Reasons for visiting Lake Oroville.

Reason	Percentage of Respondents
Proximity	41.2
Fishing	19.5
Resource conditions	13.8
Good facilities/maintenance	9.7
Social conditions	8.7
Familiar/favorite	8.0
Land activities	7.1
Friends/family there	6.1
Boating	5.7
New/change of pace	5.1

*Note: There were 2,349 respondents.
Source: EDAW, Inc. 2003a (Recreation Visitor On-site Survey).*

In general, at Black Butte Lake, Lake Berryessa, Shasta Lake and Lake Oroville, proximity was the most popular reason for visiting. This reinforces the data in Section 5.3.3 that shows Household Survey respondents lake or reservoir of choice. Most visitors choose to recreate at water bodies near where they live. Other popular reasons to visit these lakes include resource conditions, facilities and regular maintenance. Respondents choose to recreate in places that are beautiful and clean with quality facilities. Another popular reason for visiting the lakes was that people had been going there and felt familiar with it (or felt it was their favorite lake).

5.4.2 Similar Recreation Site Visitor Experiences

Survey participants at the three similar sites and Lake Oroville were asked to identify issues or problems they experienced when at the lake. Table 5.4-5 identifies issues that survey respondents may have experienced during their visit to Black Butte Lake, Lake Berryessa, Shasta Lake, and Lake Oroville. The greatest concern at Black Butte Lake was water quality, which received a mean score of 1.61, a score between “not a problem” and “a slight problem.” The greatest problem at Lake Berryessa was litter along the shoreline, which received a mean score of 1.94, “a slight problem.”

Slight problems at Shasta Lake included access to the shoreline, exposed land during lower water levels, shallow areas during lower water levels, and water level fluctuations. Slight problems at Lake Oroville were similar to those found at Shasta Lake and included exposed land during low water levels, shallow areas during low water levels, and water level fluctuations (Table 5.4-5). These water condition issues at Shasta Lake and Lake Oroville are related to the fact that these two bodies of water serve as reservoirs and are regularly drawn down to provide electricity, irrigation water for farming, fisheries water, and municipal and industrial water supply. Based on these average scores it does not appear that any of the listed issues are of relatively great concern to the general visitors at any of the four lakes.

Table 5.4-5. Visitor experiences at similar sites and Lake Oroville.

	Black Butte Lake	Lake Berryessa	Shasta Lake	Lake Oroville
Management Responsibilities	Mean Score¹			
Access to the shoreline	1.31	1.53	2.06	1.78
Adequacy of landscaping of facilities	1.37	1.61	1.40	1.38
Adequate information/warnings provided	1.22	1.42	1.37	1.32
Availability of service/staffing	1.34	1.31	1.42	1.41
Cost to use facilities	1.18	1.75	1.73	1.20
Law enforcement presence	1.18	1.35	1.37	1.45
Litter along the shoreline	1.59	1.94	1.57	1.84
Overall safety and security	1.08	1.25	1.36	1.41
Sanitation along the shoreline	1.48	1.63	1.44	1.60
Water Conditions				
Exposed land during lower water levels	1.45	1.80	2.07	2.35
Floating debris in the water	1.43	1.57	1.71	1.81
Quality of water	1.61	1.48	1.53	1.45
Shallow areas during lower water levels	1.40	1.76	1.99	2.25
Water level fluctuations	1.12	1.47	2.01	2.20
User Interactions				
Boat speed or wake effects	1.43	1.37	1.84	1.58
Encounters between PWC and other users	1.36	1.53	1.82	1.67
Encounters between pleasure boaters and boat anglers	1.07	1.26	1.35	1.39
Encounters between trail users and other users	1.02	1.11	1.14	1.15
Encounters between water-skiers and others	1.05	1.28	1.52	1.36
Noise from boats and PWC	1.35	1.46	1.84	1.52
Numbers of people at developed facilities	1.34	1.39	1.60	1.51
Numbers of watercraft	1.28	1.56	1.75	1.62
Unsafe behavior by others	1.35	1.50	1.65	1.71
Use of alcohol by others	1.25	1.37	1.52	1.41

¹Experiences were rated "not a problem" (1), "a slight problem" (2), "a moderate problem" (3), or "a big problem" (4). N/A responses were included in calculations.

Note: **Bold** indicate scores 2.00 or higher. There were 77 respondents for Black Butte Lake issues, 112 respondents for Lake Berryessa, 104 respondents for Shasta Lake, and 1,071 respondents at Lake Oroville issues.

Source: EDAW, Inc. 2003c-d (Recreation Visitor Mail-back and Similar Site Surveys).

5.4.3 Visitor Facility Preferences at Similar Sites and Lake Oroville

Similar Site Survey respondents were asked to identify what facilities they considered to be “too few,” “an adequate number,” or “too many.” A low score indicates “too few” facilities. Table 5.4-6 lists the percentage of respondents that listed “too few.”

Screening between campsites was the facility at Black Butte Lake which had the highest percentage response for “too few.” The number of floating campsites was felt to be too few by 40.9 percent of respondents. At Lake Berryessa, over one-half of respondents felt that there were too few fish cleaning stations. The number of restrooms was also felt too be too few by almost one-half of respondents (49.3). Other facilities considered to be too few at Lake Berryessa include the number of shower facilities at campgrounds and screening between campsites (46.2 and 42.0 percent of respondents respectively).

Exactly one-half of respondents felt that there were not enough developed day use/picnic areas along the shore at Shasta Lake. The number of campgrounds and the amount of swim areas were rated “too few” by many respondents at Shasta Lake (40.0 and 44.6 percent of respondents). Seventy percent of respondents rated number of shower facilities at campgrounds as “too few.”

Compared to the Similar Sites Survey responses, more facilities at Lake Oroville were rated as “too few” by over 40 percent of the respondents. At Lake Oroville, two facilities were rated as being too few by over one-half of respondents: the number of developed day use/picnic areas along the shore, and the number of docks or temporary moorage. Four facilities at Lake Oroville were rated too few by between 45 and 49 percent of respondents, including: number of floating campsites (46.7 percent), number of fish cleaning stations (46.5 percent), amount of swim areas (48.3 percent), and number of interpretive programs/educational opportunities (45.5 percent). Five additional facility types at Lake Oroville were rated as too few by between 40 and 45 percent of respondents: number of campsites with RV hookups (42.4 percent), number of shower facilities at campgrounds (44.6 percent), number of boat-in campsites (43.6 percent), number of boat-in primitive campsites (42.3 percent), and number of restroom (40.0 percent). Only two types of facilities were rated as “too few” by over 50 percent of respondents, number of docks or temporary moorage and number of day use/picnic facilities along the shore.

When comparing Lake Oroville with the other lakes, Lake Oroville received the most, 11, “too few” responses by over 40 percent of respondents. Each of the other lakes had three or four facility types rated “too few” by over 40 percent of respondents. Of the four reservoirs, Lake Shasta had the greatest response to one item with 70 percent of respondents rating number of showers at campgrounds as “too few.”

Table 5.4-6. Visitor facility preferences at similar sites and Lake Oroville.

Facility	Black Butte Lake	Lake Berryessa	Shasta Lake	Lake Oroville
Camping	Percent Responses "Too Few"			
Number of campgrounds	13.0	20.0	40.0	30.9
Number of campsites with RV hookups	37.0	31.7	31.3	42.4
Number of floating campsites	40.9	25.9	30.4	46.7
Number of group campsites	13.9	22.2	18.8	38.0
Number of shower facilities at campgrounds	29.5	46.2	70.0	44.6
Presence of campground hosts	8.5	13.5	17.0	17.3
Screening between campsites	45.9	42.0	36.4	39.9
Boating				
Number of boat ramps	7.1	17.2	24.6	37.1
Number of boat-in campsites	21.4	18.8	34.9	43.6
Number of boat-in gas stations	41.4	16.7	27.6	37.7
Number of boat-in primitive campsites	20.7	16.7	37.5	42.3
Number of docks or temporary moorage	22.5	26.2	37.9	51.6
Number of marinas	17.1	5.1	17.6	34.5
Fishing/Hunting				
Number of fish cleaning stations	27.3	51.7	33.3	46.5
Other Facilities				
Amount of swim areas	14.0	31.8	44.6	48.3
Number of developed day use/picnic areas along shore	37.7	28.8	50.0	57.1
Number of equestrian facilities	8.7	15.2	14.3	30.3
Number of group picnic sites	17.6	32.7	39.0	38.4
Number of interpretive programs/educational opportunities	26.5	17.9	35.3	45.5
Number of restrooms	36.7	49.3	36.2	40.0

Note: **Bold** indicates 40% or more response. Numbers are percent of respondents that chose "too few," N/A responses were not included in calculations. The number of respondents varies by facility.

Source: EDAW, Inc. 2003c–d (Recreation Visitor Mail-back and Similar Site Surveys).

5.4.4 Similar Site Visitor Attendance at Lake Oroville Facilities

Survey respondents at the similar sites were asked whether they had visited Lake Oroville and, if not, why they have not done so. Table 5.4-7 shows the percentages of Lake Oroville visitation from respondents at each of the three similar sites. About half of visitors at Black Butte Lake had visited the Lake Oroville area. Only 20 percent of those at Lake Berryessa and 32 percent from Shasta Lake had visited the Lake Oroville area. Visitation is analyzed further in Section 5.6.

Table 5.4-7. Similar site visitor attendance at Lake Oroville facilities.

Response	Percentage of Respondents		
	Black Butte Lake	Lake Berryessa	Shasta Lake
No, have not visited Lake Oroville	49.4	80.4	68.3
Yes, have visited Lake Oroville	50.6	19.6	31.7

Note: There were 77 respondents from Black Butte Lake, 112 respondents from Lake Berryessa, 104 respondents from Shasta Lake.

Source: EDAW, Inc. 2003d (Similar Site Survey).

5.4.5 Visitor Scenery Rating

Scenery was rated by visitors at the three similar sites (Similar Site Survey) as well as at Lake Oroville (Recreation Visitor On-site Survey). All of the lakes had average ratings above the neutral score for appearance and Shasta Lake’s average score was highest (Table 5.4-9). In general, visitors at all four lakes found the scenery to be appealing.

Table 5.4-9. Rating of scenery among similar site and Lake Oroville visitors.

	Black Butte Lake	Lake Berryessa	Shasta Lake	Lake Oroville
Mean scenery rating ¹	5.93	6.40	6.98	6.32

¹Scenery was rated on a scale from 1 to 9. 1=extremely unappealing, 4=unappealing, 6=appealing, 9=extremely appealing.

Note: Scenery was rated at the location where the survey was done. There were 75 respondents at Black Butte Lake, 108 respondents at Lake Berryessa, 100 respondents at Shasta Lake, and 2,246 respondents at Lake Oroville. Information is taken from the Similar Site Survey and the Recreation Visitor On-site Survey.

Source: EDAW, Inc. 2003a; EDAW, Inc. 2003d (Recreation Visitor On-site and Similar Site Surveys).

5.4.6 Similar Site Visitor Satisfaction

Of the four lakes, the mean satisfaction rating from both Similar Site and Recreation Visitor Mail-back respondents for overall visitor satisfaction was relatively similar at all four lakes, between 6.6 and 7.4, or “satisfied.”

Table 5.4-10. Visitor satisfaction among similar site and Lake Oroville visitors.

	Black Butte Lake	Lake Berryessa	Shasta Lake	Lake Oroville
Mean satisfaction rating ¹	6.87	6.62	7.43	6.58

¹Satisfaction was rated on a scale from 1 to 9. 1=extremely dissatisfied, 7=satisfied, 9=extremely satisfied.

Note: Satisfaction was rated based on visit to lake where the survey was done. There were 75 respondents from Black Butte Lake, 106 respondents from Lake Berryessa, 98 respondents from Shasta Lake, and 1,038 respondents from Lake Oroville.

Source: EDAW, Inc. 2003a; EDAW, Inc. 2003d (Recreation Visitor On-site and Similar Site Surveys).

The Similar Site Survey respondents that have visited Lake Oroville were asked about their satisfaction with their last visit to Lake Oroville. Black Butte Lake and Shasta Lake respondents gave average ratings between “neutral” and “somewhat satisfied” (5.66 and 5.16 respectively). Lake Berryessa respondents had a higher average rating (6.21), between “somewhat satisfied” and “satisfied” (Table 5.4-11).

Table 5.4-11. Similar Site Survey respondents' satisfaction with their last visit to Lake Oroville.

	Black Butte Lake	Lake Berryessa	Shasta Lake
Mean satisfaction rating ¹	5.66	6.21	5.16

¹Satisfaction was rated on a scale from 1 to 9. 1=extremely dissatisfied, 5=neutral, 6=somewhat satisfied, 7=satisfied, 9=extremely satisfied.

Note: Respondents include only those that have visited Lake Oroville before. There were 35 respondents from Black Butte Lake, 19 respondents from Lake Berryessa, and 31 respondents from Shasta Lake.

Source: EDAW, Inc. 2003d (Similar Site Survey).

5.4.7 Similar Site Visitor Likelihood of Returning

Similar Site Survey respondents provided a rating of how likely they were to return to the lake that they were visiting. The scores were compiled as a mean score, with all three lakes scoring between “likely to return” and “very likely to return.” Despite any dissatisfaction with facilities or conditions, the average visitor is expected to return to the lake where they were surveyed (Table 5.4-12).

Table 5.4-12. Likely to return to similar site locations.

	Black Butte Lake	Lake Berryessa	Shasta Lake
Mean likelihood to return rating ¹	7.29	7.35	7.89

¹Likelihood of returning was rated on a scale from 1 to 9. 1=extremely unlikely, 7=likely, 9=extremely likely.

Note: Likelihood of returning was for returning to the lake where the survey took place. There were 76 respondents at Black Butte Lake, 108 respondents at Lake Berryessa, and 96 respondents at Shasta Lake.

