American River Pump Station Project

Final Environmental Impact Statement/ Environmental Impact Report

Placer County Water Agency

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

June 2002

SCH# 1999062089

PCWA-043

Final
Environmental Impact Statement/Environmental Impact Report
American River Pump Station Project
Placer County, California

Lead Agencies:

U.S. Department of the Interior
Bureau of Reclamation
(NEPA Lead Agency)

Placer County Water Agency
(CEQA Lead Agency)

CEQA Responsible Agencies:

California Department of Parks and Recreation

California Department of Fish and Game

Regional Water Quality Control Board

For Further Information Contact:

Mr. Rod Hall, Environmental Specialist
Bureau of Reclamation
7794 Folsom Dam Road
Folsom, CA 95630-1799
(916) 989-7279

This Environmental Impact Statement/Environmental Impact Report (EIS/EIR) is prepared in compliance with the National Environmental Policy Act (NEPA) and U.S. Bureau of Reclamation (Reclamation) NEPA procedures and the California Environmental Quality Act (CEQA) and CEQA Guidelines.

Reclamation and PCWA are pursuing the development of a year-round water diversion facility capable of diverting up to 35,500 acre-feet annually (AFA) of PCWA's water entitlements from its Middle Fork Project (MFP) on the American River. The project purpose includes providing PCWA with the year-round access to its MFP water entitlements from the American River, as it had before its pumps were removed in 1972 by Reclamation. Three alternatives, including the No Action/No Project, Mid-Channel Diversion, and Upstream Diversion, are evaluated in this EIS/EIR. With the exception of the No Action/No Project Alternative, the project alternatives all consist of constructing a diversion and intake structure, pump station, and associated facilities including pipelines, access roads, power lines and safety features in the American River Canyon within the Auburn Dam construction area. Reclamation and PCWA are presently negotiating a contract that will define the terms and conditions upon which the ownership of the facilities would be transferred to PCWA, including responsibilities for operation, maintenance, and related activities for the project.

The Mid-Channel Diversion Alternative is the proposed action. This alternative includes closure of the Auburn Dam construction bypass tunnel and restoration of the currently de-watered river segment near Auburn. Additional improvements would be implemented under this alternative to ensure public safety access near the project area.

The EIS/EIR analyzes the direct, indirect, and cumulative impacts to the physical and natural environment that may result from construction, operation, and maintenance of the pump station project. Reclamation and PCWA have incorporated best management practices and other conservation measures as recommended by resource agencies to minimize impacts, which may occur due to implementation of a year-round pump station alternative.

The EIS/EIR evaluates impacts to the regional area watercourses associated with PCWA's proposed increased diversion of its American River water entitlement. Hydrologic impact analyses consider the effects of the project under varying hydrologic conditions and the impacts of the diversions on the potentially affected hydrologic system, including the North Fork American River, Folsom Reservoir, lower American River, and other Central Valley Project system components. The cumulative impacts to water supplies, fisheries and other aquatic species, wetland and riparian communities, including special-status species, recreational activities, and flood control are assessed as well as land use issues associated with PCWA's exercise of its existing entitlements.

The EIS/EIR will serve environmental review and consultation requirements pursuant to the Endangered Species Act (section 7c), the Fish and Wildlife Coordination Act, Executive Order 11988 (Floodplain Management), Executive Order 11990 (Wetlands Protection), and the National Historic Preservation Act (Section 106).

American River Pump Station Project

Final
Environmental Impact Statement/
Environmental Impact Report

Prepared For:

U.S. Bureau of Reclamation **Placer County Water Agency**

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

Placer County
Water Agency

Prepared By:

SWRI SURFACE WATER RESOURCES, INC.

June 2002

AF	acre-feet
AFA	acre-feet annually
AFRP	Anadromous Fish Restoration Program
Ag	agricultural
APCD	Air Pollution Control District
APE	Area of Potential Effect
AQMD	Air Quality Management District
ARD	Auburn Recreation District
ATF	Bureau of Alcohol, Tobacco and Firearms
ATSP	Automated Temperature Selection Procedure
Auburn SRA	Auburn State Recreation Area
BACT	Best Available Control Technology
Bay-Delta	San Francisco Bay-Sacramento-San Joaquin River Delta Estuary
BLM	Bureau of Land Management
BMPs	Best Management Practices
BO	Biological Opinion
CAAWC	California American Water Company
Cal/OSHA	California Occupational, Safety, and Health Administration
Cal-EPA	California Environmental Protection Agency
CALTRANS	California Department of Transportation
CAR	Coordination Act Report
CARB	California Air Resources Board
CAWC	California-American Water Company
CCR	California Code of Regulations
CCWD	Contra Costa Water District
CD	compact disk
CDF	California Department of Forestry
CDFFP	California Department of Forestry and Fire Protection
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CDPR	California Department of Parks and Recreation
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHP	California Highway Patrol
CNDDB	California Natural Diversity Data Base
$CNEL_C$	C-Weighted Community Noise Equivalent Level
CNPS	California Native Plant Society
COA	Coordinated Operations Agreement
Corps	U.S. Army Corps of Engineers
CSC	California Species of Concern
Cumulative Report	American River Basin Cumulative Impact Report
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
dB	decibel
dBA	A-weighted decibels
dBC	C-weighted decibels
DEH	California Department of Environmental Health
Delta	Sacramento-San Joaquin River Delta
DTSC	Department of Toxic Substance Control
DWR	California Department of Water Resources
EA/IS	Environmental Assessment/Initial Study
EBMUD	East Bay Municipal Utility District
EDCWA	El Dorado County Water Agency
EFH	Essential Fish Habitat
EID	El Dorado Irrigation District
EIS/EIR	Environmental Impact Statement/ Environmental Impact Report
EPA	Environmental Protection Agency
ERPP	Ecosystem Restoration Program Plan
ESA	Endangered Species Act (federal)
ESU	Evolutionary Significant Unit
F	Fahrenheit
FERC	Federal Energy Regulatory Commission
Folsom SRA	Folsom State Recreation Area
fps	feet per second
ft/day	feet per day
FR	Federal Register
FWCA	Fish and Wildlife Coordination Act
GDPUD	Georgetown Divide Public Utility District

GWh	gigawatthours
HWCL	Hazardous Waste Control Law
Interior	U.S. Department of the Interior
IRMP	Interim Resources Management Plan
ITAs	Indian Trust Assets
km	kilometer
kW	kilowatts
kWh	kilowatthours
L_{Cdn}	C-Weighted Day-Night Average Sound Level
L_{dn}	24-Hour Average Sound Level
L_{eq}	Average Noise Level
LOS	level of service
M&I	municipal and industrial
m/day	meters per day
MFP	Middle Fork Project
mgd	million gallons per day
Mitigation Plan	Mitigation Monitoring and Reporting Program/Environmental Commitments Plan
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSDS	Materials Safety Data Sheets
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
msl	mean sea level
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NID	Nevada Irrigation District
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NOC	Notice of Completion
NOI	Notice of Intent
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
NWD	Northridge Water District
O_3	ozone
OES	Office of Emergency Services
O&M	Operation and maintenance
OSHA	Occupational, Safety, and Health Administration
P.L.	Public Law
PAM	Planning Aid Memorandum
PCWA	Placer County Water Agency
PEIS	Programmatic Environmental Impact Statement
PG&E	Pacific Gas and Electric Company
$PM_{2.5}$	particulate matter (up to 2.5 microns in size)
PM_{10}	particulate matter (up to 10 microns in size)
POU	place of use
ppm	parts per million
ppt	parts per thousand
PRC	Public Resources Code
PROSIM	Project Simulation
PST	Parr-smolt transformation
RCRA	Resource Conservation and Recovery Act
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RM	River Mile
ROD	Record of Decision
ROG	reactive organic gases
RWMP	Regional Water Master Plan
RWQCB	Regional Water Quality Control Board
SARA	Save the American River Association
SEL	Sound Exposure Level Used
SC	Species of Concern (federal status)
SHPO	State Historic Preservation Office
SJWD	San Juan Water District
SRA	Shaded Riverine Aquatic Habitat
SSWD	South Sutter Water District
SWD	Sacramento Suburban Water District
SVAB	Sacramento Valley Air Basin
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
TCD	temperature control device

TDS	total dissolved solids
UARM	Upper American River Model
UBC	Uniform Building Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VELB	valley elderberry longhorn beetle
WWTRF	wastewater treatment and reclamation facility
WAPA	Western Area Power Administration
WQCP	Water Quality Control Plan
WTP	water treatment plant
WWTP	wastewater treatment plant
X2	2 ppt isohaline in Delta

American River Pump Station Project
Final Environmental Impact Statement/ Environmental Impact Report

Table of Contents

List of Appendices

List of Figures

List of Tables

Table **Page**

Chapter 1.0
Introduction

This Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) describes the potential beneficial and adverse effects of alternatives for a proposed pump station project to replace the seasonal American River pump station near Auburn, California. The EIS/EIR evaluates the potential environmental effects of three alternatives: No Action/No Project, Mid-Channel Diversion, and Upstream Diversion. The Mid-Channel Diversion Alternative is the Proposed Project and includes: (1) construction and operation of a year-round pumping facility for PCWA which would divert water from the North Fork American River in the vicinity of the Auburn Dam construction site near Auburn, California (**Figure 1-1**); (2) closure of the Auburn Dam bypass tunnel; and (3) restoration of the three-quarter mile reach of the river that was dewatered and otherwise impacted by activities associated with Auburn Dam construction. As a project-specific EIS/EIR, the impact analysis addressed the direct and indirect impacts of the alternatives as well as cumulative impacts associated with increased use of American River water supplies and regional service area impacts.

Potential environmental effects resulting from construction and long-term operation, and maintenance of the alternatives are described in this document in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). Reclamation is the lead agency under NEPA and PCWA is the lead agency under CEQA.

Public and agency comments on the Draft EIS/EIR and descriptions of how the comments were considered in preparing this Final EIS/EIR also are presented in this document. Revisions to the Draft EIS/EIR have been incorporated into this document and are summarized later in this chapter.

1.1 PROJECT PURPOSE

The purpose of the project is threefold: (1) to provide facilities to allow PCWA to convey its Middle Fork Project (MFP) water entitlement to the Auburn Ravine Tunnel (also referred to locally as the Ophir Tunnel) to meet demands within its service area; (2) to eliminate the safety issue associated with the Auburn Dam bypass tunnel; and (3) to allow for all pre-construction beneficial uses of water in what is now the dewatered river channel, including recreation, navigation, and other instream beneficial uses. Each of these elements is discussed in Section 1.3, Project Needs and Objectives.