Source: EDAW, Inc. 2003d (Similar Site Survey).

5.5 VISITATION, SATISFACTION AND RECREATION ATTENDANCE FACTORS AT LAKE OROVILLE FACILITIES

Section 5.5 addresses factors affecting visitor satisfaction and visitation rates. Four surveys conducted in 2002–03 asked respondents to rate their satisfaction and identify factors that affected their satisfaction and likelihood of future visitation at Lake Oroville Facilities. Section 5.5.1 discusses results from these surveys. Factors affecting satisfaction and visitation can be considered potential barriers or potential incentives to site recreation attendance. Such factors include Proximity and Access, Information, Conditions, Facilities, and Special Events. An assessment of the effects of these factors on recreation in the Project area is provided in Section 5.5.2.

5.5.1 Satisfaction and Visitation Survey Results

There are three types of visitors that have the potential to visit the Lake Oroville area: those who have never visited, those who have not visited recently (within the last two

years) and those who have visited recently. Those who have visited recently and, and especially those who have not visited recently, may have the potential to visit more often. Section 5.5-1 discusses why survey respondents have not visited the Lake Oroville area, why they have not gone back if they have visited before, or why they choose not to visit more often. Subsequent sections explore potential barrier and incentive topic areas.

Reasons for Never Visiting the Lake Oroville Area

Of the Household Survey respondents, approximately 42 percent stated that they do not know enough about the Lake Oroville area to motivate them to visit, the most frequent response as to why respondents have not visited the Lake Oroville area. Table 5.5-1 shows further information on the reasons respondents have not visited the Lake Oroville area. Columns list the percentage of respondents from the sub-regions surveyed that gave each reason for not visiting the Lake Oroville area. Respondents could provide more than one response; therefore, columns were not totaled. Only two respondents from Butte County had never been to the Lake Oroville area and were therefore not included in the table.

Table 5.5-1. Reasons Household Survey respondents have never visited the Lake Oroville area.

Reason	Percentage of Respondents			
	Total	Reno	San Francisco	Sacramento
Do not know enough about the area that would motivate me to visit	41.7	44.0	50.9	27.3
It is too far away from my home	31.1	42.0	29.1	22.7
Prefer to go to other lakes	12.6	16.0	10.9	11.4
Prefer a different setting	7.9	8.0	10.9	4.5
No time or personal reasons	6.0	0.0	3.6	15.9
Not interested in water-related recreation	5.3	6.0	5.5	4.5
Other	4.0	2.0	3.6	4.5
No reason – just have not been	4.0	2.0	0.0	11.4
Too hot there	3.3	8.0	1.8	0.0
Not enough trees	2.0	4.0	0.0	2.3
Do not know	1.3	0.0	3.6	0.0
It is not located on a major highway	1.3	2.0	1.8	0.0
Too many people	1.3	2.0	0.0	2.3
Not interested	1.3	2.0	0.0	2.3

Note: There were 50 respondents from the Reno area, 55 respondents from the San Francisco area, and 44 respondents from the Sacramento area. Only 2 respondents from Butte County had never been to the Lake Oroville area and therefore were not included in the table.

Source: EDAW, Inc. 2003b (Household Survey).

After the response of “not knowing enough about the area,” the second most frequent response was “it is too far away from my home,” with respondents in the Reno area accounting for the largest response percentage for this statement.

Survey respondents from the Sacramento area and Butte County were the most informed about the Lake Oroville area, compared to respondents from the other two geographic sub-regions, who listed a lack of information about Lake Oroville as the primary reason for not visiting.

Similar Site Survey respondents that have not visited the Lake Oroville area were also asked why they have not done so. Of those surveyed at Black Butte Lake, 53 percent stated that their primary reason for not visiting was that Lake Oroville is too far away. Those surveyed at Lake Berryessa and Shasta Lake listed “lack of information” as the primary reason for not having visited the Lake Oroville area (Table 5.5-2).

Table 5.5-2. Reasons Similar Site Survey respondents have not visited the Lake Oroville area.

Reason	Percentage of Respondents		
	Black Butte Lake	Lake Berryessa	Shasta Lake
Lake Oroville is too far away	53.0	23.2	31.0
Don't know about Lake Oroville	11.8	39.5	34.5
Don't like Lake Oroville	0.0	4.7	0.0
Have not had a chance to visit Lake Oroville	17.6	16.3	6.9
Like this lake better	5.8	2.3	13.8
Don't like the conditions at Lake Oroville	0.0	4.7	10.3
Other	11.8	9.3	3.5

Note: There were 17 respondents from Black Butte Lake, 43 respondents from Lake Berryessa, and 29 respondents from Shasta Lake.

Source: EDAW, Inc. 2003d (Similar Site Survey).

Reasons for Not Visiting the Lake Oroville Area Recently

Household Survey respondents that have not visited the Lake Oroville area within the last two years (approximately 34 percent of the total number of respondents surveyed) were asked why they had not visited recently. Table 5.5-3 lists the reasons given by respondents. *Preference for other places* was the reason with the largest response and may be due to travel distance (proximity), which was the main reason Similar Site Survey respondents gave as to why they chose to visit the lake at which they were surveyed. Many Household Survey respondents also have not visited Lake Oroville because it is too far away; they prefer closer places.

Lake Oroville being “too far away” was listed by 20 percent of Household Survey respondents as the reason for not visiting (Table 5.5-3). This was also a common

reason that Similar Site Survey respondents at all three lakes gave for never visiting the Lake Oroville area. Similar Site Survey respondents also listed a lack of information as a common reason for not visiting the Lake Oroville area. However, on the Household Survey, lack of information was not listed as a top reason for not having visited because many of those surveyed had previously visited the lake, although not in the last two years.

The main reason Household Survey respondents provided for not visiting Lake Oroville in the last two years was their preference for other places including Lake Tahoe, Folsom Lake, Frenchman Lake, Lake Berryessa, Bucks Lake, Delta rivers or lakes, Lake Almanor or lakes in the Plumas National Forest.

Table 5.5-3. Reasons Household Survey respondents have not visited the Lake Oroville area in the last two years.

Reason	Percentage of Respondents				
	Total	Butte County	Reno	San Francisco	Sacramento
Prefer other places	31.8	50.0	34.6	17.4	35.7
Personal reasons (too busy, too old, etc.)	25.9	12.5	26.9	26.1	28.6
Lake Oroville is too far	20.0	0.0	23.1	26.1	17.9
Prefer closer places	10.6	0.0	15.4	13.0	7.1
Quality (don't like it)	10.6	0.0	7.7	17.4	10.7
Too hot	5.9	12.5	3.8	8.7	3.6
Don't know	3.5	0.0	3.8	4.3	3.6
Have no boat	3.5	25.0	0.0	0.0	3.6
Have a cabin or boat elsewhere	2.4	0.0	3.8	0.0	3.6
Too crowded	2.4	0.0	3.8	0.0	3.6
Nothing there/no reason to go back	2.4	0.0	7.7	0.0	0.0

Note: There were 8 respondents from Butte County, 26 respondents from the Reno area, 23 respondents from the San Francisco area, and 28 respondents from the Sacramento area.

Source: EDAW, Inc. 2003b (Household Survey).

Satisfaction with Experiences at Lake Oroville

Visitor satisfaction with experiences at Lake Oroville was investigated in the Recreation On-site Surveys as well as in the Household Survey. In On-Site Surveys, respondents who responded to the trails, fishing and/or boating sections of the survey were asked about their satisfaction with their experience. Section 5.4.6 provides mean satisfaction ratings in comparing Lake Oroville to the three similar lakes selected for the Similar Sites Survey.

In general, most respondents were either neutral or satisfied with their last trip to Lake Oroville (Table 5.5-4). Lake Berryessa had the highest percentage of satisfied respondents with 57.9 percent. Shasta Lake had the lowest percentage of satisfied respondents with 29 percent. All three similar site reservoirs and the Household Survey

had at least 35 percent of respondents that felt neutral about their last trip to Lake Oroville. The Household Survey had the lowest percentage of dissatisfied respondents with 2.4 percent. Lake Berryessa also had a low percentage of dissatisfied respondents (5.3 percent). Black Butte Lake had slightly more dissatisfied respondents (17.1 percent) and Shasta Lake had the most with 25.8 percent of respondents.

Table 5.5-4. Satisfaction with last trip to Lake Oroville.

	Black Butte Lake	Lake Berryessa	Shasta Lake	Household Survey
Satisfied ¹	45.7	57.9	29.0	38.9 ⁴
Neutral ²	37.2	36.8	45.2	58.6
Dissatisfied ³	17.1	5.3	25.8	2.4 ⁵

¹ Satisfied category includes responses: Satisfied, very satisfied, extremely satisfied.

² Neutral category includes responses: Somewhat satisfied, neutral, somewhat dissatisfied.

³ Dissatisfied category includes responses: Dissatisfied, very dissatisfied, extremely dissatisfied.

⁴ Satisfied category is slightly different, includes responses: very satisfied and extremely satisfied.

⁵ Dissatisfied category is slightly different, includes responses: very dissatisfied and extremely dissatisfied.

Note: Respondents from similar sites include only those that have visited Lake Oroville before. Respondents included 35 from Black Butte Lake, 19 from Lake Berryessa, 31 from Shasta Lake, and 249 from the Household Survey.

Source: EDAW, Inc. 2003b; EDAW, Inc. 2003d (Similar Site and Household Surveys).

Table 5.5-5 illustrates Similar Site Survey and On-site Survey respondents' satisfaction with their recreation experience at the lake where they were surveyed. All four reservoirs had between 68 (Lake Berryessa) and 84 percent (Shasta Lake) satisfaction. Lake Oroville had the third highest satisfaction with 70.6 percent of respondents feeling satisfied with their recreation experience at Lake Oroville. Black Butte Lake and Lake Berryessa had the largest percentage of respondents who felt neutral about their recreation experience (24 and 23.6 percent, respectively). Black Butte Lake had the lowest percentage of dissatisfied respondents with 1.3 percent, followed by Shasta Lake (6.1 percent), Lake Berryessa (7.5 percent), and Lake Oroville (11.7 percent).

Table 5.5-5. Satisfaction with recreation experience.

	Black Butte Lake	Lake Berryessa	Shasta Lake	Lake Oroville
Satisfied ¹	74.7	68.9	84.7	70.6
Neutral ²	24	23.6	9.2	17.7
Dissatisfied ³	1.3	7.5	6.1	11.7

¹ Satisfied category includes responses: satisfied, very satisfied, extremely satisfied.

² Neutral category includes responses: somewhat satisfied, neutral, somewhat dissatisfied.

³ Dissatisfied category includes responses: dissatisfied, very dissatisfied, extremely dissatisfied.

Note: Respondents included 75 from Black Butte Lake, 106 from Lake Berryessa, 98 from Shasta Lake, and 1,038 from Lake Oroville.

Source: EDAW, Inc. 2003b; EDAW, Inc. 2003d (Similar Site Survey and Mail-back Survey).

More specifically, most respondents stated they were satisfied with their experiences on the trails, fishing or boating (Table 5.5-6). Respondents who completed the trails portion of the survey were the most satisfied, with almost 90 percent satisfaction. The majority of angling respondents were also satisfied with 78 percent satisfaction. Approximately 89 percent of boating respondents were satisfied.

Table 5.5-6. Satisfaction with experiences at Lake Oroville.

	Percent of Respondents Satisfied	Percent of Respondents Dissatisfied
Experience on trails	89.8	10.2
Fishing experience	78.0	22.0
Boating experience	88.7	11.3

Note: Respondents include only those that filled out the trails, fishing or boating sections respectively. There were 876 trail respondents, 946 fishing respondents, 1,191 boating respondents.

Source: EDAW, Inc. 2003a (Recreation Visitor On-site Survey).

Those who were not satisfied with their last trip to Lake Oroville (11 percent) gave several reasons, as listed in Table 5.5-7. *Access* issues included reasons such as campsites too far from the water, not enough shore access, and shore access that was too steep. *Facility* issues included not enough facilities (more beaches, sand) and poorly maintained facilities. Those who mentioned *lake level* as a reason for dissatisfaction considered the lake level to be too low. Dissatisfaction with *conditions* included reasons such as the air temperature is too hot, no trees, the fish are too small, the area or the lake is too crowded. *Other visitor* issues included reasons such as that other visitors were unpleasant. The *Other* reasons Similar Site Survey respondents listed were mainly that respondents could not remember why they were dissatisfied with their last trip to Lake Oroville. *Other* reasons in the Household Survey included the lake or area was considered to be too unnatural, the lake needs better fishing or more fish, and other miscellaneous reasons.

Facility issues were the reason for dissatisfaction among half of the Black Butte Lake respondents who were dissatisfied. The main reason for dissatisfaction among Lake Berryessa respondents was access (80 percent). *Lake level* was the most common reason for dissatisfaction among respondents from both Shasta Lake and the Household Survey (Table 5.5-7).

Table 5.5-7. Reasons why dissatisfied survey respondents were not satisfied with their last visit to Lake Oroville.

Reason	Percentage of Respondents			
	Black Butte Lake	Lake Berryessa	Shasta Lake	Household Survey
Access	27.3	80.0	7.1	—
Conditions	18.2	20.0	14.3	18.5
Facilities	54.5	0.0	14.3	26.9
Lake level	18.2	20.0	42.9	44.4
Other	9.0	0.0	14.3	33.3
Other visitors	0.0	0.0	14.3	—

Note: Respondents include only those that have visited Lake Oroville before and answered that they were not satisfied with their last visit. There were 11 respondents from Black Butte Lake, 5 respondents from Lake Berryessa, 14 respondents from Shasta Lake, and 27 respondents from the Household Survey. Respondents could include more than one reason; therefore, total percentages for each column may exceed 100 percent.

Source: EDAW, Inc. 2003b; EDAW, Inc. 2003d (Household and Similar Site Surveys).