1.2 PROJECT HISTORY

In 1965, Congress authorized the construction of Auburn Dam on the North Fork American River near the City of Auburn. Construction began in 1967 and included a cofferdam, a tunnel through a ridge to bypass the river around the construction area (referred to as the bypass tunnel), excavation for the Auburn Dam foundation (also referred to as the keyway), and removal of a permanent

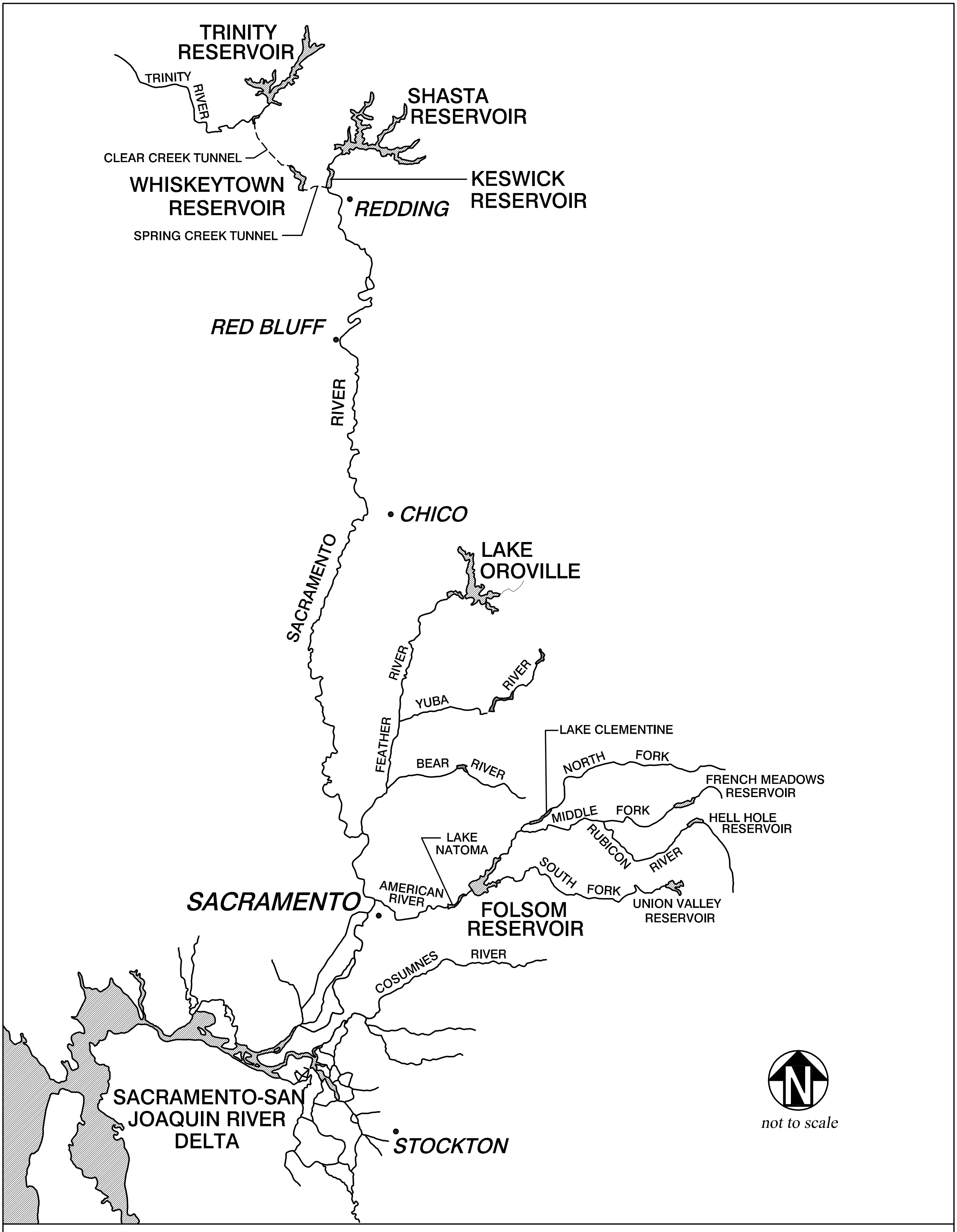


Figure 1-1 Regional Setting

pump station owned by PCWA. Because of concerns over seismic safety, heightened by the 5.7 magnitude (Richter scale) Oroville earthquake of August 1, 1975, construction of Auburn Dam was suspended in 1977.

1.2.1 PCWA ORIGINAL PUMP STATION

Prior to the initiation of construction of Auburn Dam, PCWA built a 50 cubic feet per second (cfs) pump station on the North Fork American River to convey PCWA water supplies from its MFP to the Auburn Ravine Tunnel for delivery to PCWA's service area. However, before PCWA's operations began, the pump station was removed by Reclamation to facilitate construction of Auburn Dam. Pursuant to a Land Purchase Agreement with PCWA described below, Reclamation has since installed a seasonal pump station annually as needed by PCWA to meet water supply demands.

1.2.2 LAND PURCHASE AGREEMENT

Before suspending Auburn Dam construction, Reclamation sought a Land Purchase Agreement with PCWA to acquire canyon lands needed for the Auburn Dam Project. PCWA entered into a Land Purchase Agreement in 1972 with Reclamation under the threat of condemnation. As part of the Land Purchase Agreement, PCWA's 50 cfs pump station was removed to facilitate construction of Auburn Dam subject to Reclamation's provision of an interim pumping facility or alternative water supply until Auburn Dam was completed. As the Auburn Dam Project was designed at that time, water from the reservoir was to flow by gravity into the Auburn Ravine Tunnel to provide PCWA its water entitlements, thereby eliminating the need for a pump station. As stipulated in the Land Purchase Agreement:

> [Article 11] A *"...the United States will provide a temporary pumping facility in the event the Vendor [PCWA] demonstrates a need for water, to be delivered into the existing tunnel intake structure at the intake portal of the Auburn Ravine Tunnel, or at its option, the United States may provide water from an alternative source, provided delivery is made at a point suitable for its intended use."*

The Land Purchase Agreement obligated Reclamation to deliver up to 25,000 acre-feet annually (AFA) at a rate of up to 50 cfs.

1.2.3 OPERATIONS UNDER THE LAND PURCHASE AGREEMENT

Pursuant to the Land Purchase Agreement, the United States, through Reclamation, has delivered water through the installation and removal of a seasonal pump station on an as-needed basis. The first time PCWA required access to its MFP water rights to meet system demands was during the drought of 1977. In response to PCWA's request for water under the Land Purchase Agreement, Reclamation constructed a pump station capable of delivering approximately 50 cfs using pumps salvaged from PCWA's original pump station.

Beginning in 1990, PCWA has required access to its MFP water annually to meet its system demands under a variety of operating conditions. Reclamation has responded with the seasonal reinstallation and removal of PCWA's original pumps at the same location as the 1977 installation. Due to the location of the installation, the pumps have to be removed before winter each year to prevent damage due to inundation from high river flows. As discussed below, the seasonal pumps do not fully meet PCWA's water supply requirements, are not reliable, and have become increasingly expensive to install and maintain.

Reclamation can deliver the MFP water supply to PCWA only from approximately April to November. Late-fall, winter, and spring MFP water supplies are not accessible due to the potential for high river flows that can inundate the seasonal pump station. Further, because of limitations on the pumping capacity of the existing facilities (50 cfs) and the timing of seasonal diversions as compared to the pattern of demands, the maximum annual diversion for the seasonal pump station is approximately 19,300 acre-feet (AF). The seasonal pump station no longer permits Reclamation to provide PCWA with a reliable water supply when and where required to meet PCWA's system demands in accordance with the Land Purchase Agreement.

The annual installation and removal of the seasonal pump station has become increasingly expensive for Reclamation. In recent years, the minimum cost for annual installation and removal has been approximately $250,000. The record high flows of the American River during January 1997 destroyed both the access road to the seasonal pump station and the pipeline connecting the pumps to the Auburn Ravine Tunnel. Reinstallation of the seasonal pump station in the summer of 1997 required new foundation work for the access roads and the pipeline, costing Reclamation nearly $1 million (W. Sanford, pers. comm. 1997).

1.2.4 U.S. BUREAU OF RECLAMATION MANAGEMENT OF AUBURN DAM CONSTRUCTION SITE

Auburn Dam remains an authorized federal project and is considered by some to be feasible. In 1992 and 1996, there were unsuccessful Congressional initiatives to modify and restart the Auburn Dam Project.

Since suspension of Auburn Dam construction in 1977, Reclamation has been managing the Auburn Dam site on an interim basis. Existing site conditions present Reclamation with several resource management issues and opportunities, including public safety, access, and recreation management.[1] In 1994, Reclamation undertook a study to address these issues, together with the installation of a year-round pump station for PCWA. The results were published in a report entitled *Preliminary Concept Plan, Restoration and Management of the Auburn Dam Site* (Reclamation 1996) (1996 Concept Plan).

Reclamation's 1996 Concept Plan identified several interests and options related to improving public safety, access, and recreation at the Auburn Dam construction site. The options identified included closure of the bypass tunnel, restoration of the river through the dewatered channel, and recreational access at the site. Upon completion of the 1996 Concept Plan, Reclamation initiated a concerted engineering and environmental planning effort to implement the findings of the report.

[1] California Department of Parks and Recreation (CDPR), through an agreement with Reclamation, provides management of Auburn State Recreation Area (Auburn SRA) activities, including the project area.

Early in the planning effort, members of the public and certain interest groups supported inclusion of the 1996 Concept Plan site restoration and river bypass tunnel closure measures. In late 1997, Reclamation (1997) undertook a Value Planning Study to further evaluate the options for a year-round pump station, restoration of the Auburn Dam construction site, and tunnel safety consistent with the 1996 Concept Report. However, following publication of the results of the 1997 study, it appeared that critical Congressional support for the project would not be forthcoming if the project included blocking the bypass tunnel or restoring the river channel. Therefore, during 1998 and into 1999, Reclamation and PCWA concentrated on designing a pump station that would not require the bypass tunnel to be closed or the channel restored.

1.2.5 STATE OF CALIFORNIA INTEREST

In September 1999, the State of California's Attorney General sent the Secretary of the Interior a letter indicating legal obligations by the United States to close the diversion tunnel and restore the American River to its natural channel. In March 2000, Reclamation replied that it was ready to address the issues of tunnel closure and river restoration and was willing to enter into a more formal partnership with California to explore alternatives. The Attorney General responded affirmatively and Reclamation and the state entered into a Memorandum of Agreement (MOA) in January 2001 (California Resources Agency and Reclamation 2001) (Appendix A of the Draft EIS/EIR).

The MOA obligates the state to provide funding towards the work needed to complete the EIS/EIR and design plans and specifications in connection with efforts to restore the dewatered portion of the North Fork American River. The MOA also obligates Reclamation to include incidental public access to the river in the vicinity of the Auburn Dam construction site for public health and safety, resource protection and emergency purposes, and any other purposes necessary as a foreseeable result to returning water to the dewatered portion of the river under the Proposed Project. Reclamation's agreement with California Department of Parks and Recreation (CDPR) for management of the Auburn State Recreation Area (Auburn SRA) would be updated to reflect responsibilities associated with river access at the Auburn site and at Oregon Bar.

1.3 PROJECT NEEDS AND OBJECTIVES

1.3.1 PCWA NEEDS FOR WATER SUPPLY AND CONVEYANCE

1.3.1.1 PCWA Existing Water Entitlements

Pacific Gas and Electric Company's (PG&E) Drum-Spaulding Project on the Yuba and Bear rivers and PCWA's MFP on the American River are two sources of water currently available to PCWA to serve areas in western Placer County. PCWA has a contract with PG&E for 100,400 AFA of Drum-Spaulding Project water, at a maximum delivery rate of 244 cfs, to serve Zone 1, encompassing the communities of Auburn, Loomis, Rocklin, Lincoln, Newcastle, Penryn, and parts of Roseville. PCWA also holds existing appropriative rights to divert 120,000 AFA from the MFP under Water Right Permits numbers 13856 and 13858, as authorized by the State Water

Resources Control Board (SWRCB). PCWA uses Drum-Spaulding Project water supplies first to meet service area demands. PCWA then uses MFP water supplies from the American River to satisfy demands not met by the Drum-Spaulding Project, or as needed to provide back-up supplies when the Drum-Spaulding Project is not operating.