Dissatisfaction Among Trail Users

Among the 10.2 percent of users who said they were unsatisfied with their trail experience, trail maintenance and the desire for more facilities were the two most frequent reasons given. Lake level was also mentioned in 13 percent of responses for those dissatisfied with their trail experience (Table 5.5-8). Although lake level does not directly impact the ability to use most of the trails, it can impact the aesthetic experience of the trail. Only those respondents who filled out the trail section of the survey and answered that they were not satisfied were included in this analysis.

Table 5.5-8. Reasons Lake Oroville visitors were not satisfied with experience on the trails.

Reason	Percentage of Responses
Trails need maintenance	21.1
Would like more facilities (including rest area, trash cans, beaches, grassy areas, picnic areas, trails, benches, restrooms)	18.3
Lake level too low	12.7
Lack of signage	9.9
Would like water provided on the trails	8.5
Litter	8.5
Would like better accessibility	8.5
Other	7.0
Would like trail uses separated	5.6
Dust from the trail machine	2.8

Note: Responses are from respondents who filled out the trail section of the survey and were not satisfied with their experience on the trails. There were 71 respondents. Some respondents gave more than one reason.

Source: EDAW, Inc. 2003a (Recreation Visitor On-site Survey).

Dissatisfaction With Fishing Experiences

Twenty-two percent of respondents were not satisfied with their fishing experience. As shown in Table 5.5-9, lack of catch, either none or not enough, was the reason mentioned in over half of responses for dissatisfaction with their fishing experience (52 percent). Lack of water or flow was the second most frequently mentioned reason at 17 percent. Crowding was the third most frequent reason visitors were dissatisfied with their fishing experience (Table 5.5-9). Only those respondents who filled out the fishing section of the survey and answered that they were not satisfied were included in the analysis.

Table 5.5-9. Reasons Lake Oroville visitors were not satisfied with their fishing experience.

Reason	Percentage of Responses
Did not catch anything/did not catch enough	52.4
Lake level too low/water too low/flow too low	17.3
Too crowded	8.4
Other	7.9
Conditions (garbage, bees, dirty bathrooms, etc.)	5.8
Fish are too small	5.2
Other visitors caused a bad experience	4.2
People illegally fishing	3.1
Access	2.6

Note: Responses are from only those respondents who filled out the fishing section of the survey and answered that they were not satisfied with their fishing experience. There were 191 respondents, however some respondents gave more than one reason.

Source: EDAW, Inc. 2003a (Recreation Visitor On-site Survey).

Dissatisfaction with Boating Experiences

Only 11.3 percent of Recreation Visitor On-site Survey respondents indicated that they were dissatisfied with their boating experience. Of those that were dissatisfied with their boating experience, 46.2 percent mentioned low lake level as the reason. Boat ramp and boat launching problems was the second most common reason (21.0 percent) for their dissatisfaction (Table 5.5-10). Many respondents that mentioned problems with the boat ramp or launching, mentioned having to wait for other inexperienced launchers, crowds at the boat ramp or problems with the length of the boat ramp, mainly that the ramp was too short. As Lake Oroville becomes lower in elevation, some of the boat ramps become unusable or have less launching lanes available, which in turn could cause congestion around the available ramps. Over 17 percent of respondents attributed their dissatisfaction with their boating experience to the conditions including hazards in the water, crowdedness on the water, or physical conditions such as choppy water, rocks, or dirty water. Only those respondents who filled out the boating section of the survey and answered that they were not satisfied were included in the analysis.

Table 5.5-10. Reasons dissatisfied Lake Oroville visitors were not satisfied with their boating experience.

Reason	Percentage of Responses
Lake level too low	46.2
Boat ramp/launching problems (length of boat ramp, inexperienced people, crowded, waiting, etc)	21.0
Want more or better facilities	11.8
Too crowded on the water	8.4
Conditions (too choppy, rocks, dirty)	6.7
Other	6.7
Parking	5.9
Problems with marina	4.2
Hazards in the water	2.5

Note: Responses are from only those respondents who filled out the boating section of the survey and answered that they were not satisfied with their boating experience. There were 119 respondents, however some respondents gave more than one reason.

Source: EDAW, Inc. 2003a (Recreation Visitor On-site Survey).

Dissatisfaction with Camping Experiences

While survey respondents were not queried directly about their camping satisfaction levels, many respondents volunteered information about their camping experiences. Suggestions and complaints about camping included difficulty using the reservation system, crime at campsites, lack of bathrooms or bathroom odor, and access to the reservoir from the campground (EDAW, Inc. 2003b).

5.5.2 Factors Affecting Satisfaction and Visitation

Visitation to regional lakes and reservoirs can be affected by many factors. Potential barriers and incentives to increased reservoir-related recreation were identified upon review of other studies; in consultation with interested parties and local experts; and at Relicensing Work/Group meetings. Although many specific barriers can be identified from survey responses (e.g., “it’s too hot,” “there aren’t enough campgrounds,” “I don’t like the boat launches”), several categories were identified under which these specific barriers and incentives may be grouped. The factors affecting satisfaction and visitation at Lake Oroville include:

- € Proximity and access: ability of potential users to access the site, influenced by distance to site from residence, transportation facilities, and signage;
- € Information: availability of information on recreation opportunities, facilities, and reservoir surface water level;
- € Conditions: weather, lake surface level, and crowdedness;
- € Facilities: availability, quality, and maintenance of facilities; and
- € Special events: the type and amount of special events at the Lake.

Each of these factors is assessed for its impact on recreationists' satisfaction and demand.

5.5.2.1 Proximity and Vehicular Access

As described in Tables 5.5-1 through 5.5-3, *access* and *proximity* were among the top three reasons given for never visiting or not visiting recently. Some visitors feel that it would take too much time and effort to travel to Lake Oroville, and therefore, they do not recreate at Lake Oroville. Table 5.5-11 lists driving distances from regional population centers to lakes and reservoirs included in the On-site Survey. Lake Tahoe is included as well, due to its popularity and proximity to Reno. Recreationists may choose to visit a site that is closer to their home requiring less driving and, therefore, offers them more time to recreate at the site. Visitors may continue to visit lakes they easily know how to get to or perceive as more accessible.

Although not located directly off of the interstate, Lake Oroville is accessible by three major State highways. There are also many signs that direct visitors to Lake Oroville Facilities as well as a Visitors Center which offers maps and directions to various sites and facilities.

Table 5.5-11 Driving distances from population centers to Lake Oroville and comparison sites (miles).

	Redding	San Francisco	Sacramento	Reno
Lake Oroville	94	151	68	141
Lake Tahoe	270	198	116	36
Black Butte Lake	69	155	101	228
Lake Berryessa	182	74	65	195
Shasta Lake	12	221	167	203

Source: Mapquest 2004.

Three major highways—State Routes (SR) 70, 99, and 162—provide transportation access to Lake Oroville. Two major interstate highways—Interstate 5 (I-5) and Interstate 80 (I-80)—connect to these State Routes (Figure 5.3-1). Table 5.5-12 lists ranges of average annual daily traffic (AADT) and level of service (LOS) for route segments in the Project region. LOS ratings provide an indication of how traffic is operating on roads or highways. Levels of service are generally given letter designations, with LOS A representing the best operating conditions, smooth traffic flow, and LOS F the worst with traffic at a standstill. Two-lane highways can be rated lower, because they present problems for passing if congestion is present. Congestion can be created by just a few slow-moving vehicles when passing becomes difficult or dangerous on a two-lane highway.

Table 5.5-12. AADT for State Routes in the Project area.

State Route	2002 AADT Range Within the Project Region	LOS Range (year) Within the Project Region
SR 70	1,600 to 57,000	A–E (2003)
SR 99	6,600 to 216,000	B–E (2000)
SR 162	980 to 28,500	A–E (2003)

Source: Caltrans 2003.

SR 70 is a two-lane highway that runs parallel to SR 99 (north/south) between Sacramento and Oroville. Between Oroville and Quincy, SR 70 runs northeast/southwest. Between Quincy and Reno, SR 70 runs east/west to U.S. Highway 395 near the Nevada border. SR 70 ranges between 1,600 and 57,000 AADT. Between Sacramento and the City of Oroville, LOS on SR 70 is rated from A to E. Table 5.5-13 describes current LOS for segments of SR 70 in the Project Region. Figure 5.5-1 depicts road segments of SR 70.

SR 99 is a two-lane highway that runs primarily north/south, somewhat paralleling I-5 but providing inland access between the Sacramento area and Red Bluff. SR 99 connects Chico to Red Bluff to the north and Sacramento to the south. AADT on SR 99 ranges between 6,600 and 216,000. Table 5.5-13 describes current and projected LOS for each segment of SR 99 in the Project region. LOS is rated from B to E on SR 99 in the vicinity of Lake Oroville. Figure 5.5-2 depicts road segments of SR 99.

SR 162 is a two-lane highway that runs east/west between I-5 and Oroville. AADT on SR 162 ranges between 980 and 28,500. The LOS for each segment is listed in Table 5.5-11. LOS is rated from A to E on segments 2–6 of SR 162 which are located in the vicinity of Lake Oroville. Figure 5.5-3 depicts road segments of SR 162.

Of the 24 segments of State routes in the Project region, 12 have LOS ratings of C or better. The main road segments approaching Lake Oroville have impaired drivability. Proposed improvements to these segments could improve LOS ratings. Caltrans plans to improve State roadways with regular congestion as budget allocations allow (pers. comm., Van Valen 2003). The Interregional Transportation Strategic Plan identifies the portion of SR 70 between its junction with SR 99 in Sutter County and SR 149 in Butte County (segments 1 through 7) as a “High-Emphasis Focus Route,” which means it is one of Caltrans’ highest priority routes for project planning and programming. The intent is to bring all of this portion of SR 70 to full freeway standard (Caltrans 2003).

Based on the recent survey data, it appears that the majority of visitors to lakes and reservoirs (including Lake Oroville) choose to recreate at lakes close to their home. While an increase in width or number of lanes would not necessarily recruit substantial numbers of new visitors to the area, it could provide easier access for those who do visit

the area. Diminished driving time associated with higher LOS ratings could also reduce effective proximity. Some occasional and infrequent visitors might visit more regularly.

Table 5.5-13. Level of Service (LOS)¹ for road segments in Project region.

Hwy 70					
Milepost	County	Segment	2003 LOS	20 Year No-Build LOS	Concept LOS ²
0 - 0.3	Sutter	1	D	F	C
0 - 6.6	Yuba	2	D	F	C
6.6 - 13.9		3	C	F	D
13.9 - 15.9		4	C	F	D
15.9 - 25.8		5	D	F	D
0 -13.5	Butte	6	E	F	D
13.5 -20.5		7	A	B	B
20.5 - 28.1		8	D	D	C
28.1 - 33.1		9	A	A	C
33.1 - 18.1		10	D	D	E
Hwy 99					
Milepost	County	Segment	2000 LOS	20 Year No-Build LOS	Concept LOS
32.1 - 36.9	Sacramento	4	C	F	E
0 - 8.9	Sutter	5	B	E	C
14.3 - 41.2		6	E	C	C
25.0 - 30.6		7	C	E	D
30.6 - 35.0		8	C	E	E
35.0 - 42.4		9	E	F	D
0 - 3.1	Butte	10	E	F	D
3.1 - 4.8		11	E	F	D
4.8 - 24.8		12	E	F	D
30.6 - 37.8		13	B	C	C
30.6 - 37.8		14	D	F	C
37.8 - 46.0		15	E	F	D
Hwy 162					
Milepost	County	Segment	Current LOS	20 Year No-Build LOS	Concept LOS
37.7 - 64.9	Glenn	2	B	B	D
64.9 - 67.2		3	A	A	D
67.2 - 84.6		4	B	C	D
0 - 15.8	Butte	5	E	F	E
15.8 - 21.466		6	B	C	B

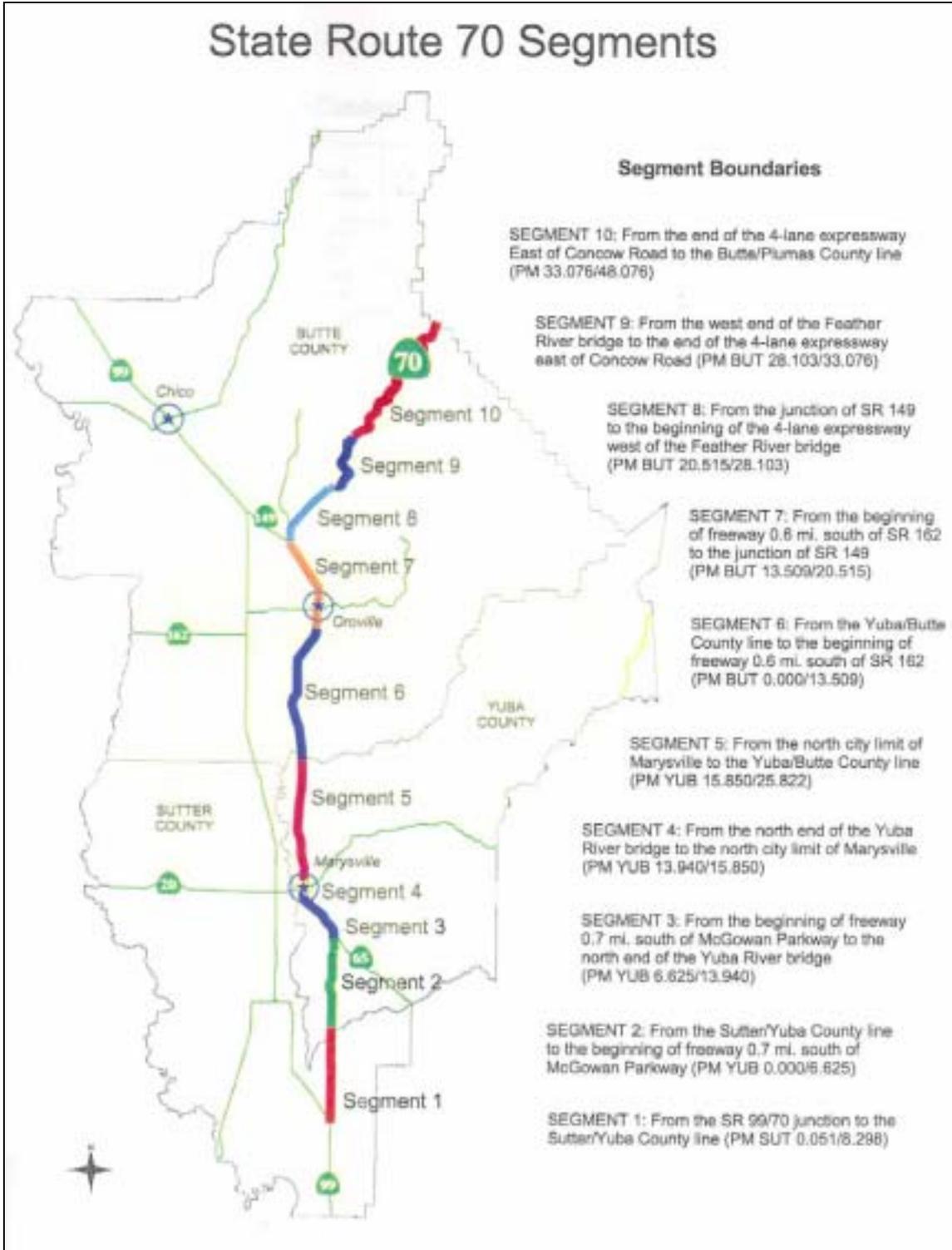
¹ Level of Service ratings for two-lane highways: A=no delays, B=no delays, C=minimal delays, D=minimal delays, E=significant delays, F=considerable delays (Source: TRB 2000).

² Concept LOS is the goal that Caltrans has for various road segments. Implementation is based on prioritization of funding allocations and constraints.

Source: Caltrans 2003, pers. comm., Flourney, 2003.

Figure 5.5-1. Road segments on State Route 70

[Insert 8 ½ X 11 figure]

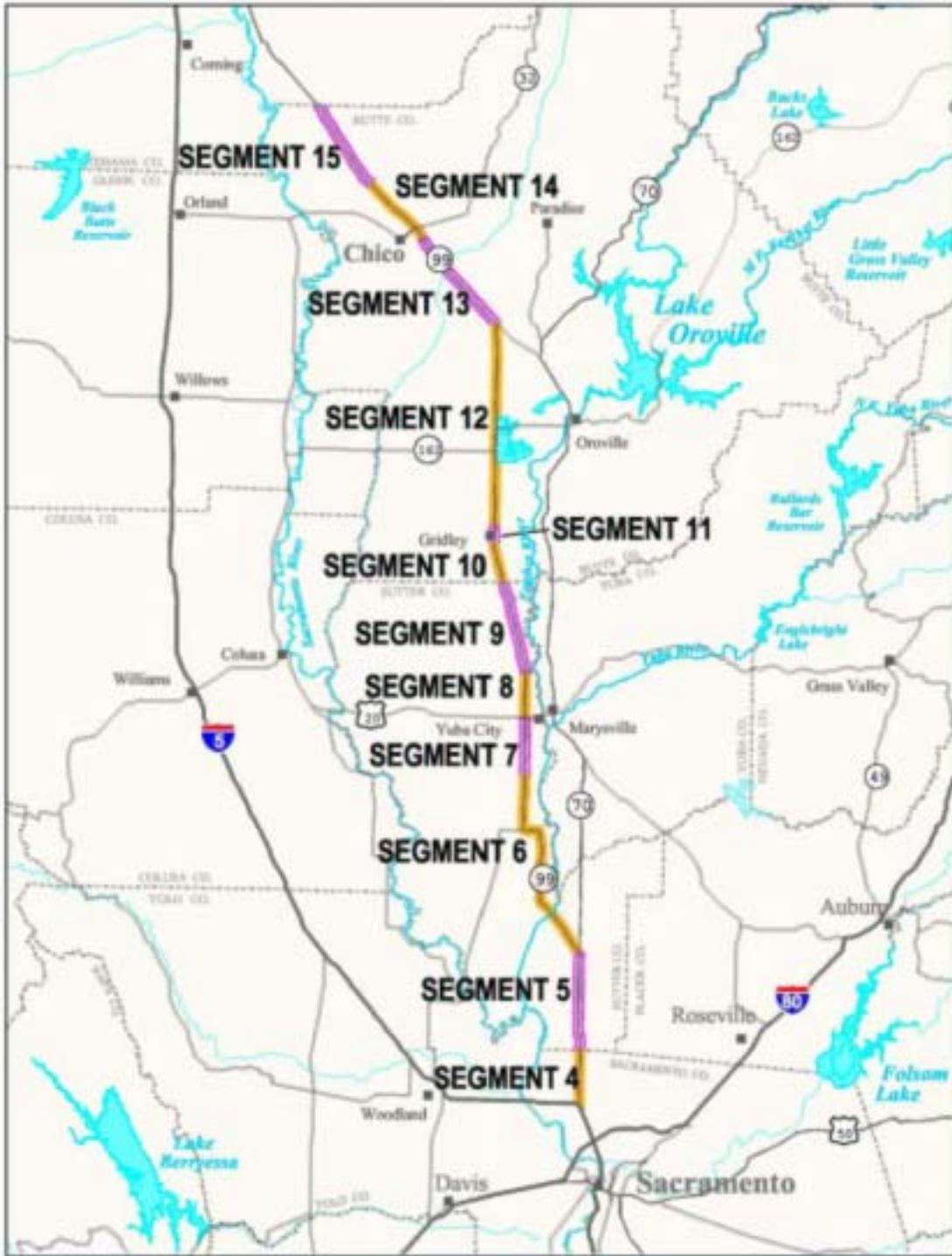


Source: Caltrans 2003

Figure 5.5-1. Road segments on State Route 70.

Figure 5.5-2. Road segments on State Route 99

[Insert 8 ½ X 11 figure]

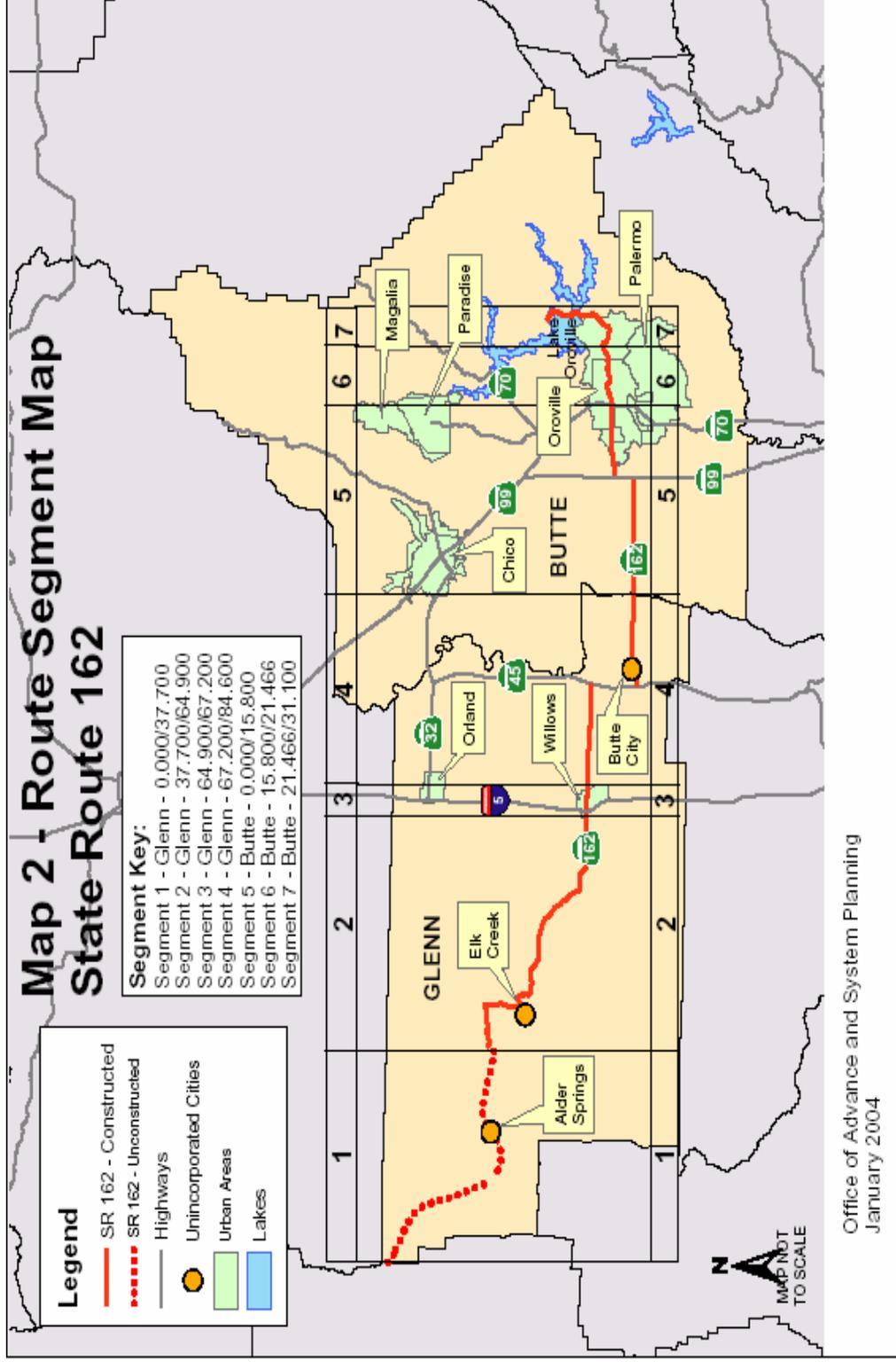


Source: Caltrans 2003

Figure 5.5-2 Road segments on State Route 99.

Figure 5.5-3. Road segments on State Route 162

[Insert 8 ½ X 11 figure]



Source: Caltrans 2004.

Figure 5.5-3 Road Segments on State Route 162

5.5.2.2 Information

Information relates to the amount of knowledge visitors have about what Lake Oroville has to offer. Some visitors lack knowledge about what is offered (activities, facilities, etc.) at Lake Oroville or the surrounding area and, therefore, do not go there. DPR provides information on all of the State recreation areas including the LOSRA on its website. DWR also provides information regarding its facilities on its website. Some local marketing is done for various special events. However, lack of information was one of the top two reasons that Household Survey and Similar Site Survey respondents had not visited the Lake Oroville area (Section 5.5.1). Many visitors want to know in advance what activities, opportunities, and facilities are available so they can better plan their trip. Without such knowledge, much of the time that could be spent recreating is spent trying to find facilities or activities.

5.5.2.3 Conditions

Conditions may also play a part in why some people choose not to visit Lake Oroville. During the summer, the air temperature on many days typically reaches over 100° F at the lake. While the survey data indicate that some people are avoiding the Lake Oroville area because it can be too hot there, this was not a common reason for not visiting the Lake Oroville area.

Low pool levels can also cause less-than-desirable conditions, impacting both aesthetic experience and recreation opportunities. Perceived conditions such as crowdedness or lines at boat ramps could create potential barriers to attendance, although crowdedness was not a common reason listed on surveys for not visiting the area. As shown in Table 5.5-3, however, lake level and conditions were common reasons that Similar Site and Household Survey respondents were dissatisfied with their last visit to Lake Oroville. Lake level was the reason more than 40 percent of Household Survey and Similar Site – Shasta Lake respondents were dissatisfied with their last visit to Lake Oroville. Conditions were the reason that between 14 and 20 percent of Similar Site Survey respondents (from all three lakes) and Household Survey respondents were not satisfied with their last visit to Lake Oroville.

There are periods during each recreation season when conditions might also be ideal, fuller reservoir levels, mid-range temperatures and non-crowded boat ramps. Relicensing Study R-3 – *Assessment of the Relationship of Project Operations and Recreation* provides further details regarding reservoir level and available recreation opportunities.

5.5.2.4 Facilities

Lack of available facilities may also create potential barriers for recreationists. Visitors are diverse in the kinds of facilities they want. Currently, Lake Oroville has a very wide range of facilities, around the lake including an OHV area, floating campsites and

equestrian camping facilities which are generally in good condition. However, this range may not include some facilities that certain visitors want, such as a floating restaurant or additional developed swimming areas. Some visitors may want other kinds of facilities, more of the existing types of facilities, or facilities in areas where none are currently located. Most activities are dependent on the availability of certain facilities and some potential visitors may choose to recreate at another location. However, Lake Oroville, when compared with other reservoirs, provides a large range of facilities and recreation opportunities. The facilities at Lake Oroville may only be available at certain times during the year. For instance, when the lake level drops, fewer boat ramps are available. This may cause people to recreate at another reservoir where more boat ramps are still useable. It should be noted that though certain facilities may be desired, many factors must be considered (i.e. resource protection, project purposes and user conflicts) to determine their appropriateness at Lake Oroville.

Relicensing Study R-3 – *Assessment of the Relationship of Project Operations and Recreation* provides further details regarding reservoir level and available recreation opportunities including facilities. Relicensing Study R-10 – *Recreation Facility and Condition Inventory* describes the many available recreation facilities.

Facilities That Would Motivate Initial Visits to the Lake Oroville Area

Two questions were asked on the Household Survey regarding facilities as a motivating factor for people who had never visited Lake Oroville. The first question, with responses presented in Table 5.5-14, was open-ended. The second question was asked using a given list of potential facilities; this list was also used in the Similar Site Survey (Table 5.5-15). Section 5.5.4 describes the distribution of visitation by the various respondents at similar sites.