A third PCWA water entitlement is through a water service contract most recently amended in February 2002 with Reclamation. The February 2002 amendment to the contract modified the original maximum water allotment of 117,000 AFA and limits the amount of water available to PCWA to 35,000 AFA prior to completion of Auburn Dam.

The project evaluated in this EIS/EIR involves only PCWA's proposed increased diversion of its existing American River MFP water entitlement at the pump station site near Auburn. Separate environmental documentation will be required to evaluate the effects of PCWA's diversion of water under its CVP water service contract with Reclamation.

1.3.1.2 PCWA Water and Conveyance Needs

Since the mid 1980s, Placer County has been one of the fastest growing regions in California. The resulting increased water demands have steadily pushed the limits of PG&E's Drum-Spaulding Project to meet the needs of PCWA customers adequately.

Since 1990, PCWA has needed to rely on the seasonal pump station to supplement the Drum-Spaulding Project water supply with PCWA's MFP supplies during scheduled maintenance outages. Since 1994, PCWA's service area needs for water have exceeded the maximum delivery rate and annual supply available from the Drum-Spaulding Project; again, requiring use of the seasonal pump station to meet the total demand of PCWA's system. In 2000, PCWA's service area demands exceeded the current available delivery amounts from the combined Drum-Spaulding Project and seasonal pump station and PCWA obtained approximately 5,000 AF of surplus surface water through a contract with South Sutter Water District for Nevada Irrigation District (NID) water. However, this surplus supply is only temporarily available until needed within the NID service area and would not be available to PCWA in the future. The present procedure of installing and removing the seasonal pumps does not allow Reclamation to meet its full obligations under the Land Purchase Agreement to fulfill PCWA's needs, nor does it allow PCWA to meet its need for a reliable back-up water supply.

Surface water supply projections through 2030 indicate demand for an additional 92,100 AFA to serve planned buildout of Placer County and other communities within the Auburn pump station service area of PCWA Zones 1 and 5 (PCWA 2001). The determination of these demands assumed continued commitment and implementation of water use efficiency measures throughout the service area. While PCWA has sufficient water entitlements to meet these increasing demands, they require the ability to access the MFP supply beyond the historic seasonal pump station operating period and capacity. This supply also would serve as a critical year-round back-up source to the Drum-Spaulding Project. PCWA has determined that 35,500 AF would provide the necessary back-up supply reliability and meet increasing service area demands for the immediate and near-term (up to 10-year) timeframe.

If the existing seasonal pumps could operate year-round, the 50 cfs capacity would provide an annual diversion of about 35,500 AFA of water. However, PCWA's MFP is a multi-purpose project designed to conserve and control water for irrigation, domestic and commercial purposes, and for hydroelectric generation. To meet these multiple objectives, PCWA's annual diversion pattern is seasonally limited according to Federal Energy Regulatory Commission (FERC) hydroelectric power generation license (Federal Power Commission 1963) and PG&E water contract (PG&E 1968) conditions. These restrictions, in effect until 2013, include specified minimum and maximum monthly diversions as shown in **Table 1-1**.

Table 1-1
Minimum and Maximum Monthly Diversions of Middle Fork Project Water Supplies
(Percent of Total Annual Diversions)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum	0	0	2	5	9	12	13	13	12	4	0	0
Maximum	5	5	6	10	16	19	19	16	13	8	6	5

The net effect of the above is that, even though a year-round 50 cfs diversion could physically provide about 35,500 AFA, operational limitations of the FERC license and PG&E water contract conditions make this annual diversion unattainable. Furthermore, even if a continuous 50 cfs diversion were possible, PCWA's customer demands require that the majority of supplies be delivered in the late-spring through late-fall. Consequently, a larger capacity pump station is needed that would comply with FERC license and PG&E contract conditions, and deliver water to PCWA's customers on its demand pattern. PCWA has determined that a 100 cfs capacity pump station would meet these needs into the 2005 to 2010 period. Water supply needs beyond 2010 would be met through a combination of sources, including PCWA's CVP water contract recently negotiated with Reclamation, by a reduction over time in the amount of MFP water supplied to Sacramento Suburban Water District (formerly Northridge Water District), and/or the potential expansion of the Auburn pump station (see Section 1.3.6, Expandable Conveyance Facility). These conditions and agreements are described further in Chapter 3.0, Section 3.4, Water Supply and Hydrology.

1.3.2 AUBURN DAM BYPASS TUNNEL SAFETY

As part of the original Auburn Dam construction work, a 257-foot high cofferdam and 33-foot diameter bypass tunnel were constructed. The cofferdam was breached by high flows in 1986, depositing millions of cubic yards of debris in the downstream channel. The bypass tunnel remains open and passes the entire flow of the American River at normal flow rates. Due in part to the sediment deposition from the eroded cofferdam, it is common for the downstream end of the tunnel to be submerged while the upper end is open. Although the river portion of the construction site is officially closed to the public, it is known that some people enter the area, and could be seriously injured or killed if they enter the bypass tunnel. Both Reclamation and the state believe this safety issue needs to be corrected.

1.3.3 RIVER RESTORATION

Reclamation and the State of California wish to restore the dewatered reach of the river channel, and to manage the site in a safe and environmentally sound way. Their objectives include restoring the river to a condition that would provide the same biological, hydrologic, and recreation functions, including public use, as it did prior to Auburn Dam construction.

1.3.4 PUBLIC RIVER ACCESS FOR HEALTH AND SAFETY, RESOURCE PROTECTION, AND EMERGENCY PURPOSES

Presently, there is public vehicular access to the North Fork American River at the North/Middle fork confluence on Highway 49 in the Auburn SRA and at Rattlesnake Bar in the Folsom State Recreation Area (Folsom SRA). When Folsom Reservoir is full, the nine-mile reach between these two points is comprised of four miles of moving water and five miles of still water in Folsom Reservoir. When the reservoir is drawn-down for flood control in the winter, the reach of moving water is increased to six miles, or more depending on flood control operations. PG&E will continue to release flows from MFP facilities to provide adequate river conditions for whitewater boating in the Middle Fork American River, as is currently done under agreement with PCWA. Morning release of such flows provides an opportunity for mid- to late-afternoon boating upstream of the project area. Under the Proposed Project, these conditions could result in use of the river in such a way that boaters may become stranded either in the project area, or downstream closer to Rattlesnake Bar, because of the flat water conditions described above. From the perspective of public health and safety, the state believes that the public needs vehicular access to the river near the Folsom Reservoir high-water location to prevent people from being stranded in the canyon and for providing emergency services and resource protection. The provision of public river access features in the project area also would reduce the potential for non-motorized boating use in Folsom Reservoir where motorized boating activity occurs.

1.3.5 LAND PURCHASE AGREEMENT

An overall objective specific to Reclamation is to completely satisfy its obligations to PCWA under the Land Purchase Agreement. This would include alleviating Reclamation of any and all obligations for water delivery, management, operation and maintenance activities of the intake, pumps, and pump station site following completion of construction and start-up of the Proposed Project. PCWA proposes to enter into a contract accepting ownership of such new facilities, and operate them for water supply purposes, thereby relieving Reclamation of its obligation under the Land Purchase Agreement.

1.3.6 EXPANDABLE CONVEYANCE FACILITY

Demand projections for PCWA water supplies into the future show a need for an additional 35,000 AFA, above the capacity of the proposed year-round alternatives, by 2030. To maintain an option to meet this projected demand by diverting water from the American River at Auburn, PCWA has identified the objective of designing the project so that it could be expanded from 100 cfs to 200 cfs when, and if, needed in the future. Consistent with its negotiations within the Water Forum[2], PCWA is currently engaged in various engineering studies and contract negotiations designed to advance the option of diverting water from the Sacramento River to meet a portion of its projected future demands as an alternative to the expansion of the pump station. However, since a Sacramento River diversion alternative is not currently consistent with PCWA's water rights or CVP entitlements, preserving the opportunity to expand this project (which would be consistent with PCWA's existing water rights) with minimal local environmental disruption appears to be prudent planning. Any future expansion (from 35,500 AFA to about 70,500 AFA) would require prerequisite environmental regulatory review and approvals before PCWA could modify the facilities and operate at that level.

An additional future water demand consideration for the project involves the Georgetown Divide Public Utility District (GDPUD). Public Law (P.L.) 101-514 authorizes and directs Reclamation to enter into a long-term water service contract with the El Dorado County Water Agency (EDCWA) for up to 15,000 AFA, of which up to 7,500 AFA is planned to be subcontracted to GDPUD. Planning efforts have been initiated and public notices have been issued for the water service contract with EDCWA (*Federal Register* Notice dated June 14, 1998). Although GDPUD will not need additional water supplies for many years, it has requested that PCWA design its intake and pump station so its capacity could be expanded by up to 25 cfs to accommodate GDPUD's future needs. Additionally, GDPUD requested construction of water delivery facilities (pipelines) to allow transmission of water to the El Dorado County side of the river without further construction in the river.

1.4 USES OF THIS DOCUMENT

This Final EIS/EIR, and information and analyses contained herein, will be used to meet the statutory requirements for environmental review prior to constructing, operating, and maintaining the pump station; to execute a contract between Reclamation and PCWA to transfer certain facilities to PCWA, to provide PCWA easements for use of federal lands, and to delineate the responsibilities of the two agencies; and to secure necessary approvals and permits from responsible federal and state agencies. The laws, ordinances, regulations, and standards applicable to this project, as well as permits and approvals that are required from responsible federal and state agencies, are identified in Chapter 2.0, Description of Alternatives, Section 2.6, Table 2-9 and described within the resource discussions in Chapter 3.0, Affected Environment and Environmental Consequences.

Following lead agency consideration of the comments received during public review of the Draft EIS/EIR, a decision will be made as to whether or not to approve the Proposed Project or an alternative. PCWA's Board will hold a meeting to consider certification of the Final EIR and

[2] The Sacramento Area Water Forum is a diverse group of business and agricultural leaders, citizen groups, water managers, and local governments in Sacramento, Placer, and El Dorado counties. The Water Forum Agreement includes provisions for each of the participating agencies to achieve the plan's two coequal objectives -- provide a reliable and safe water supply for the region's economic health and planned development to 2030; and to preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River. The elements of the Water Forum Agreement address key regional issues including surface water diversions, groundwater management, dry year water supplies, water conservation, and protection of lower American River resources.

make a decision whether to approve a project alternative and adopt Findings of Fact, a Statement of Overriding Considerations, and the Mitigation Plan.

Reclamation will accept additional public and agency comments on the Final EIS prior to taking action on the project and publishing its Record of Decision (ROD). The ROD will identify the agency's decision regarding the project and address substantive comments received on the Final EIS. The public and agencies have 30 days from the release of the Final EIS to provide their comments to Reclamation.

1.4.1 DOCUMENT ORGANIZATION

This Final EIS/EIR includes the Draft EIS/EIR and its appendices, an Executive Summary, and the Mitigation Plan. The complete list of environmental compliance documents prepared for this project is provided below:

Draft EIS/EIR

- Executive Summary
- Draft EIS/EIR
- Technical Appendices to the Draft EIS/EIR

Appendix A	Memorandum of Agreement Between the State of California and U.S. Bureau of Reclamation
Appendix B	Notice of Intent and Notice of Preparation
Appendix C	Draft Negotiated Agreement Between U.S. Bureau of Reclamation and Placer County Water Agency
Appendix D	American River Basin Cumulative Impact Report
Appendix E	Hydrologic Modeling Technical Memorandum
Appendix F	U.S. Fish and Wildlife Service Coordination and Consultation
Appendix G	National Marine Fisheries Service Coordination and Consultation
Appendix H	Figures and Tables Cited in Chapter 3.0
Appendix I	Modeling Output (CD)

Final EIS/EIR

- *Executive Summary* provides an overview of the project background, purpose and objectives, and identifies resource issues and impacts. The Executive Summary is a separate document distributed to individuals, parties, and agencies expressing an interest in the project.