Of the Household Survey respondents, approximately 56 percent stated that no outdoor recreation facility would motivate them to visit the Lake Oroville area for the first time. Table 5.5-14 shows the total percentage of several recreation facilities, including “none” (as in “no facilities”), which would motivate respondents to visit the Lake Oroville area for the first time. Columns list the percentage of respondents from each sub-region surveyed who either listed a recreation facility, or “none,” as a motivating factor. Respondents could provide more than one facility; therefore, column totals exceed 100 percent and are not shown.

By far, the greatest response was “none,” meaning that there were no facilities that would motivate Household Survey respondents to visit the Lake Oroville area for the first time. “Campgrounds” was the most frequent answer for respondents who stated that a facility would motivate them to visit for the first time (11.3 percent). Since there are available campgrounds at Lake Oroville, this response does not necessarily indicate that more campgrounds should be built, only that this could be a motivating factor for recreationists to visit. Survey respondents from the Sacramento and Reno areas were less likely to be motivated to visit Lake Oroville for the first time based on facilities

provided (72.0 and 72.7 percent), as compared to respondents from San Francisco (50.9 percent).

Table 5.5-14. Facilities that would motivate Household Survey respondents to visit the Lake Oroville area for the first time.

Recreation Facilities	Percentage of Respondents			
	Total	Reno	San Francisco	Sacramento
None	64.2	72.0	50.9	72.7
Indicated that a facility would motivate them to visit for the first-time	35.8	28.0	49.1	27.3
Campgrounds	11.3	6.0	16.4	11.4
Hiking, biking trails, rock climbing	7.9	10.0	9.1	2.3
Sailing, kayaking, rafting, canoeing, boating, water-skiing, parasailing	6.0	0.0	14.5	2.3
Boat rental, houseboat rental	4.6	6.0	5.5	2.3
Swimming facilities, water park	4.0	4.0	7.3	0.0
RV hookups	3.3	4.0	3.6	2.3
Cabins	2.6	2.0	3.6	2.3
Hotels and restaurants, spa retreat	2.6	0.0	7.3	0.0
Fishing rentals and facilities	2.0	0.0	0.0	6.8
Other	2.0	2.0	1.8	2.3
Showers and restrooms	1.3	0.0	1.8	0.0
Game hunting	1.3	0.0	3.6	0.0
PWC Facilities	0.7	0.0	1.8	0.0

Note: Respondents generated their own facility ideas. There were 50 respondents from the Reno area, 55 respondents from the San Francisco area, and 44 respondents from the Sacramento area.

Source: EDAW, Inc. 2003b (Household Survey).

Both the Similar Site and Household Survey respondents were questioned as to whether facilities (from a given list) would motivate them to visit the Lake Oroville area for the first time. Warm water swimming/beach areas was the facility chosen most frequently by respondents from Black Butte Lake (19.5 percent) as the facility that would motivate them to visit Lake Oroville for the first time (Table 5.5-15). This facility was also popular with respondents from the other lakes and the Household Survey. Swimming and beaches were also the most requested new facility/activity from Recreation Visitor Mail-back Survey respondents (Section 5.2.4.1). A water park was the most frequent response from respondents at Lake Berryessa (25 percent). Of the given facilities, respondents from Shasta Lake and the Household Survey chose a floating restaurant on Lake Oroville most frequently (20.2 and 38.6 percent respectively) as the facility that would motivate them to visit the Lake Oroville area for the first time.

Table 5.5-15. Facilities (from a given list) that would motivate respondents to visit the Lake Oroville area for the first time.

Facility	Percentage of Respondents			
	Black Butte Lake	Lake Berryessa	Shasta Lake	Household Survey
None	71.4	60.7	75.0	30.5
Indicated that a facility would motivate them to visit for the first-time	28.6	39.3	25.0	69.5
Expanded outdoor center	5.2	2.7	4.8	30.5
Water park	13.0	25.0	17.3	27.2
Floating restaurant on Lake Oroville	16.9	16.1	20.2	37.1
Warm water swimming/beach areas	19.5	17.0	13.5	29.8
More RV sites for people with disabilities	2.6	7.1	2.9	13.9
Showers at DUAs	10.4	12.5	4.8	25.8
Child play areas	13.0	9.8	4.8	20.5
More full hook-up RV sites	5.2	8.0	2.9	15.2

*Note: **Bold** percentages indicates the facility with the highest respondent percentage. Respondents could list more than one facility from a predetermined list of options. Respondents included 77 from Black Butte Lake, 112 from Lake Berryessa, 104 from Shasta Lake, and 151 from the Household Survey. Source: EDAW, Inc. 2003b; EDAW, Inc. 2003d (Household and Similar Site Surveys).*

Facilities That Would Motivate More Frequent Visits to the Lake Oroville Area

As was the case with facilities that would motivate first time users, a floating restaurant on Lake Oroville and warm water swimming and beach areas were the top two facilities that would motivate respondents to visit the Lake Oroville area more often (Table 5.5-16).

Of Household Survey respondents who have not visited the Lake Oroville area recently (have visited before but not in the last two years), nearly 85 percent identified at least one facility that would motivate them to visit more often. The respondents were relatively unified in their selection, with the identified facilities tending to be heavily favored or heavily disfavored. Five facility types were selected by more than 29 percent of those who identified facilities. The most popular facilities were a floating restaurant, a warm water/beach area, showers at DUAs, an expanded outdoor center, and a water park. Conversely, there were 7 facilities listed which were selected by less than 5 percent of respondents. These were more of various camping sites, other facilities, Marina/boat launch facilities, more water in the reservoir, more restaurants, more trails, and more cabins.

Since these facilities are available at Lake Oroville, this response does not necessarily indicate that more facilities should be built, only that this could be a motivating factor for recreationists to visit.

Table 5.5-16. Facilities that would motivate Household Survey respondents to visit the Lake Oroville area more often.

Facility	Percentage of Respondents
	Total
None	15.3
Indicated that a facility would motivate them to visit more often	84.7
Floating restaurant on Lake Oroville	38.6
Warm water swimming/beach areas	37.8
Showers at DUAs	36.9
Expanded outdoor center	30.5
Water park	29.7
Children's play areas	27.7
More full hook-up RV sites	21.7
More RV sites for people with disabilities	19.3
Various types of camping sites	4.8
Other	3.6
Marina/boat launching facility	1.6
More water in the reservoir	1.2
Restaurants	1.2
Trails	0.8
Cabins	0.8

Note: There were 98 respondents from Butte County, 50 respondents from the Reno area, 45 respondents from the San Francisco area, and 56 respondents from the Sacramento area.

Source: EDAW, Inc. 2003b (Household Survey).

Preferences for Additional Facilities at the Lake Oroville Area

Table 5.5-17 shows the total percentage of Household Survey respondents who had previously visited Lake Oroville that would like to see additional facilities at the Lake Oroville area. Respondents could provide more than one response; therefore, columns are not totaled. Results indicate that overall, respondents would like additional, diverse facilities at the Lake Oroville area.

Of the additional facilities that Household Survey respondents stated they would like at the Lake Oroville area, the most frequent response (about 43 percent) of all regional sub-groups was "other" facilities. Some of those who stated what "other" facilities they would like to have provided written responses. These include:

- € Reasonable boat rentals;
- € An area that's blocked off for more serenity with nature;
- € More access areas into the lake;
- € Lots and lots of trees;
- € Fish hatcheries;
- € Fish cleaning sink;
- € Hotel;
- € Jet ski rental;
- € More public access other than by boat;
- € Bait shop/convenience store;

- € Tours of the dam;
- € Paddle boats, kayaks, canoe rentals;
- € Floating docks in swimming areas;
- € Services for the disabled;
- € More police; and
- € More shade.

About 12 percent of all respondents stated that they would like various types of camping sites at the Lake Oroville area. A marina and boat launching facility was also requested by almost 10 percent of respondents. Lake Oroville currently has two marinas, one located at Bidwell Canyon and one at Lime Saddle; the Oroville Facilities also have more boat ramp lanes than any other reservoir in the State.

Table 5.5-17. Preference for additional facilities at the Lake Oroville area.

Other Facilities	Percentage of Respondents
Other	42.9
Various types of camping sites	11.9
Marina and boat launching facility	9.5
Expanded outdoor, nature, cultural, historic interpretation center	7.1
Fishing-related facilities	7.1
Warm-water swimming and beach areas	4.8
More water in reservoir	4.8
Restaurants	4.8
Trails	4.8
More restrooms	4.8
Water park	2.4

*Note: There were a total of 42 respondents.
 Source: EDAW, Inc. 2003b (Household Survey).*

5.5.2.5 Special Events

Special events have the potential to draw recreationists to the Lake Oroville area who do not visit for other recreational opportunities. Special events may represent an opportunity to increase visitation to the Lake Oroville area by attracting visitors who participate in recreational activities that may not currently be available or widely promoted to occur at Lake Oroville. Additionally, special events may serve to reduce the impact of possible barriers by increasing awareness among potential visitors who live in the region but have never visited the Lake Oroville area. An increase in organized events could lead to an increase in visitation to the Project area. For example, fishing tournaments are very popular special events that currently draw many visitors to the Lake Oroville area. Additionally, too few, inadequate, or unattractive special events could represent a lost opportunity to increase recreational use at Lake Oroville. Special events that are currently being offered in the Lake Oroville area include major fishing tournaments, equestrian rides, the POKER bike ride, a triathlon, an Independence Day celebration, a salmon festival, and the Butte Sailing Club events.

Special Events That Would Motivate Initial Visits to the Lake Oroville area

Two questions were asked on the Household Survey regarding special events as a motivating factor for people who have never visited Lake Oroville. The first question, with responses presented in Table 5.5-18, was open-ended. The second question was asked with a given list of potential special events; this list was also used in the Similar Site Survey (Table 5.5-19).

Of the Household Survey respondents, 68.9 percent stated that there is no special event that would be a motivating factor to visit the Lake Oroville area for the first time. Table 5.5-18 shows several special events which respondents mentioned would motivate them to visit the Lake Oroville area for the first time, and the percentage of respondents who mentioned that event. Columns list the percentage of respondents from each sub-region surveyed who either listed a special event, or “none,” as a motivating factor. Respondents could identify more than one event; therefore, columns are not totaled.

Responses were distributed fairly evenly across regions. Boating and water events were slightly higher for Reno residents (8.0 percent) suggesting that they might be more likely to come to the Lake Oroville area than on-water recreationists from the other regions for that type of event. Sacramento area responses were greater for concerts (6.8 percent) and July 4th events (6.8 percent) suggesting that they might be more likely to come to the Lake Oroville area than on-water recreationists from the other regions for that type of event.

Table 5.5-18. Special events that would motivate Household Survey respondents to visit the Lake Oroville area for the first time.

Special Event	Percentage of Respondents			
	Total	Reno	San Francisco	Sacramento
None	68.9	72.0	70.9	63.6
Need more information about the area	9.9	6.0	7.3	15.9
Indicated that a special event would motivate them to visit for the first-time	21.2	22.0	21.8	20.5
Boat and water events	6.0	8.0	5.5	4.5
Concerts	3.3	2.0	1.8	6.8
July 4 th events and fireworks	2.6	2.0	0.0	6.8
Historical and/or cultural exhibits	2.0	0.0	3.6	2.3
Outdoor festivals	2.0	4.0	1.8	0.0
Parades and/or bands	1.3	2.0	1.8	0.0
Contests and pageants	1.3	2.0	1.8	0.0
Animal events	1.3	0.0	1.8	2.3
Off-road, motocross, roller derby	1.3	2.0	1.8	0.0
Camping events	0.7	0.0	1.8	0.0
Children's events	0.7	0.0	0.0	2.3
Fishing events	0.7	2.0	0.0	0.0
Other	0.7	0.0	1.8	0.0

*Note: Respondents provided their own special event ideas. There were 50 respondents from the Reno area, 55 respondents from the San Francisco area, and 44 respondents from the Sacramento area.
Source: EDAW, Inc. 2003b (Household Survey).*

Both the Similar Site Survey and Household Survey respondents were questioned as to whether special events from a given list would motivate them to visit the Lake Oroville area for the first time (Table 5.5-19). The majority of respondents from the three similar sites indicated that special events would not be a motivating factor for an initial visit. Household survey respondents as a whole appear to be more likely to come to the Lake Oroville area for a special event. This difference may be due to an inherent preference among On-site Survey respondents for the lake at which they were surveyed.

Of the given facilities that were selected, respondents from Black Butte Lake and Lake Berryessa listed powerboat races most frequently (15.6 and 18.8 percent respectively). Food and beverage festivals was listed by the most Shasta Lake and Household Survey respondents (16.3 and 25.2 percent, respectively). Other special events listed by over 20 percent of Household Survey respondents were canoe/kayak and fishing events (24 and 22 percent, respectively).

Table 5.5-19. Special events (from a given list) that would motivate respondents to visit the Lake Oroville area for the first time.

Special Event	Percentage of Respondents			
	Black Butte Lake	Lake Berryessa	Shasta Lake	Household Survey
None	72.7	62.5	75.0	29.8
Indicated that a special event would motivate them to visit for the first time	27.3	37.5	25.0	70.2
Fishing events	11.7	13.4	13.5	21.9
Food or beverage festivals	13.0	14.3	16.3	25.2
Waterskiing events	10.4	16.1	7.7	15.2
Powerboat races	15.6	18.8	9.6	19.9
Canoe/kayak events	6.5	5.4	2.9	23.8
Living history demonstrations	5.2	2.7	4.8	17.2
Mountain bike events	3.9	6.3	3.8	13.2
PWC events	3.9	4.5	2.9	7.9
Target shooting competition	5.2	5.4	5.8	14.6
OHV related special events	3.9	5.4	4.8	9.3
Sailing events	3.9	6.3	2.9	8.6
Triathlons	2.6	2.7	2.9	8.6
Equestrian events	3.9	3.6	1.9	9.9

Note: **Bold** percentages indicated the special event with the highest respondent percentage. Respondents could select more than one event from a predetermined list of options. There were 77 respondents from Black Butte Lake, 112 respondents from Lake Berryessa, 104 respondents from Shasta Lake, and 249 respondents from the Household Survey.