- *Chapter 1.0* describes the pump station history, PCWA water entitlements, the Land Purchase Agreement between PCWA and Reclamation, the purpose of and need for the project and project objectives identified by the lead agencies, and provides a summary of public involvement and scoping conducted for the EIS/EIR.

- *Chapter 2.0* describes the Proposed Project and alternatives considered in the EIS/EIR, the alternatives considered but eliminated from detailed study, and provides a summary comparison of alternatives and environmental impacts.

- *Chapter 3.0* describes the affected environment and analyzes the direct, indirect, and cumulative environmental impacts of each alternative considered in detail.

- *Chapter 4.0* describes public involvement, coordination, and consultation efforts with interested members of the public, federal, state, and local agencies and private organizations that occurred during preparation of the EIS/EIR, and provides the document distribution list.

- *Chapter 5.0* lists the individuals involved in preparation of the EIS/EIR, their expertise and education, and role on the project.

- *Chapter 6.0* provides a list of references and personal communications.

The appendices to this Final EIS/EIR include:

- *Appendix A* Auburn State Recreation Area Prefire Management Plan

- *Appendix B* Contract Between the United States and Placer County Water Agency Related to American River Pumping Plant and Associated Facilities

- *Appendix C* Responses to Comments on the Draft EIS/EIR

- *Appendix D* Mitigation Monitoring and Reporting Program/Environmental Commitments Plan

1.4.2 SCOPING SUMMARY

Reclamation and PCWA have been involved in ongoing environmental evaluation of the Proposed Project and alternatives, including numerous agency and public involvement opportunities, since July 1995. These activities included five public and agency stakeholder meetings and a formal public scoping meeting for the Draft EIS/EIR which are described below and in Chapter 4.0, Consultation and Coordination, Section 4.2, Public Involvement.

Formal scoping for the EIS/EIR began with publication of the Notice of Intent (NOI) to prepare an EIS and notice of a public scoping meeting in the June 18, 1999 *Federal Register*. Concurrently, a Notice of Preparation (NOP) of an EIR was filed with the California State Clearinghouse, distributed, and a corresponding news release was published. Copies of the NOI and NOP are included in Appendix B of the Draft EIS/EIR.

A scoping meeting was held the evening of July 8, 1999 at PCWA's offices in Auburn to receive public input on the appropriate scope of the EIS/EIR, consistent with NEPA and CEQA requirements and implementing regulations. Attendees were encouraged to prepare written comments for consideration in the EIS/EIR scoping process.

The public comment period for the NOI and NOP extended from June 18, 1999 through July 30, 1999. The lead agencies received comment letters from 89 interested parties during this period. In response to these comments, the lead agencies prepared a Scoping Summary Report. The Scoping Summary Report identifies all comments received during the public comment period. The Scoping Summary Report is available at the lead agency offices (refer to the Cover Page for agency contact information).

1.4.2.1 Summary of Public Concerns

During all public and agency stakeholder meetings, participants were provided with a brief presentation concerning the project and particular challenges associated with each of the project alternatives, including a No Action/No Project Alternative. A summary listing of issues and comments identified by the public, resource agencies, and project proponents is presented below. These comments, consultations with agencies, and professional judgment of the preparers of this document defined the impact issues that are addressed in Chapter 3.0.

Water Supply and Hydrology

- Commitment to Water Forum purveyor-specific agreement elements
- River channel stability – cofferdam debris movement
- Long-term stability of the diversion structure
- Backwater effect at Tamaroo Bar
- Flood event effects on project facilities
- Meet increased demand by conservation or water exchanges with other purveyors
- Instream flow/diversion effect
- Discuss possible use of pump station facilities by GDPUD, identify any rate increase associated with facility construction
- Consistency of this project with the Central Valley Project Improvement Act PROSIM 99 model
- Groundwater supplies

Fish Resources and Aquatic Habitat

- Special-status species – chinook salmon, steelhead (flow, diversion structure)
- Instream flow requirements for fisheries
- Water chemistry changes – effects on special-status fish species migration (Auburn Ravine)
- Restoration of coho salmon to the north and middle forks of the river (otters and eagles)
- Restore the river channel
- Restore fish runs upstream of Folsom Dam
- Protection of fish from injury at the pump station
- Auburn Ravine impacts from increased flows

Terrestrial Resources

- Wildlife migration corridors and flyways
- Riparian habitat protection/enhancement
- Restore the river channel to improve the ecosystem

Water Quality

- Sedimentation/turbidity
- Water temperature
- Auburn Ravine – when the water leaves the Auburn Ravine Tunnel – where does it go?
- Groundwater quality

Recreation

- Public access – hiking, equestrian, bicycle trails, and access to the river for water-based activities
- Public use of roads constructed by the project
- Project consistency with the Auburn SRA Interim Resource Management Plan
- Cost-benefit comparison of recreation opportunities between alternatives
- Diversion tunnel safety hazard to recreation
- Restore the river channel for water-based activities
- Attract Olympic events

Visual Resources

- Pump station aesthetics

Land Use

- Growth-inducement aspects of increased diversion/water supply (traffic, loss of habitats, public service burden)
- Agriculture impacts
- Placer County General Plan – what does "build-out" look like; will the project serve build-out; and will other facilities need to be constructed?
- Public utilities and services – energy consumption by pump station

Air Quality

- Short-term construction emissions
- Long-term operational emissions

Public Health and Worker Safety

- Diversion tunnel safety
- Structures as potential attractive nuisance (safety issue)
- Fire safety

Alternatives Analysis

- Upstream location poor choice – silt settling basin requires frequent dredging or special effort to maintain
- Cost-benefit analysis between alternatives – particularly related to recreation opportunities

Other Issues

- Political support
- Funding/use of tax dollars
- Auburn Dam – future construction/waste of resources
- Future planned changes to Folsom Dam (height)
- Relationship of project to other local and regional projects (cumulative analysis)
- Public Trust Doctrine
- Unreasonable methods of diverting water prohibited by Article X, Section 2 of the California Constitution and Section 100 of the California Water Code

1.4.3 PUBLIC REVIEW OF DRAFT EIS/EIR

Reclamation and PCWA distributed the Draft EIS/EIR to federal and state resource and regulatory agencies, legislative representatives, water districts, environmental organizations, and other interested parties on September 10, 2001. Reclamation's NEPA policy requires a 60-day review period for the Draft EIS and CEQA Guidelines Section 15205(d) requires a 45-day review period for the Draft EIR. The Draft EIS/EIR was available for review and comment 63 days following filing of the Notice of Availability (NOA) of the EIS with the Environmental Protection Agency and the Notice of Completion (NOC) of the EIR with the California State Clearinghouse. The NOA and notice of public hearing on the EIS were published in the *Federal Register* on September 10, 2001. The NOC was filed with the California State Clearinghouse and posted at the Placer, El Dorado, and Sacramento county clerk offices. In response to public comments and other requests, the public comment period was extended another 30 days and closed on December 13, 2001. The lead agencies provided public notice of the review period extension as required by CEQA and NEPA. In summary, the Draft EIS/EIR public review comment period, therefore, extended for a total of 93 days, from September 10, 2001 to December 13, 2001.

1.4.4 FINAL EIS/EIR

The purpose of public review of the Draft EIS/EIR was to receive comments from interested parties on its completeness and adequacy in disclosing the environmental impacts of the Proposed Project. Following the close of the Draft EIS/EIR public review period, this Final EIS/EIR has been prepared containing the comments received on the Draft EIS/EIR and responses to those comments, and clarifications or further explanations of information provided in the Draft EIS/EIR. Reclamation is responsible for determining that the EIS is adequate and in compliance with NEPA and PCWA is responsible for certifying the EIR as adequate in compliance with CEQA. After making this determination and certification, the agencies will use the EIS/EIR in making their decisions on whether to approve a year-round pump station project.

The Draft EIS/EIR (September 2001) has been modified to reflect revisions and corrections made in response to public and agency comments received during the public review and comment period. These changes to the document do not alter the impact conclusions that were presented in the Draft EIS/EIR. **Table 1-2** presents a summary of these revisions. These changes to the report are presented in the Final EIS/EIR to clarify project design, construction and operation features, incorporate additional detail regarding proposed project features or mitigation measures and to correct typographical errors found during preparation of the final documents. The revisions and corrections included in the Final EIS/EIR have also been incorporated into the material presented in this Executive Summary, as appropriate to the level of detail in each section.

Table 1-2 **Revisions and Corrections Made to the Draft EIS/EIR**
List of Acronyms ❑ Updated and corrected list of acronyms to include all acronyms used in Final EIS/EIR and supporting documentation
Chapter 1.0 - Introduction ❑ Updated discussion of Public Review of Draft EIS/EIR to reflect extended public review comment period ❑ Added List of Revisions and Corrections to the Draft EIS/EIR ❑ Added section regarding Final EIS/EIR Process
Chapter 2.0 - Description of Alternatives ❑ Expanded discussion regarding selection of alternatives explaining infeasibility of land conservation easements ❑ Updated Table 2-2 to correct summary of major features of the alternatives ❑ Added new figure depicting major features of the No Action/No Project Alternative ❑ Provided cost estimate breakdown for the Proposed Project pump station, bypass tunnel closure, and river channel excavation and public river access features ❑ Revised reference to fish screen to reflect change to California Department of Fish and Game (CDFG)-approved design, not Coanda-based design ❑ Removed references to use of a standby diesel generator which is no longer proposed ❑ Revised description of Public River Access Features to indicate modifications of riverside parking area to include only a turnaround and 3 handicap-accessible spaces, not 20 spaces ❑ Revised references to total number of public river access parking area spaces from 70 to 53 ❑ Provided revised Public River Access Features graphic to show parking area changes ❑ Updated description of No Action/No Project Alternative, Proposed Project, and Upstream Diversion Alternative operation and maintenance to explain proposed double-pump operations using the Auburn Ravine Tunnel pump station to avoid potential impacts to Auburn Ravine fish and terrestrial resources ❑ Revised discussion of Ralston Afterbay reoperation to clarify nature of activity ❑ Made corrections to Table 2-8, Summary of Alternatives Considered and Eliminated from Further Analysis to explain infeasibility of land conservation easements and other suggested alternatives ❑ Updated Table 2-9, Anticipated Permits and Approvals for the Proposed Project to reflect project permitting needs based upon coordination with regulatory agencies since release of Draft EIS/EIR

Table 1-2 (Continued)
Revisions and Corrections Made to the Draft EIS/EIR

Chapter 3.0 - Affected Environment and Environmental Consequences

General Revisions and Corrections

- Updated references to Northridge Water District (NWD) to reflect recent name change to Sacramento Suburban Water District (SSWD)
- Updated references to Citizen's Utilities Water Company to reflect recent name change to California-American Water Company (CAWC)
- Corrected discussion of SSWD (formerly NWD) water supply sources
- Updated discussion of Auburn Recreation District proposed American River campground area
- Provided additional explanation regarding placement of model output table and graphic results in Appendix H to the Draft EIS/EIR (also provided in all resource sections containing diversion-related analyses)

Water Supply and Hydrology

- Updated information pertaining to PCWA's Water Conservation Program

Fish Resources and Aquatic Habitat

- Revised description and evaluation of Auburn Ravine fish resources
- Deleted references to National Marine Fisheries Service (NMFS) critical habitat designations for Central Valley steelhead and spring-run chinook salmon due to recent withdrawal of such designations by NMFS
- Updated discussion of backwater effects at Tamaroo Bar
- Updated and revised mitigation measures to reflect individual agency responsibilities and in response to changes related to (1) project construction no longer requires use of cofferdam, therefore related measures would not be needed; and (2) updated method to evaluate fish screen performance based on further consultation with CDFG fish screen experts

Terrestrial Resources

- Provided additional information regarding non-listed species at the project site, per request of U.S. Fish and Wildlife Service (USFWS) Draft Coordination Act Report recommendations
- Added account of potential areas of habitat affected by the Proposed Project, per request of USFWS Draft Coordination Act Report recommendations
- Incorporated findings of recent Red-Legged Frog Habitat Assessment and Site Survey performed at request of USFWS as part of federal Endangered Species Act (ESA) consultation
- Updated and revised mitigation measures to reflect individual agency responsibilities

Recreation

- Included additional detail regarding existing project area recreation uses as supplied by the California Department of Parks and Recreation (CDPR)
- Revised description and analyses related to modification of the Public River Access Features incorporated into the Proposed Project by the lead agencies and CDPR
- Developed revised recreation trail map for project area
- Updated discussion of recreation trail access impact during construction due to changed approach in mitigation
- Revised discussion of Auburn-to-Cool Trail impact and responsibilities for mitigation of impact under Proposed Project
- Incorporated additional information related to backwater effects at Tamaroo Bar rapid
- Provided further clarification of the Middle Fork American River whitewater boating impact under all alternatives
- Updated and revised mitigation measures to identify individual agency responsibilities and in response to changes in project features

Table 1-2 (Continued)
Revisions and Corrections Made to the Draft EIS/EIR

Visual Resources

- Updated impact discussion in response to changes in Public River Access Features
- Revised mitigation measures to identify individual agency responsibilities and to reflect change in construction materials of pump station housing

Cultural Resources

- Updated discussion of cultural resources laws and regulations applicable to the project to reflect priority of federal laws
- Updated mitigation measures to identify individual agency responsibilities and in response to recent efforts related to Programmatic Agreement with the State Historic Preservation Office (SHPO)

Power Supply

- Corrected errors in text in response to comments

Land Use

- Incorporated discussion of growth issues and description of lead agencies responsibilities

Geology and Soils

- Updated discussion of mitigation measures to incorporate recommended measures under Public Health and Worker Safety program

Transportation and Circulation

- Incorporated information from supplemental Traffic Study and additional coordination with City of Auburn Public Works Department to evaluate potential impacts at Maidu Drive/Burlin Way intersection
- Updated discussion of mitigation measures to identify individual agency responsibilities and incorporate recommendations for Construction Traffic Management Plan and payment of mitigation fees to City of Auburn

Air Quality

- Updated analysis of public river access-related traffic based on new emission evaluation information from Placer County and El Dorado County air pollution control districts
- Added information describing particulate matter less than 2.5 microns in size ($PM_{2.5}$), as requested by U.S. Environmental Protection Agency (EPA)
- Provided discussion of project alternatives' compliance with federal general conformity requirements, as requested by U.S. EPA
- Incorporated additional information and explanation of analysis approach of sensitive receptors related to El Dorado County and the community of Cool, as requested by El Dorado County Air Pollution Control District (APCD) and others
- Removed references to diesel generator as one is no longer included in project alternative activities
- Updated and revised discussion of mitigation measures to identify individual agency responsibilities

Noise

- Updated discussion of public river access traffic-related noise sources
- Revised mitigation measures to identify individual agency responsibilities

Table 1-2 (Continued) Revisions and Corrections Made to the Draft EIS/EIR
Public Health and Worker Safety ❑ Added new information relative to Fire Management ❑ Incorporated geology and soils mitigation measures relative to slope stability, worker safety during construction and public safety during use of project area under Proposed Project ❑ Revised mitigation measures to identify individual agency responsibilities *Other Impact Considerations* ❑ Corrected information presented under Essential Fish Habitat (EFH) to more specifically identify discussion relative to fall-run chinook salmon ❑ Expanded discussion of Short-term Uses of the Environment Versus Long-Term Productivity ❑ Added discussion of Climate Change, per request of U.S. EPA ❑ Revised ESA Compliance section to reflect (1) NMFS retraction of steelhead and spring-run chinook salmon critical habitat designations; (2) correction of inadvertent reference to incidental take; (3) update to summary of consultation to date; (4) addition of PCWA's proposed Auburn Ravine monitoring program as a conservation measure; and (5) incorporation of corrections to conclusion and determination
Chapter 4.0 - Consultation and Coordination ❑ Updated discussions of resource agency ESA consultations and other coordination ***Chapter 5.0 - List of Preparers*** ❑ Added additional names and updated area of participation to reflect efforts undertaken to complete the Final EIS/EIR and related activities
Chapter 6.0 - References ❑ Incorporated additional references cited and personal communications held during preparation of the Final EIS/EIR

Chapter 2.0
Description of Alternatives

This chapter presents a description of the alternatives considered in the Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR), the alternatives eliminated from detailed study, a summary comparison of the alternatives and their impacts, and a list of the permits and approvals that likely will be needed for project construction and operation. **Figure 2-1** illustrates the regional setting extending from the upper Sacramento River and upper American River, south to the Sacramento-San Joaquin River Delta (Delta). **Figure 2-2** depicts the project study area relative to cities, counties, transportation corridors, and waterways of the region. **Figure 2-3** shows the local project area and site.

2.1 DEVELOPMENT OF ALTERNATIVES

Chapter 1.0, Introduction, describes the early planning for the project. These efforts included development of preliminary alternatives that would meet the project objectives and lead agency management goals for the project site described in Section 1.1, Project Purpose, and Section 1.3, Project Needs and Objectives. The first alternatives considered included siting the diversion structure at several different locations upstream of the bypass tunnel inlet, downstream of the bypass tunnel outlet, or within the dewatered portion of the river channel. The diversion alternatives downstream of the bypass tunnel outlet were determined to be substantially inferior to the others. The U.S. Department of the Interior (Interior) Bureau of Reclamation's (Reclamation) *Preliminary Concept Plan – Restoration and Management of the Auburn Dam Site* (1996 Concept Plan) (Reclamation 1996a) describes the details and results of this early planning study.

Then, in 1997, a Value Planning Study (Reclamation 1997) was conducted to reevaluate the preliminary alternatives described in the 1996 Concept Plan as well as new alternatives or features not previously considered. The new alternatives and features were formulated as a result of public involvement and scoping activities that occurred in 1996 and 1997 (Section 1.4.2, Scoping Summary and Section 4.2, Public Involvement). Based on the 1997 study, a range of reasonable alternatives was developed for analysis, and others were considered and eliminated from detailed study. The eliminated alternatives include a wide range of possibilities such as off-stream storage, increased conservation, a diversion with pumping and pipeline conveyance facilities from Folsom Reservoir, and water purchases from other purveyors (Section 2.5, Alternatives Considered and Eliminated). These alternatives were dismissed from detailed consideration because they were not feasible based on engineering, public safety, and environmental considerations, or did not meet the provisions of the project purpose, needs, or objectives (Section 1.1 and Section 1.3).

The alternatives presented in this EIS/EIR represent a range of reasonable actions and include a No Action/No Project Alternative (continue seasonal pump station installation and operation) and two new pump station project alternatives that would construct new facilities for diversion of