Source: EDAW, Inc. 2003b; EDAW, Inc. 2003d (Similar Site and Household Surveys).

Special Events That Would Motivate More Frequent Visits to the Lake Oroville Area

In general, Household Survey respondents (that have visited the Lake Oroville area before) felt that fishing events would motivate them to visit the Lake Oroville area more often (Table 5.5-20). "Fishing events" was the most common motivating special event stated by respondents from Butte County, Reno area, and Sacramento area respondents. Respondents from the San Francisco area listed food/beverage festivals most often (26.7 percent). Respondents from the San Francisco area also felt that fishing events and canoe/kayak/river-related events would motivate them to visit more often (24 percent each). "None of the above" was also a frequent response from San Francisco area respondents (22.2 percent).

Other frequent responses from Butte County visitors were food/beverage festivals (31.6 percent), waterskiing events (27.6 percent), powerboat races (25.5 percent), and canoe/kayak/river-related events (24.5 percent).

Other frequent responses from Reno area residents were slightly different from Butte County residents. Waterskiing events (28.0 percent), powerboat races, and canoe/kayak/river-related events were popular as well (20.0 percent each). Reno area respondents also felt that mountain bike races would motivate them to visit the Lake Oroville area more often (24.0 percent), but this event was not one of the top responses from any of the other respondents in the sub-regions.

Sacramento area respondents also felt that waterskiing events and powerboat races would motivate them to visit the Lake Oroville area more often (23.2 and 25.0 percent respectively). They also felt that OHV-related events would motivate them to visit more often (21.0 percent), but this event was not one of the top responses from any of the respondents in the other sub-regions. Results suggest that the special events that would motivate respondents from all sub-regions to visit more often include fishing events, food/beverage festivals, waterskiing events, powerboat races, and canoe/kayak/river-related events. Of these potential special events, only fishing events are regularly being offered; most fishing events are organized by private event sponsors. Increased marketing of the existing events may improve visitation.

Table 5.5-20. Special events that would motivate Household Survey respondents to visit the Lake Oroville area more often.

Special Event	Percentage of Respondents				
	Total	Butte County	Reno	San Francisco	Sacramento
None	14.9	7.1	22.0	22.2	16.1
Indicated that a special event would motivate them to visit more often	85.1	92.9	88.0	77.8	83.9
Fishing events	36.9	40.8	30.0	24.4	46.4
Food/beverage festivals	24.5	31.6	14.0	26.7	19.6
Waterskiing events	23.7	27.6	28.0	11.1	23.2
Powerboat races	22.1	25.5	20.0	13.3	25.0
Canoe/kayak/river-related events	21.7	24.5	20.0	24.4	16.1
Living history demonstrations	15.7	22.4	8.0	6.7	17.9
Mountain bike races	15.3	13.3	24.0	15.6	10.7
PWC events	14.1	17.3	14.0	4.4	16.1
Target shooting competition	13.3	14.3	14.0	13.3	10.7
OHV related events	12.4	14.3	10.0	0.0	21.4
Sailing events	11.6	13.3	10.0	15.6	7.1
Triathlons	10.0	13.3	4.0	11.1	8.9
Equestrian events	8.8	11.2	4.0	8.9	8.9
Other	2.0	2.0	4.0	0.0	1.8
Wake or knee boarding	0.8	2.0	0.0	0.0	0.0

Note: **Bold** percentages indicate the special event with the highest respondent percentage. There were 98 respondents from Butte County, 50 respondents from the Reno area, 45 respondents from the San Francisco area, and 56 respondents from the Sacramento area.

Source: EDAW, Inc. 2003b (Household Survey).

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6.0 CONCLUSIONS

This section synthesizes information regarding supply and demand for recreational opportunities and facilities in both the Project area and the larger regional study area; compares Lake Oroville to other lakes and reservoirs; and examines potential barriers and incentives to visiting the Project area. Recommendations are given as to how the potential barriers to visitation may be overcome, and how incentives may be managed to increase visitation to the Lake Oroville area. This report was prepared under the direction of DWR staff. Opinions, conclusions, and findings expressed in this report are those of the authors. This report does not express the official position of the DWR unless approved by the Director or his designee.

6.1 SUPPLY AND DEMAND

Both the local (Project area) and regional supply and demand for recreational facilities and opportunities are discussed in this section.

6.1.1 Project Area Supply and Demand

There are many recreational activities and facilities available within the Project area, with water activities being the most common. There appears to be some latent demand for swimming, even though there are several areas where swimming is available in the Project area. The following two subsections describe conclusions regarding Project area recreation supply and demand.

6.1.1.1 Project Area Supply

Within the Project area, there are boating, camping, day use and trail use facilities. There are three large developed campgrounds, two developed group camping areas and one equestrian campground along with three primitive camping areas and two RV “en route” camping areas. There are two full-service marinas, nine boat ramps, six car-top boat ramps, ten floating campsites, seven boat-in campgrounds, and seven floating toilets. There are several trails of varying length available to equestrians, hikers, and bikers. There are also several day use areas, offer opportunities for picnicking, swimming, wildlife watching, OHV use, target shooting and hunting. Currently at Lake Oroville, there is one beach/swimming area at Loafer Creek DUA, and this area becomes unusable once the reservoir elevation drops below 860 feet. There is also a beach/swimming area at the North Thermalito Forebay BR/DUA and a small beach at Monument Hill BR/DUA located on the Thermalito Afterbay.

6.1.1.2 Project Area Demand

Water-related activities are the most popular activities within the Project area, including bank fishing, motorboating, swimming, boat fishing, and waterskiing/wakeboarding.

Mail-back Survey respondents generally prefer a natural setting to a more developed setting, reflecting survey data indicating that for many respondents, development of additional facilities would not motivate them to visit the area more often. Swimming is the third most popular activity in the Project area, and there is some additional, latent demand for this activity. Of the Mail-back Survey respondents that want additional opportunities, over 25 percent of them want beach/swimming areas. Of first-time visitors, approximately eight percent participate in swimming at Lake Oroville. This could indicate that more opportunities for swimming are desired.

6.1.2 Regional Supply and Demand

Twenty-two other lakes and reservoirs in the vicinity and region of Lake Oroville are included in this study, comprising the regional supply of recreation facilities. Visitation, and therefore demand for recreation activities, facilities and opportunities, is expected to increase in the future at most of the lakes and reservoirs included in the study (see Table 5.3-4).

6.1.2.1 Regional Area Supply

Many recreation opportunities exist in the Northern California area surrounding Lake Oroville. Research on 22 lakes and reservoirs in the Northern California region that provide recreation facilities was included in this study. Many of these other lakes and reservoirs have facilities similar in type to Lake Oroville's and offer similar recreation experiences, activities, and opportunities. All of the regional waterbodies have boat launching facilities and campgrounds, though Lake Oroville's facilities compare favorably in type and quantity to similar projects in California (DWR 2001). Lake Oroville is unique in offering floating campsites and for offering equestrian trail riding combined with equestrian group camping. The SVRA is also an uncommon opportunity (only 6 reservoirs in the state have nearby OHV areas).

6.1.2.2 Regional Area Demand

The regional lakes and reservoirs receive differing amounts of visitation. Lake Tahoe receives the most visitors, with approximately 3 million visitors annually, and was also the lake most visited by Household Survey respondents (63.5 percent). Folsom Lake, Shasta Lake, and Lake Berryessa each receive approximately 1 to 2 million visitors annually. The Lake Oroville area receives approximately 0.7 to 1.7 million visitors annually. The majority of the regional lakes and reservoirs are expected to have increased visitation in the coming years, although only about half of them are expected to have facilities that will be able to accommodate the increase in use (see Table 5.3-4). This means that in the future, there may be more people seeking recreational opportunities and experiences than current facilities can accommodate. The unmet demand at these high-visitation sites may generate demand for substitutes such as Lake Oroville, where facilities are generally under-utilized. Relicensing Study R-9 – *Existing Recreation Use* provides details on existing use and capacity at Lake Oroville's facilities.

6.1.2.3 Differences between Supply and Demand

In terms of supply, there are a large number of water-related recreation opportunities in the study region. For most Northern Californians, there are water-related recreation opportunities within a one-hour drive. All of the lakes and reservoirs included in this study have boating, camping, and a range of other facilities. Generally, most of them also have either DUAs and/or picnic sites. About one-half of them have marinas. Six reservoirs, including Lake Oroville, offer boat-in camping. Lake Oroville and Black Butte Lake are the only reservoirs with designated OHV areas.

Based on regional supply and demand information from recreation surveys, it appears that there will be deficiencies in the amount of camping facilities at eight lakes and reservoirs, and there will be deficiencies in boat launching facilities and restrooms at three lakes and reservoirs. Vehicular accessibility may also be a problem both in terms of roads and parking at seven lakes and reservoirs. Most of the lakes and reservoirs have enough day use facilities to meet expected future demand in the next 30–50 years. Generally, there are no plans for further development of camping facilities at the sites where camping facilities may be deficient in the future. Therefore, if escalation in demand is not later addressed by other reservoir managers, it appears that there may be latent demand in the future for camping and as well as recreation opportunities at areas with good vehicular accessibility.

6.2 COMPARISON OF LAKE OROVILLE TO OTHER LAKES AND RESERVOIRS

As stated, lakes and reservoirs are abundant in Northern California. Lake Oroville is the second largest after Shasta Lake. Facilities listed in Table 5.3-2 show that Lake Oroville is one of only three reservoirs and lakes offering swimming beaches. Less than half of the reservoirs and lakes have marinas and boat-in camping, both of which are offered at Lake Oroville. None but Lake Oroville offer floating campsites. While it is increasingly common for regional lakes and reservoirs to prohibit PWC use, it is currently allowed and regulated at many lakes and reservoirs including parts of Lake Oroville.

When comparing the reasons for visiting Black Butte Lake, Lake Berryessa, Shasta Lake, and Lake Oroville, three of the top reasons for visiting each lake are proximity, resource conditions, and good facilities/maintenance. Proximity of Lake Oroville to population centers is static; however, population growth in communities and counties near Lake Oroville could cause visitation to increase. While there is little that can be done to change some conditions or visitors' proximity, facilities and maintenance are subject to change. Another reason survey respondents gave for visiting Lake Oroville, which was not a major reason for visiting the other three similar site lakes, was the fishing. This indicates that the fishing at Lake Oroville is very important in drawing people to the area. Enhancing and promoting the existing fishing opportunities at Lake Oroville may motivate more anglers to visit the area, thus increasing overall visitation.

Visitors to Lake Oroville Shasta Lake and were generally satisfied with their visits; however, exposed land associated with lower reservoir levels and water level fluctuations were rated as slight to moderate problems. Visitors to Black Butte Lake and Lake Berryessa did not identify exposed land or water level fluctuations as problems, most likely because there is less variability in reservoir levels at these two lakes. These two issues may influence choice of recreation destinations due to the changing water levels and effects on scenery and facilities (availability and ease of use).

Lake Oroville visitors surveyed at similar sites were generally satisfied with their last trip to Oroville. Of the dissatisfied respondents, “poor” or “not enough” facilities was the main cause of dissatisfaction for respondents from Black Butte, while Lake Berryessa respondents cited access issues including campsites too far from the water or poor shoreline access. Excessively low lake level was the main reason for dissatisfaction for a subset of Shasta Lake and Household Survey respondents; water level fluctuation is one of several factors that commonly impacts reservoir related experiences. Of the reasons cited for dissatisfaction, lake level is the hardest of these reasons to control; efforts to improve access and facilities are alternative actions that may improve the experience of dissatisfied visitors.

6.3 POTENTIAL BARRIERS, OPPORTUNITIES, COMPONENTS OF VISITATION, AND RECOMMENDATIONS

There are three types of visitors that have the potential to visit the Lake Oroville area: those who have never visited, those who have not visited recently (within the last two years) and those who have visited recently. Those who have visited recently, and especially those who have not visited recently, may have the potential to visit more often. Potential barriers and incentives discussed include access and proximity, lack of information, conditions, facilities and special events. Following this discussion, recommendations are given that may potentially lead to increased overall visitation both by attempting to address some of the potential barriers that may prevent people from visiting the Lake Oroville area and by enhancing recreation opportunities.

6.3.1 Components of Visitor Satisfaction

Distance to Lake Oroville (proximity) and lack of information were the top two reasons that Household and Similar Site Survey respondents have never visited Lake Oroville. Many respondents either felt that Lake Oroville was too far away from their home or that they did not know enough about the reservoir to want to go there. While changes in visitors’ proximity are outside of management control, facilitating access and navigation could offset the distance of Lake Oroville from population centers. Caltrans expects to upgrade State highways in the area, but no budget or timeframe has been identified. Providing additional information about the Lake Oroville area to water-based recreationists in the region could also reduce the effect of these potential barriers.

The top two reasons that Household Survey respondents have not visited recently are that respondents prefer other places and for personal reasons. Preference may be partially influenced through marketing and outreach.

The effects of perceived or expected extreme heat and low lake level (and resulting effects on perception of scenery) at various times may affect visitors' willingness to visit the Lake Oroville area. Perceived conditions such as crowding or having to wait to launch a boat could be disincentives to visit a reservoir. However, the Household and Similar Site Surveys found that extreme heat, crowdedness, and waiting to launch a boat were neither major disincentives to visiting the Lake Oroville area nor causes of dissatisfaction with respondents' last trips to Lake Oroville. However, lake level was the reason that over 40 percent of Household Survey and Shasta Lake respondents gave for being dissatisfied with their last visit to Lake Oroville.