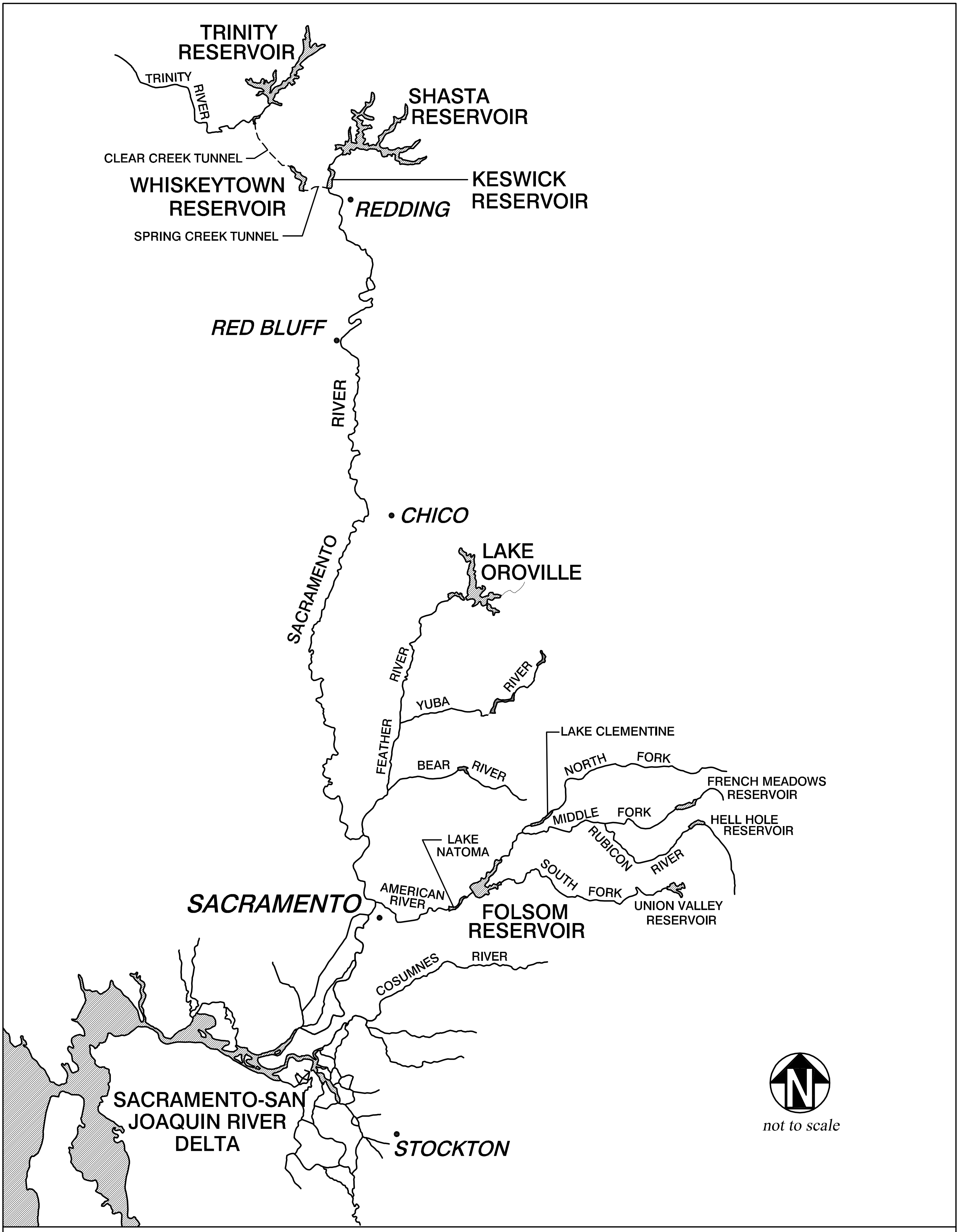


Figure 2-1 Regional Setting

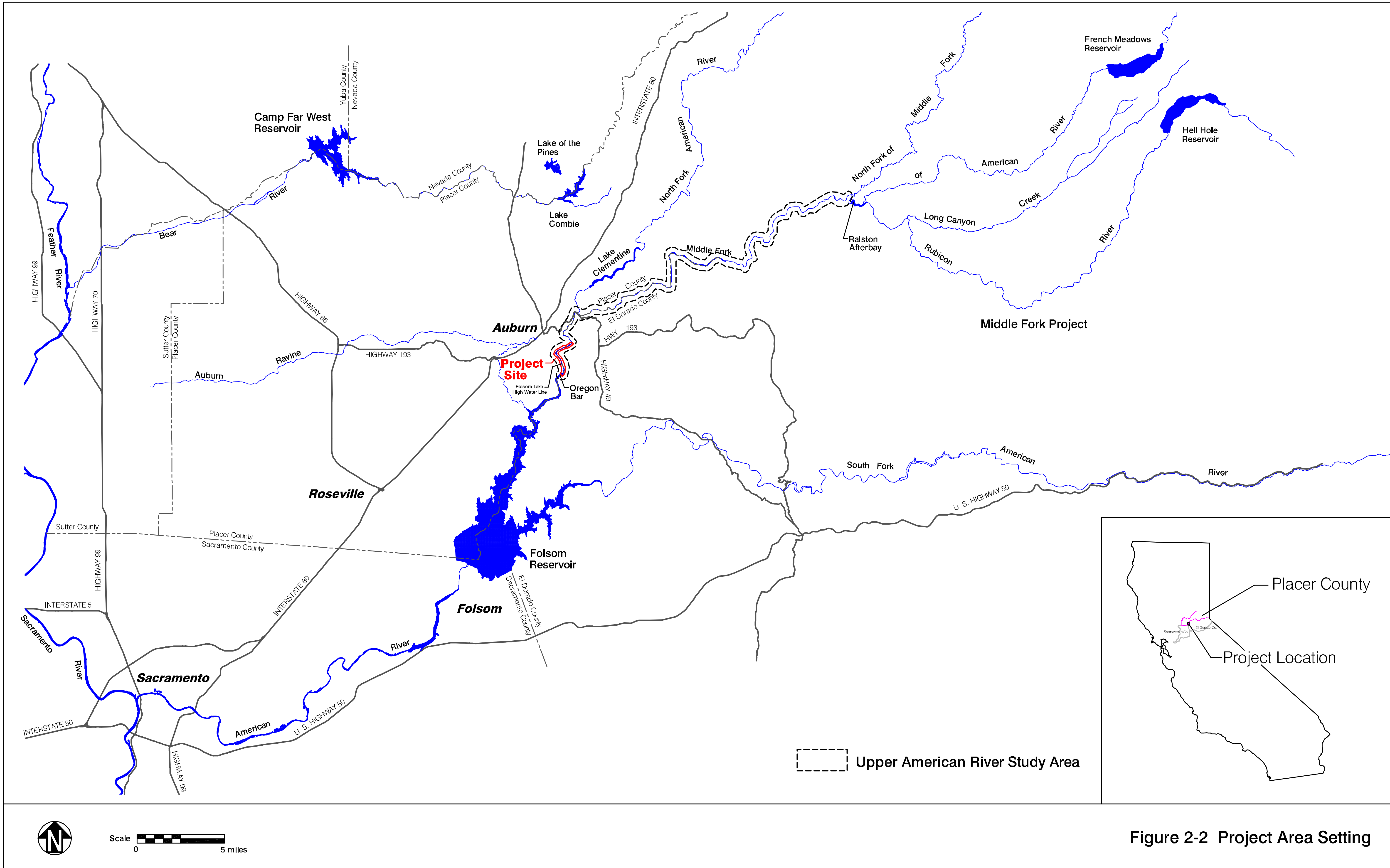


Figure 2-2 Project Area Setting

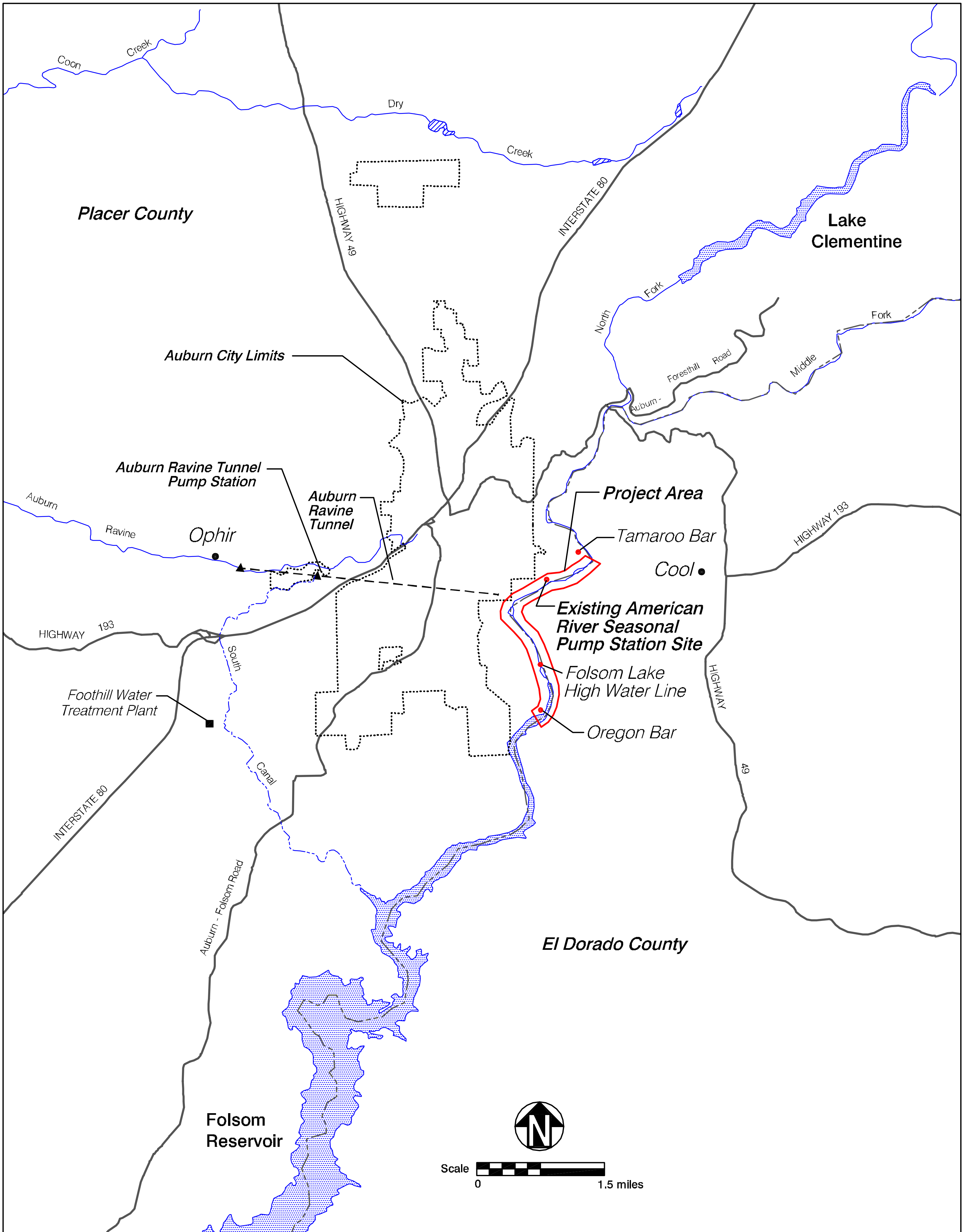


Figure 2-3 Project Area

water at the Auburn site: the Mid-Channel Diversion Alternative and the Upstream Diversion Alternative. Each of these alternatives is described in detail in this chapter.

The Mid-Channel Diversion Alternative is being considered for approval and implementation by Placer County Water Agency (PCWA) and Reclamation and is referred to as the Proposed Project. This alternative differs from three proposals put forward in the Value Planning Final Report (Reclamation 2000) but is consistent with the project objectives and continues to meet the preliminary design restrictions, requirements, and special criteria determined through the value planning efforts. The Mid-Channel Diversion Alternative, as currently proposed, was developed through further site-specific considerations and refinement of preliminary design concepts. Key modifications include the intake/diversion location and pump station site. The intake/diversion structures remain situated on the outside curve of the natural channel, but were moved upstream of the former mid-channel location to take advantage of the narrowed portion of the river channel created by the northwestern bank cofferdam remnant. Siting the intake/diversion structures in this area would require smaller in-river control structures as the width of the river channel is shorter in this area than in other locations. Additionally, the narrow channel formed by the cofferdam remnant creates a natural pooling of the river flow and permits more control for the diversion. The pump station also was relocated to keep the facilities together, thereby minimizing the distance and length of pipeline and associated construction activity required between the intake and pump station. The proposed pump station site is considered to have more suitable soil conditions and would require less excavation than other possible locations.

The pump station and associated facility locations evaluated in this EIS/EIR represent the preliminary footprint for the project at this stage in the design process. It is noted that the design continues to be refined and construction of individual facilities would be modified, based on actual site conditions at the time of construction. However, it as anticipated that such adjustments would be minor and the analysis of the project area provided in this EIS/EIR adequately addresses site-specific resource issues that would be affected by construction and operation of the pump station facility. Any substantial change in the size or placement of project facilities would warrant reconsideration of environmental impacts in a separate document.

2.2 ALTERNATIVES CONSIDERED IN DETAIL

The three alternatives considered in detail are described below, beginning with the No Action/No Project Alternative followed by the Proposed Project and then the Upstream Diversion Alternative. The Proposed Project and Upstream Diversion Alternative are referred to as the "Action Alternatives" as selection of either one would result in development of the year-round pump station facilities. Differences between the two Action Alternatives include the location of the diversion/intake structure, whether or not the Auburn Dam construction bypass tunnel is closed, and implementation of a restoration plan for the existing dewatered segment of the American River channel at the project site. The Proposed Project would locate a new pump station and diversion/intake facility in the dewatered reach of the river channel, close the bypass tunnel, and restore the river channel. The Upstream Diversion Alternative would locate the pump station at the same site as the Proposed Project, but place the diversion/intake facilities upstream of the bypass tunnel inlet; the bypass tunnel would remain open, and the dewatered river segment would not be restored. Both Action Alternatives propose facilities that would provide a year-round Middle Fork Project (MFP) water supply to PCWA with a design capacity of 100 cubic feet per second (cfs) for an annual supply of up to 35,500 acre-feet (AF).

Upon completion of the Proposed Project or Upstream Diversion Alternative, there would be a full transfer of pump station project ownership, operation and maintenance responsibilities, and grant of land rights from Reclamation to PCWA. PCWA would enter into a contract accepting ownership of the new water supply facilities, and operate them for water supply purposes, thereby relieving Reclamation of its obligations under the Land Purchase Contract. Reclamation would retain responsibility for all other operation and maintenance activities associated with the authorized Auburn Dam Project, and would have certain of those responsibilities performed by the California Department of Parks and Recreation (CDPR) under its agreement with Reclamation to manage the Auburn State Recreation Area (Auburn SRA). Under the No Action/No Project Alternative, Reclamation would maintain responsibility for the annual installation, operation and maintenance, and removal of the seasonal pump station.

Table 2-1 provides a comparison of each alternative to the purpose, needs and objectives for the project. As shown, the ability of each alternative to accomplish these purposes and objectives varies. For example, although the Upstream Diversion Alternative would meet PCWA's water supply objectives and alleviate Reclamation from its obligations to PCWA under the Land Purchase Agreement (Contract), it would not satisfy the river restoration or public river access objectives of the federal and state stakeholders. However, the Upstream Diversion Alternative is evaluated in this EIS/EIR as a viable option because the bypass tunnel and dewatered reach of the river remain part of an authorized federal action. These issues are considered in the evaluation of the alternative impacts (Chapter 3.0, Affected Environment and Environmental Consequences). **Table 2-2** lists the major features and activities associated with each alternative. **Figure 2-4** shows existing site conditions. **Figure 2-5** shows the No Action/No Project Alternative features. **Figures 2-6** and **2-7** show the major water supply facilities and public river access sites/safety features of the Proposed Project, respectively. **Figure 2-8** presents the major features of the Upstream Diversion Alternative.

2.2.1 NO ACTION/NO PROJECT ALTERNATIVE

If the lead agencies do not construct a new year-round diversion and pump station facility for the American River diversion, the No Action/No Project Alternative would occur. Under this alternative, Reclamation would continue annual installation and removal of the seasonal pumps at the existing location (Figure 2-4) and maintain responsibility for the operation and maintenance of the facilities. The seasonal pump station facility includes an inlet pipeline that draws water from a small sump pond approximately 750 feet upstream of the bypass tunnel inlet, four pump canisters (12.5 cfs capacity each), and 2,800 feet of steel pipeline placed above ground from the pump station connected to the Auburn Ravine Tunnel portal (Figure 2-5).

Beginning in 2000, Reclamation's California Department of Fish and Game (CDFG) Streambed Alteration Agreement required installation of a fish screen on the inlet pipeline. A Geotextile fabric screen was used at the onset of the 2000 diversion season but eventually was removed due to operational failure. During the 2001 diversion season, Reclamation used a Smith-Root portable electric barrier to discourage fish from entering the inlet channel/sump pond. The

Table 2-1
Comparison of the Alternatives to Project Purpose, Needs, and Objectives

	No Action/ No Project Alternative	**Proposed Project**	**Upstream Diversion Alternative**
Project Purpose [a]			
Provide facilities to allow PCWA to convey its MFP water entitlement to the Auburn Ravine Tunnel to meet demands within its service area.	No	Yes	Yes
Eliminate the safety hazard associated with the Auburn Dam bypass tunnel.	No	Yes	Partially
Restore the dewatered portion of the North Fork American River at the Auburn Dam bypass tunnel.	No	Yes	No
Project Needs and Objectives [b]			
PCWA Water and Conveyance Needs			
Restore PCWA's ability to divert its MFP water supply year-round.	No	Yes	Yes
Provide reliable, year-round diversion capacity of up to 100 cfs.	No	Yes	Yes
Auburn Dam and Bypass Tunnel Safety			
Alleviate public safety hazards from Auburn Dam construction site.	No	Yes	Partially
River Restoration			
Open the American River to water-based recreation from Highway 49 to Folsom Reservoir.	No	Yes	No
Public Safety River Access			
Provide public safety river access at the Auburn pump station site and at Oregon Bar.	No	Yes	No
Land Purchase Agreement			
Alleviate Reclamation of obligations to PCWA under the Land Purchase Agreement.	No	Yes	Yes
Expandable Conveyance Facility			
Provide potential to add future diversion capacity of 25 cfs for Georgetown Divide Public Utility District (GDPUD) and an additional 100 cfs for PCWA.	No	Yes	Yes

[a] See Section 1.1, Project Purpose
[b] See Section 1.3, Project Needs and Objectives

Table 2-2
Summary of Major Features and Activities for the Alternatives [a]

Facility	No Action/No Project Alternative	Proposed Project	Upstream Diversion Alternative
Pump Station			
Pump Station Location	At the existing site, approximately 750 feet upstream of bypass tunnel inlet	Approximately 600 feet northwest of bypass tunnel inlet	Same as Proposed Project
Pump Station Elevation (feet mean sea level (msl))	525	560 (above 100-year flood level)	Same as Proposed Project
Pump Station Configuration: PCWA	4 12.5 cfs pumps (50 cfs)	5 pumps: 2 at 38 cfs and 2 at 17 cfs, one standby pump at 38 cfs	Same as Proposed Project
Expansion Planning: PCWA	None	Additional 100 cfs for a total of 200 cfs	Same as Proposed Project
GDPUD	None	25 cfs	Same as Proposed Project
GDPUD Pipeline to East Side of Canyon	No	Yes	Same as Proposed Project
Diversion/Intake Structure			
Diversion Location	At the existing site, approximately 750 feet upstream of bypass tunnel inlet	Approximately 600 feet northwest of bypass tunnel inlet	Approximately 100 feet upstream of bypass tunnel inlet
Intake Structure Design	Coarse screen diversion from sump pond	Intake structure with fish screens	Intake structure with trash rack and fish screens
Fish Screen	CDFG-approved screen or fish barrier to be placed at mouth of inlet channel	Installation of a CDFG-approved fish screen on the water supply intake structure	Same as Proposed Project
Hydraulic Gradient Control Structures	None	Series of structures constructed from rock, grouted rock, and concrete to create low-gradient hydraulic drop resulting in a rapid navigable by watercraft	V-notch weir
Extent of River Channel Modification	100 feet annually	4,000 feet	200 feet

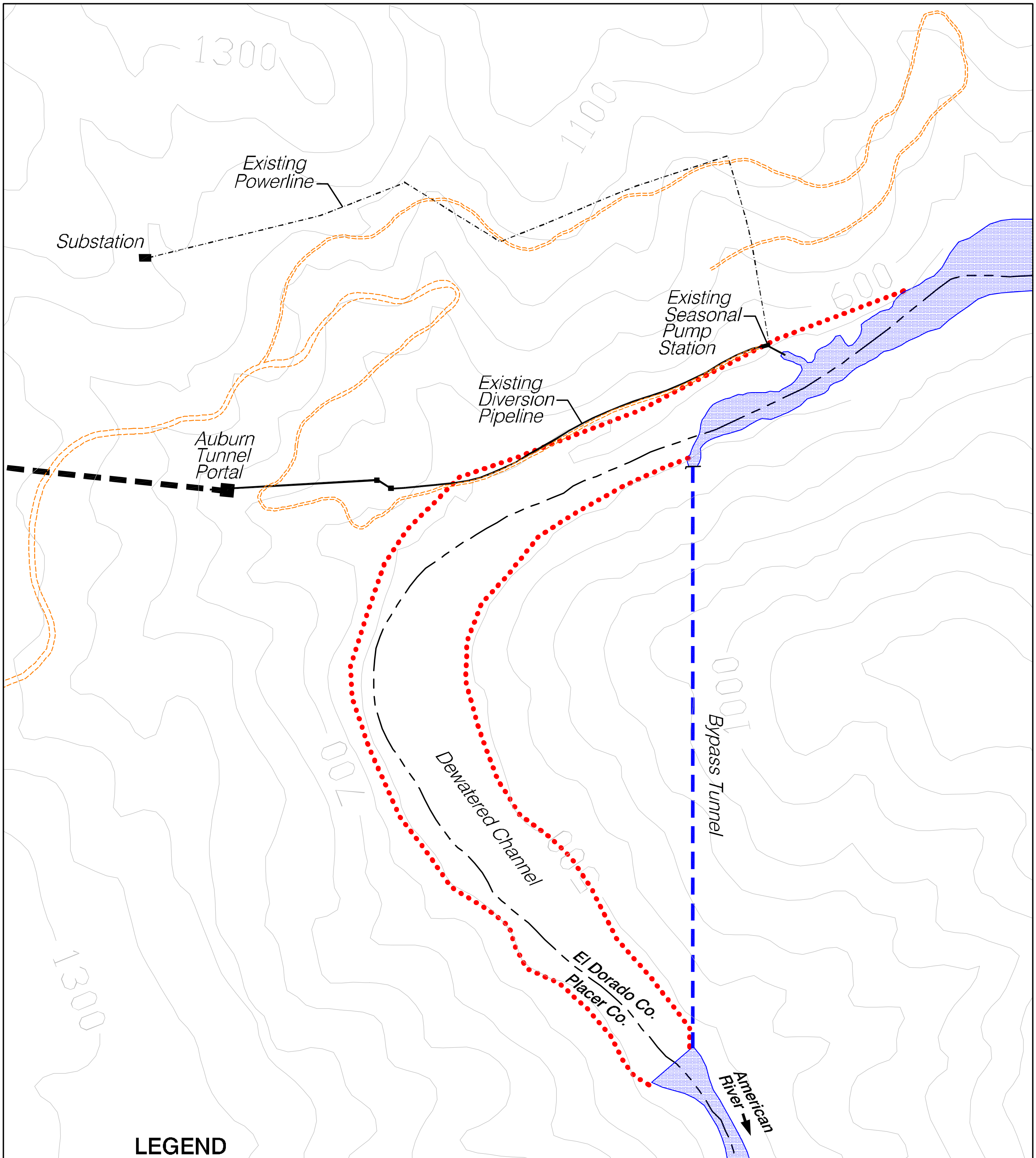
[a] The pump station and associated facility locations evaluated in the EIS/EIR represent the preliminary footprint for the project at this stage in the design process. It is noted that the design continues to be refined and construction of individual facilities would be modified, based on actual site conditions at the time of construction. However, it is anticipated that such adjustments would be minor and the analysis of the project area provided in the EIS/EIR adequately address site-specific resource issues that would be affected by construction and operation of the pump station facility. Any substantial change in the size or placement of project facilities would warrant reconsideration of environmental impacts in a separate document.