Facilities do not appear to be an overwhelmingly motivating factor, as about 56 percent of Household Survey respondents said that no facility would motivate them to visit for the first time. Of the respondents who felt a facility would motivate them to visit, a waterpark, a floating restaurant, warm water swimming/beach areas, and showers at DUAs were the most popular new facility options.

As with facilities, special events also do not appear to be an overwhelming factor motivating respondents to visit the Lake Oroville area. Over 61 percent of Household Survey respondents said that a special event would not motivate them to visit the Lake Oroville area for the first time. Among those respondents who felt that a special event would motivate them to visit, the most popular special events were food or beverage festivals, powerboat races, and fishing events. Special events that are currently being offered in the Lake Oroville area include major fishing tournaments, equestrian rides, the POKER bike ride, a triathlon, an Independence Day celebration, a salmon festival, and the Butte Sailing Club events.

6.3.2 Recommendations

Lakes and reservoirs are abundant in the region, and all of them offer boating, camping, and other facilities. Generally, people visit the lake nearest to them or lakes they already know about. It appears that people are not going to the Lake Oroville area because they do not know enough about the area or feel it is too far away. Distance from visitor residences is unlikely to change, although people could be offered more information about the area. Such information could impact potential visitors' perceptions of Oroville as too distant to visit.

To draw more visitors to the Lake Oroville area, it would be beneficial to find new ways to disseminate additional information on the Lake Oroville area in Northern California outside Butte County. Such information could mention not only the facilities offered, but it could also highlight those facilities and recreational experiences that are offered

few other places, such as houseboating, boat-in camping, floating campsites, and excellent fishing opportunities. Because campgrounds are popular facilities among first time and occasional visitors, it is especially important to facilitate access and information about campground availability.

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APPENDIX A

Background Report Summaries

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APPENDIX A LITERATURE REVIEWED

PUBLIC OPINIONS AND ATTITUDES ON OUTDOOR RECREATION IN CALIFORNIA – 1997

The focus of this study was on two areas: the public values, opinions, and attitudes on outdoor recreation in California; and the demand for, and participation in, over 40 selected outdoor recreation activities. The survey consisted of 2,010 telephone interviews, representing all of the counties in the state. Of these respondents, 1,506 agreed to and were mailed a questionnaire and a follow-up postcard if they failed to respond to the mail questionnaire. Most of the mailed questionnaires were in English (1,459); however, 47 Spanish questionnaires were sent to Spanish speaking households.

As for their attitudes and beliefs, most Californians thought that “outdoor recreation areas and facilities are very important to their quality of life,” felt they “are fairly satisfied with available public outdoor recreation areas and facilities,” and thought the condition “of public outdoor recreation areas and facilities in California are the same or better than they were 5 years ago” (pg 11). Although Californians visited “highly developed parks and recreation areas” most regularly, they preferred natural and undeveloped areas in the greatest proportion.

Walking was the activity undertaken by over 80 percent of respondents and recorded by far the greatest average number of activity days. Other top activities included visiting museums/historic sites; use of open grass or turf areas; driving for pleasure; beach activities; visiting zoos and arboretums; and picnicking in developed sites. “In general, participation rates appear to be higher for activities that are less expensive, require less equipment, and need fewer technical skills” (pg 15).

The study found 13 activities with “high” unmet demand. By combining latent demand with support for public funding of the over 40 listed activities, the study found 9 activities in the top priority level. These activities were walking, trail hiking, camping in developed sites, camping in primitive sites, general nature study, use of open grass areas, picnicking in developed sites, visiting museums/historic sites, and visiting zoos and arboretums.

Spending priorities of Californians tended “to focus more on existing facilities than expanded opportunities for outdoor recreation areas and facilities” (pg 36). Californian attitudes toward changes to park and recreation facilities and services showed that about 78 percent approved developing more community parks, and 76 percent approved constructing simple campgrounds and developing more horseback riding, and hiking and/or mountain biking areas where no motorized vehicles are allowed.

Noting the growth in the Hispanic population of California and its future influence on recreation participation, the 1997 survey also included a section that compared the survey results of Hispanic and non-Hispanic respondents. Focusing on Hispanic

recreational preferences is important since this group is expected to grow significantly as a percentage of the population in coming years.

Hispanic respondents were more likely to use and prefer highly developed areas (excluding historic and cultural sites) than non-Hispanic respondents. Hispanics and non-Hispanics also differ regarding changes to park and recreation facilities. The largest differences were for “providing more picnic sites for large groups” and “more parking at picnic sites,” with Hispanics showing more support for these two items than non-Hispanics.

Hispanics also have a different latent demand than non-Hispanics. Hispanic respondents rated use of open space areas, use of play equipment, and visiting zoos and arboretums as “high” latent demand; whereas, non-Hispanic respondents rated these as “moderate” latent demand. Conversely, Hispanics rated trail hiking, camping (both developed and primitive), and general nature study as “moderate” latent demand while respondents from other ethnic groups rated these items as “high” latent demand.

There were few major changes between this 1997 survey and its predecessors conducted in 1987 and 1992. Some of the changes found were in preferences for funding mechanisms and the average number of participant days for general nature study, surfing, walking, basketball, sailboating and windsurfing, kayaking and other nonmotorized watercraft use, and freshwater fishing. Many activity participation rates grew between 1987 and 1992 and then by 1997 had declined to around 1987 levels, thus displaying an inverted “U” curve. These activities included walking; camping in developed and primitive areas; picnicking in developed sites; kayaking, rowboating, canoeing, and rafting; and saltwater and freshwater fishing. Possible explanations for this occurrence included the shifting demographic structure of California, a change in income, changing ethnicity patterns, the 1992 sampling approach, or reduced recreation participation due to time constraints of the new California economy.

Compared to the 1992 study, “high” latent demand activities were basically unchanged, although the willingness to pay for the activities had changed. Finally, there has been a shift in attitudes on spending preferences. Comparing 1987 and 1992 to 1997, support has increased for acquisition of land for park and recreation purposes, facility maintenance, and construction of new facilities (DPR 1992 + 1998).

Table A-1. Comparison of 1992 and 1997 California Public Opinion Reports

1992 Report	1997 Report
Attitudes	
Approximately 76 percent of CA residents rated outdoor recreation areas and facilities as important or very important to quality of life and stated they were satisfied with public outdoor recreation areas and facilities available.	82 percent
Roughly 10 percent rated outdoor recreation areas and facilities as unimportant or not at all important.	5 percent
16 percent said they were unsatisfied.	10 percent
Highly developed sites were the most visited. Private facilities were the least visited.	Same
78.5 percent strongly agree and 15.9 percent moderately agree that protection of the natural environment is an important aspect of outdoor recreation areas.	72.0 percent & 20.5 percent
Almost 70 percent of CA residents indicated that outdoor recreation areas and facilities are often too crowded when they wish to use them.	60 percent
Roughly 85 percent support continued funding at federal and state levels.	Same
Participation is higher for activities that are less expensive, require less equipment, and need less technical skill.	Same
The top three activities: <ul style="list-style-type: none"> € Walking € Visiting museums, historic sites € Beach activities 	The top three activities: <ul style="list-style-type: none"> € Walking € Visiting museums, historic sites € Use of open grass or turf areas for casual and unstructured activities, like games, sitting, sunning
Latent Demand: defined as those activities in which people would increase participation if more opportunities were available.	
Latent demand is high for the following activities <ul style="list-style-type: none"> € Camping at developed sites € Walking € Trail hiking € General nature study € Freshwater fishing € Beach activities € Visiting museums/historic sites € Camping in primitive areas € Picnicking in developed sites 	The "high" list is the same but ranked in a slightly different order.
Public Support is high for govt. funding of all the activities except two. Beach activities came in with moderate support and picnicking at developed sites came in with low support.	The public support rankings were the same public support changed from high to moderate for freshwater fishing, and picnicking went from low to high for public support.
Some differences were identified between individual willingness to pay and a high ranking of support for public funding.	Same

Table A-1 (continued). Comparison of 1992 and 1997 California Public Opinion Reports

1992 Report	1997 Report
Youth	
The top three activities participated in among youth included walking, bicycling, and playing on equipment.	Youth preferences were not reviewed in the 1997 report.
The favorite activities among youth included softball/baseball, basketball, swimming, and beach activities.	
Youth were more interested in softball, baseball, football, and soccer than adults.	
Recreation Participation Days were slightly higher for youth than adults.	
Differences among Ethnic Groups	
Ethnic group differences were not reviewed in the 1992 report.	Latent demand was high among Hispanic respondents for the following activities, which were moderate among the other ethnic groups: Use of play equipment Visiting zoos and arboretums
	Latent demand was rated low among Hispanic respondents for trail hiking but was high among the other ethnic groups.
	These differences suggest that other strategies are required to meet the recreational activity needs of non-Hispanics.
	Motives for recreating outdoors were variable among ethnic groups.
	The 1997 results consistently showed less Hispanic participation for the activities surveyed.
	Hispanics rated safe areas as the highest ranked. "Law enforcement" and "friendly, informative rangers" were also rated high in importance.

Source: DPR 1992 & 1998

A STUDY OF BOATER RECREATION ON LAKE BERRYESSA, CALIFORNIA

The study provides a summary of survey data collected at Lake Berryessa in the summer of 1998.

Description of Boaters and Their Use of Lake Berryessa

Most boaters had a significant number of years of experience at boating. The study distinguishes between boaters who use the marinas and those who use the boat ramps. Ramp boaters visited the lake an average of 21 days per year while marina users boated 40 days on average. Ramp users typically boated for a single day while marina boaters typically visited for two or more days. A large majority of boaters in both groups lived within 15 miles of the lake. Ramp users placed more emphasis on experiencing the outdoors in an undisturbed natural setting. Marina boaters sought more opportunity to socialize in the scenic outdoor setting.

Boater Perceptions of and Preferences for Conditions

Boaters listed both their most favorite locations on the lake as also those most likely to be avoided due to overcrowding. Good water quality, calm water, beautiful scenery, and lake size were cited as the most attractive features associated with the lake setting. Boaters also cited several problems with boating on the lake, including undesirable boats/boating and unsafe and discourteous boaters. Boaters chose Lake Berryessa primarily for the closeness and convenience to their permanent homes or summer homes. Good water quality and scenery were described as better at Lake Berryessa. Positive changes noticed by boaters included higher and/or more consistent water level followed by improvements to facilities and services.

Perceptions and Estimated Use Levels

Boating traffic appeared to be somewhat reduced during the 1998 season due to cool, rainy weather. About 24 percent of the marina boaters and 46 percent of the ramp users indicated that they saw more boats than they wanted to on the lake. Boats numbered from 493 to 538 on weekends and 90 to 188 on weekdays.

Suggestions for Using Data

- € Increase and improve lower-density and dispersed camping opportunities
- € Coordinate with law enforcement personnel
- € Increase boater education and visitor information services
- € Prohibit exclusive uses of various coves and areas around the lake
- € Develop partnerships for more effective and efficient lake management
- € Provide additional short-term lodging (hotels and motels)

- € Create limits on boat speed, size, and horsepower
- € Increase public access to shoreline (Jackson 1998).

POE HYDROELECTRIC PROJECT

Several background recreation reports were prepared for the Poe Hydroelectric Project. These reports discuss recreation on the North Fork Feather River (NFFR) and are listed as follows:

- € Recreation Supply Analysis
- € Recreation Demand Analysis
- € Recreation Needs Analysis
- € Recreation Capacity and Suitability Analysis
- € Recreation Visitor Survey Report
- € Whitewater Boating Assessment Report

Reports with pertinent information to R-14 *Assessment of Regional Recreation* are summarized below.

The **Recreation Supply Analysis** identifies recreation sites and facilities in the region, as well as those located along the NFFR in the Poe Project study area. Four dispersed sites on the NFFR were identified: Sandy Beach, Bardees Bar, Poe Beach, and the Poe Powerhouse Beach. Within the Poe Project vicinity, 12 to 17 regional sites were identified. All of these sites except one offer shoreline access. Many of the sites offer boat ramps, camping, trails, and picnicking.

The **Recreation Demand Analysis** identified statewide and projectwide trends that are predicted to affect recreation in the Project area. Annual visitation is expected to increase 94 percent in the Poe Project Area by 2035. Recreation Visitor Days (RVDs) are expected to increase 72 percent by 2035 in the Poe Project Area. The majority of visitors (80 percent) prefer very little exposure to the sights and sounds of civilization. Nearly all (94 percent) prefer to recreate in a landscape that is totally or predominately natural in appearance. There is not a high demand for additional facilities in the Poe Project Area. Whitewater boaters would use this stretch of the river if adequate flows were provided.

The **Recreation Needs Analysis** identified that the four sites have existing facilities that could be improved, such as grading and graveling roads, providing a picnic table, adding signage, providing trash receptacles, and periodically pruning. The report identified the need for periodic trash cleanup at the four sites. In the future, additional parking and toilets may be needed at existing sites, but no new sites were identified as being needed during the next license period.

The **Recreation Visitor Survey Report** summarizes visitor habits in the Poe Project Area. The majority (88 percent) of recreationists visited their chosen site (over 50 percent at Sandy Beach) for the day only; 12 percent of visitors camped, primarily at

Bardees Bar. The top three activities were swimming/wading, resting/relaxing, and beach use/sunbathing. Of the survey respondents, 96 percent were California residents. Visitors reported low levels of crowding. Anglers and RV Park managers were also surveyed (PG&E 2002).

UPPER NORTH FORK FEATHER RIVER PROJECT RECREATION STUDY (VOLUME 3 OF 8)

This report (1,268 pp.) covers existing recreation opportunities and facilities in the Upper North Fork Feather River (UNFFR) Project vicinity as well as in the region. The Project vicinity covers Lake Almanor, Butt Valley Reservoir, and 22 miles of the upper reaches of the NFFR, including the Poe Project Area. The following topic areas are covered in the UNFFR report:

- ∓ Existing Recreational Opportunities and Facilities
- ∓ Existing and Potential Recreation Use and Needs Analysis
- ∓ Agency Recommended Measures
- ∓ Recreation Proposals
- ∓ Responsible Parties, Schedules, and Costs for Implementing Measures and Proposals
- ∓ National Wilderness Areas, Wild and Scenic Rivers; and Trails
- ∓ Economic Impacts of Lake Almanor and Project Recreation Resources

Reports with information pertinent to R-14 Assessment of Regional Recreation are summarized below.

The **Existing Recreational Opportunities and Facilities** topic area includes (among other studies) the Regional Recreation Assessment as well as the Recreation Facility Condition and Site Inventory. These studies describe the seven campgrounds, six day use areas, and 22 commercial and private resorts at Lake Almanor. There are two campgrounds and one boat launch and picnic area. There are also three campgrounds and one rest stop along the two river reaches included in the Project area. Most of the facilities are in good condition. The regional recreation assessment describes several areas that have similar recreation resources including the LOSRA and Oroville area. Comparisons are also given for reservoir- and river-related sites based on the number of developed facilities. Demand for activities statewide and projected demand for selected activities in the Project area are also discussed. It was concluded that there is little latent demand in the Project area.

The **Existing and Potential Recreation Use and Needs Analysis** topic area includes (among other studies) the Questionnaire Survey, Projected Recreation Use Analysis, and Recreation Needs Analysis Synthesis. The most popular activities in the Project area include fishing, swimming, sightseeing, and wildlife viewing. Most visitors to the Project area felt that either Lake Almanor or Butt Valley Reservoir was their favorite area. About 50 percent of Belden Reach respondents felt the Belden Reach was their

favorite area. Survey respondents were fairly evenly split about their preference for “natural and undeveloped areas” and “developed nature-oriented parks.” Popular reasons for visiting the Project area include the area is special to them, the area is quiet and peaceful, the scenery, camping and the area is easily accessible. Most visitors felt that the area was not at all crowded, although respondents felt slightly crowded on the water. Shoreline access, low water level and high cost to use facilities were the main issues mentioned in the surveys and focus groups. The Projected Use study projects how much activities in the Project area will grow in the coming years drawing on the 1998 DPR Survey and the 1999 Cordell report to project future demand. Those reports are summarized under their own heading. Demand is expected to increase for swimming, beach use, picnicking, biking, and developed camping from 2000 to 2035. Projections when facilities will hit carrying capacity were also done based on occupancy rates. The role of the Project area within the region was also discussed. The Needs Analysis identified possible facility improvements or additions for camping, day use/picnicking, boating, swimming, interpretation and education, trail, fishing, open space, and whitewater boating facilities.

LAKE OROVILLE SRA ATTENDANCE DATA 1974-2001

The information presented in the following attendance data summary has been collected by DPR for their planning purposes and more recently to help meet FERC guidelines. The information is from several sources including payment information collected at kiosks, ranger estimates and traffic counter data.

Lake Oroville has had varying levels of attendance since 1974. Compared to 1974 and 1975, attendance dropped in 1976-77 and then started rising yearly until hitting a peak in 1980-81 with 953,192 visitors, the highest recorded attendance in the data set. Within two years, attendance was at a low of 321,274 visitors, a 66 percent drop in attendance. The next year, attendance went back up to 713,823 visitors, over a twofold increase.

There was much less variation for the next six years (1985-86 through 1990-91). Attendance dropped about 20 percent in 1991-92 to 477,166 visitors and then went back up the next year to 626,178 visitors. Attendance steadily climbed to another peak of 777,819 visitors in 1995-96, about a 60 percent increase from the 1991-92 low. This peak however was still about 20 percent less than the attendance peak in 1980-81. After the 1995-96 peak, attendance began to decline and then dropped significantly in 1997-98 to 472,301 visitors (a 40 percent drop from the 1995-96 peak) and leveled off for the next two years. The year 2000-01 saw an even larger drop in attendance, hitting a low for this data set at 266,509 visitors. This was a drop of 45 percent from the year before and a 66 percent drop from the peak in 1995-96.

Specific sites within the Lake Oroville area have also had variable attendance patterns. The North Forebay followed the Lake Oroville State Recreation Area (LOSRA) attendance patterns with a few exceptions. After a peak in attendance in 1990-91, attendance began to decline at the North Forebay; however, LOSRA attendance was increasing and eventually peaking in 1995-96. Another exception occurred in 1998-99

and 1999-00 when attendance rose at the North Forebay, while overall LOSRA attendance was dropping.

Besides peaks in 1980-81 (28,993) and 1981-82, (31,694) attendance at the South Forebay was approximately 15,000 visitors from 1984-85 to 1996-97. Since 1997-98, attendance at the South Forebay has dropped off to under 10,000 visitors annually.

The highest attendance in the data set for Loafer Creek was in 1974-75 (160,101). After this peak, attendance dropped and then surged again in the late 1970s and early 1980s. Loafer Creek attendance was low in 1983-84 (49,119) but increased the next year, as did overall LOSRA attendance. Generally, attendance levels have not been as high for the mid 1980s and 1990s as they were for the late 1970s and early 1980s, except for the years 1995-96 (681,297) and 1996-97 (717,106). For Loafer Creek, 1990-91 and 1991-92 were very low attendance years but were not low attendance years for LOSRA. Also, attendance was consistent in 1999-2000 and 2000-01, while LOSRA attendance saw a sharp decline between these two years.

Unlike Loafer Creek, where attendance levels have declined since the mid-1980s, attendance levels at Spillway have increased since the late 1980s. Attendance has remained at about 100,000 visitors for the late 1980s and most of the 1990s, except for a drop in 1991-92, which was also a drop for LOSRA attendance. Attendance only hit 100,000 visitors three times between 1974-75 and 1986-87. However, attendance only dropped below 100,000 visitors once between 1987-88 and 1996-97. Since 1997-98, attendance has dropped well below 100,000 visitors to under 50,000 visitors in 2000-01.

Bidwell Canyon has also seen an increase in attendance levels. Attendance has increased in the 1990s from the 1970s and 1980s. Attendance peaks were higher for LOSRA in the 1980s than in the 1990s; whereas, the reverse is true for Bidwell Canyon, which had much higher peaks in the 1990s than the 1980s.

As for Lime Saddle, attendance levels during the 1990s were roughly half of what they were for parts of the late 1970s and mid to late 1980s. Attendance fluctuated between 100,000 and 140,000 visitors during the late 1970s and mid to late 1980s. Attendance has been between 40,000 and 60,000 visitors since then, until a significant drop below 20,000 visitors in 2000-01. No significant peaks in attendance have occurred at Lime Saddle since 1990-91.

Car-top boat ramps, boat-in camps, and Enterprise all had a significant surge in attendance in 1980-81, the same year that LOSRA attendance peaked. Enterprise and car-top boat ramps doubled their attendance that year and boat-in camps tripled in attendance. Car-top boat ramps had higher attendance levels in the late 1970s and 1980s than in the 1990s. Attendance hovered around 30,000 visitors in the 1970s and 1980s but dropped to around 20,000 visitors for the 1990s until a sharp decline in 1997-98. Boat-in camps have had a drop in attendance levels since the late 1970s and 1980s. There was high attendance at boat-in camps from 1984-85 through 1986-87 with

around 12,000 visitors. Since 1987-88, attendance has dropped to between 2,000 and 4,000 visitors, except lows in 1990-91 and 1991-92 of less than 400 visitors.

LAKE OROVILLE RECREATION AUTHORITY (LORA) RECREATION PLAN 2001

The LORA Recreation Plan provides guidance for recreation facility/economic development for the Lake Oroville Area. The document, created by Oroville community members, outlines funding and planning needs and calls for infrastructure improvements at various places throughout the LOSRA. LORA members argue that many of these projects should be completed under the existing license and not be delayed into the next license period. The plan identifies the Joint Powers Authority, principally the City of Oroville and Feather River Recreation and Parks District leadership, as an alternative to DPR management of recreation facilities at Lake Oroville.

Table A-2 lists LORA-proposed projects that may be relevant to Oroville Facilities Relicensing recreation studies (LORA 2001).

RESOURCE MANAGEMENT PLAN AND GENERAL DEVELOPMENT PLAN LAKE OROVILLE STATE RECREATION AREA (1973)

This is the General Plan prepared for LOSRA, adopted by the California Parks and Recreation Commission. It describes the various natural resources at Lake Oroville. Descriptions of each recreation area summarize the relationship between the natural resources and potential recreation development. Capacity of each area, and existing and potential recreation developments are also discussed (DPR 1973).

OROVILLE RESERVOIR, THERMALITO FOREBAY, THERMALITO AFTERBAY WATER RESOURCES RECREATION REPORT BULLETIN NO. 117-6

This report outlines the potential for development of recreation facilities at Lake Oroville. This planning report projected that visitation would increase by approximately one million visitors per decade starting at approximately 750,000 the first year that the Oroville Facilities Project was to be completed (1968). The report outlines draft site plans and numbers of parking spaces, campsites, etc. for each recreation site (DWR 1968).¹

LAKE OROVILLE STATE RECREATION AREA, RECREATIONAL USE STUDY – 1996

Chico State University, under contract with the DWR, conducted this survey to determine the number of recreation days that occur at each site within LOSRA in order for the Department of Water Resources to meet an Order of the Federal Energy

¹ The projected use numbers do not match actual user numbers which have been averaging about 650,000 annually since the project was built.

Regulatory Commission (FERC). The study had several other purposes beyond determining the number of recreation days. These included determining the specific activities being participated in, the length of visit, establishment of multipliers to convert car count data to recreation days, suggestion of methods to meet FERC attendance data collection requirements, the amount of money spent by users per recreation user day, how much money was spent in the local area, visitor origin, visitor satisfaction level, and whether visitors generally desired an additional facilities and/or recreation opportunities.

Table A-2. Proposed LORA Projects

LORA-Proposed Project	Location	Suggested Project Type	LORA Plan pp.
Craig Access Road Improvement	From Lumpkin Road to Craig Park	Road Improvement	21
Potter's Ravine Access Road	From the top of the dam to Cherokee Road	Road construction	22
South Forebay	Grand Avenue access	Restrooms and utilities	22
South Forebay	Nelson Avenue access	Restrooms and utilities	23
Power Canal	Tres Vias Road/Grand Avenue	Bridge construction	23
Thermalito Afterbay	Monument Hill access	Restrooms and utilities	24
Thermalito Afterbay	Larkin Road access	Restrooms and utilities	24
Native Plant Nursery	Undetermined	Native plant nursery for environmental rehabilitation	25
Hamilton Cemetery Rehabilitation	Historic Hamilton Ranch	Cultural preservation	26
Historic and Cultural Museum	Potentially North Forebay	Museum construction	27 to 28
Diversion Pool	Various	Trail improvement, utilities, gate install, boat ramp install, plus others	30 - 32
Thermalito North Forebay	Various	Picnic area, beach, swimming area improvement, wildlife studies	33 - 35
Thermalito South Forebay	Various	New grandstand, shade plantings, restrooms, and additional picnic tables	35
Thermalito Afterbay	Various	Improved fishery, new RV park, parking improvements, stabilized water levels, improved signage	37 – 39
Equestrian Facility Improvements	Lakeland Boulevard and other locations	Acquire land for equestrian center and develop parking, signs, trails, rental stables etc. Parking improvement, replace water trough, designate pedestrian bridge for multi-use, connect trails	39 – 46
Bike Trail Improvements	Overlaps with equestrian facility projects	Road widening, trail improvements, etc.	47-50

Source: LORA 2001

Attendance data from 1991 to 1994 from the California Department of Parks and Recreation (DPR) were used as a starting point to divide the year into three seasons: high, medium, and low attendance. The high attendance season included the months between Memorial Day to Labor Day (the end of May, June, July, August, and the beginning of September). The medium attendance season included the months of March, April, May (until Memorial Day weekend), September (after Labor Day), and October. The low attendance season was the remaining months of the year, November, December, January, and February. As the study did not begin until the medium attendance season, no data were collected for the low attendance season. The study was conducted on 33 dates during the 1996 recreation season. The four locations with the highest use, Bidwell Canyon, Spillway, Lime Saddle, and Loafer Creek, received continuous data collection. Five days of continuous data collection were conducted at Monument Hill and North Forebay in addition to periodic visit data collection. At sites without high use, roving use counts were done. In addition, 1,628 questionnaires were collected from visitors between 8:00 a.m. and 8:00 p.m. at several sites between April 22 and September 21, 1996. These questionnaires provided information on the visitor and their group, household, and visit.

The study found that Bidwell Canyon and Spillway accounted for around 40 percent of the total visitor days and about \$3.1 million of the over \$5.6 million in total local expenditures, making these two sites by far the most used locations at Lake Oroville.

The study also looked at participation by season. During the summer, 50 percent of respondents went at least once per week and less than 2 percent of respondents did not go at all, making summer the season with the highest participation. Winter had the least amount of participation with about 55 percent of respondents not participating at all during the season. Besides resting and picnicking, the top activities were water related: fishing from boats, waterskiing, pleasure boating, and swimming/wading. Over half of the respondents participated with their family or a group of family and friends. Visitor satisfaction was found to be very high with about 93 percent of users stating they were satisfied or very satisfied with their experience, about 98 percent would recommend/strongly recommend LOSRA to a friend, and over 99 percent plan to return to the area.

Users were also asked about their desire for new or additional facilities. At least 48 percent of respondents rated as a high priority the following four items: security patrols in parking lots, enforcement of laws, stocking more fish, and more shore access for fishing and swimming. These four items did vary some by location, possibly due to differences in activities at each location. The only item to receive about 50 percent response for no priority was having hotels and motels near LOSRA. Several comments by respondents were collected and repeated enough to be included in the report. These comments were the following: clean the debris out of the lake, add more lake patrols, clean the toilets, keep the non-fee areas, maintain maximum Afterbay water levels on the weekends, and add more sandy beaches (Guthrie et al., CSUC 1997).