Table 2-2 (Continued) Summary of Major Features and Activities for the Alternatives			
Facility	**No Action/No Project Alternative**	**Proposed Project**	**Upstream Diversion Alternative**
River Channel Restoration			
Bypass Tunnel Closure	No	Yes	No
Restoration of the Dewatered River Channel	No	Yes	No
Public River Access Improvements	None	Parking, road, and trail improvements, CDPR entrance station, sanitation facilities	None
Construction and Restoration Excavation			
River Channel Excavation Depth	N/A	Up to 20 feet	N/A
Volume of Excavation Material to be Removed	N/A	700,000 to 1 million cubic yards	72,000 cubic yards
Excavation Material Disposal Volume by Location	N/A		
East of Auburn Dam Keyway		90,000 cubic yards	72,000 cubic yards
Bypass Tunnel Inlet		30,000 cubic years	
Bypass Tunnel Outlet		20,000 cubic yards	
Bench, South of Keyway		560,000 cubic yards	
Pipelines			
Pipeline(s) From Intake Diversion to Pump Station			
Length	16 feet	150 feet	550 feet
Diameter	Two at 8 feet each	One at 7 feet	Same as Proposed Project
Pipeline from Pump Station to Auburn Ravine Tunnel			
Length	2,800 feet	1,670 feet	Same as Proposed Project
Diameter	2.5 feet	6 feet	Same as Proposed Project
Pump Station Construction and Facility Access Roads			
Access Road Improvements	Annual re-grading and rehabilitation of all roads	All-weather road improvements:	
Entrance to Pump Station Site		1,460 feet	Same as Proposed Project
To Auburn Ravine Tunnel		1,430 feet	Same as Proposed Project
Pump Station to Diversion		150 feet	600 feet
Power Lines			
Length of New Power Lines to be Installed to the Pump Station and Intake Structure	None	Approximately 650 feet	Approximately 1,050 feet

Table 2-2 (Continued)
Summary of Major Features and Activities for the Alternatives

Facility	No Action/No Project Alternative	Proposed Project	Upstream Diversion Alternative
Safety Features			
Safety Features to Warn and Discourage the Public from Entering the Bypass Tunnel	Signs	Tunnel closed, low gradient structures to reduce hazards to in-river users	Buoys, signs, and ropes
Project Design and Construction Cost			
Project Cost	$250,000 to $1 million annually	$31 million	$17 million
Management Responsibility			
Project Ownership, Operation and Maintenance Responsibilities	Reclamation - continued role with seasonal facilities	PCWA - pump station and related facilities Reclamation/CDPR - public river access site maintenance and management	PCWA - pump station and related facilities

Figure 2-4 Existing Project Area Conditions



LEGEND

County Line
Boundary of Dewatered Channel
Existing Access Road
400 Contour of Equal Elevation (feet above msl)

Figure 2-5 Major Features of the No Action/No Project Alternative

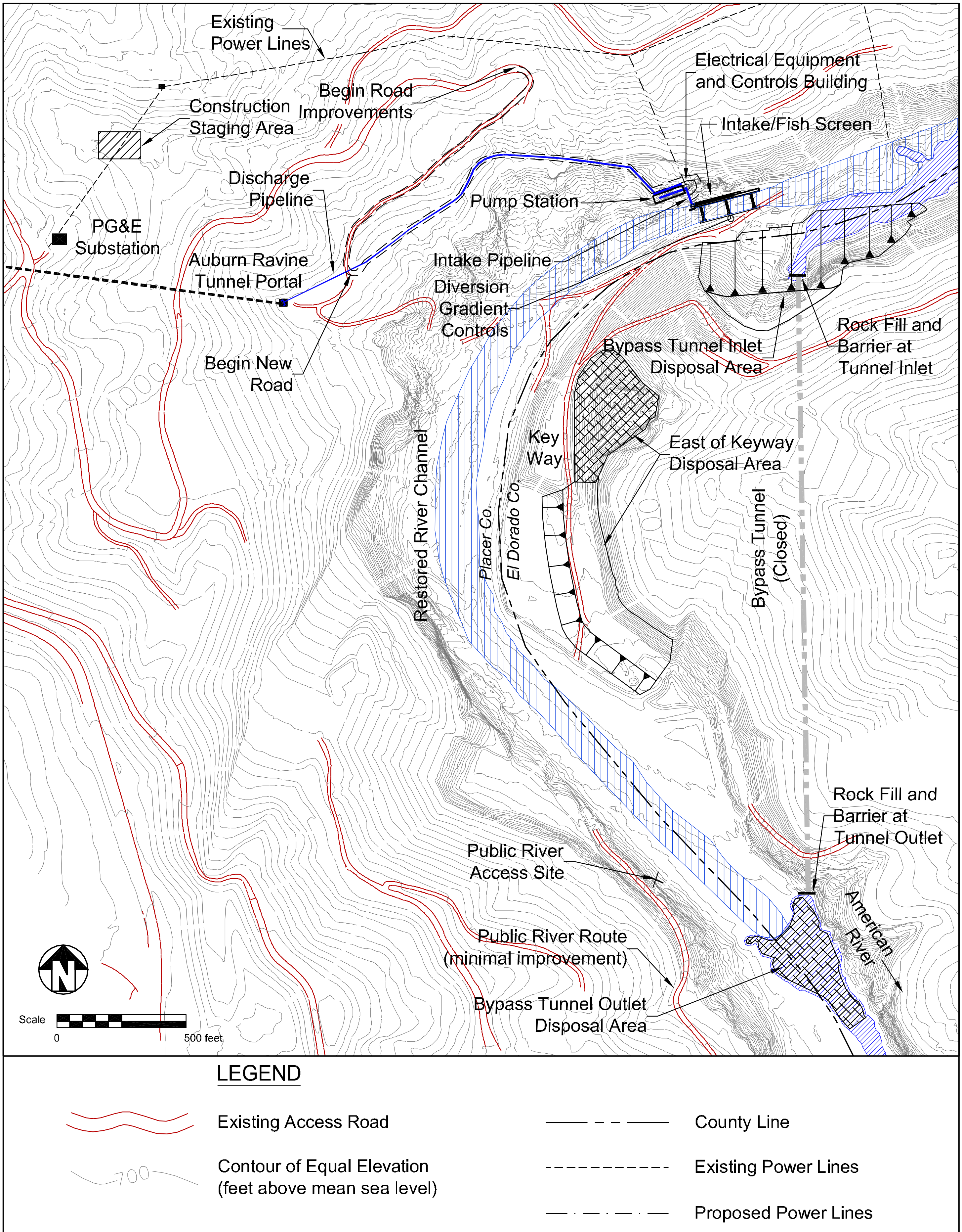


Figure 2-6 Major Features of the Proposed Project (Mid-Channel Diversion)

Source: CDPR, MW

Approximate Scale 0 800 feet

Figure 2-7 Public River Access Facilities at Auburn Dam Site and Oregon Bar (Proposed Project-revised)

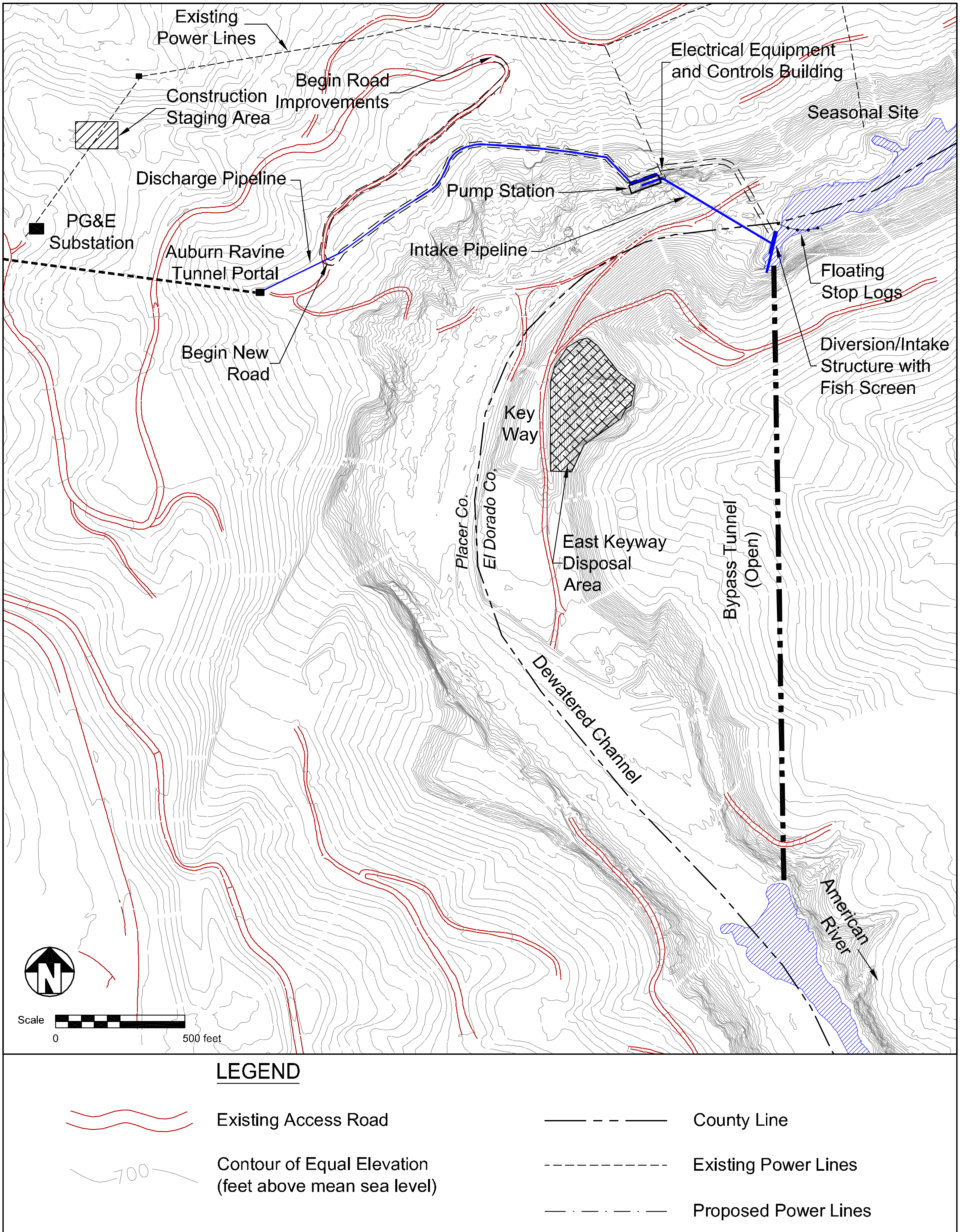


Figure 2-8 Major Features of the Upstream Diversion Alternative

30-foot barrier was placed at the entrance to the inlet, parallel to the river flow. CDFG determined that this method satisfied the requirements of the 2001 Streambed Alteration Agreement. The fish screen method for the seasonal pump station will need to be re-evaluated every one to five years as part of the Streambed Alteration Agreement. The screening method selected for implementation at the site would be assumed adequate to meet CDFG's permit requirements.

Under the No Action/No Project Alternative, PCWA would rely upon operation of the seasonal pumps for its MFP water supply; however, within the next few years, PCWA would request that Reclamation install the pumps earlier in the year as PCWA customer demands and overall reliance on the pump station increase. For purposes of analysis in this EIS/EIR, the seasonal pump station under the No Action/No Project Alternative would operate for eight months of the year, April through November, as shown in **Figure 2-9** and **Table 2-3**. This operational period was selected because it excludes the normal high river flow months of December, January, February, and March, when facilities would be at the greatest risk of flood-related damages.

Table 2-3
Diversion Pattern at the Seasonal Pump Station Under the No Action/No Project Alternative

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Thousand acre-feet (TAF) [a]	0	0	0	1.9	3.0	3.0	3.1	3.1	2.5	1.5	1.2	0
Annual Percent [b]	0	0	0	10.0	15.8	15.4	15.9	15.9	13.0	8.0	6.0	0

[a] Maximum TAF in a given month. Diversions would vary annually based on water supply, demand, and water delivery system operations.

[b] Approximate percent of total annual diversions. Diversions would be in compliance with existing agreements and permits governing upstream storage, water rights, minimum instream flow, and other conditions.

Reclamation and PCWA recognize that there may be years when river flows at the site would preclude installation of the pump station facilities as early as April and require removal of the facilities prior to November. The limitations of seasonal pump station operation would affect the reliability and amount of water supply available. These issues are discussed further in the evaluation of water supply issues in Section 3.4, Water Supply and Hydrology.

2.2.1.1 No Action/No Project Alternative Construction Schedule and Activities

Annual construction activities for the No Action/No Project Alternative generally would be unchanged from the existing condition, with the exception of the earlier installation and later removal of the facilities. Installation of the seasonal pump station facilities occurs over a four- to six-week period while removal of the structures is typically completed within two weeks. General construction activities include those associated with installing the pumps and above-ground transmission pipelines, dredging accumulated sediment from the intake pond and trench from the river to the pump plant, installation of a floating debris barrier across the entrance to the

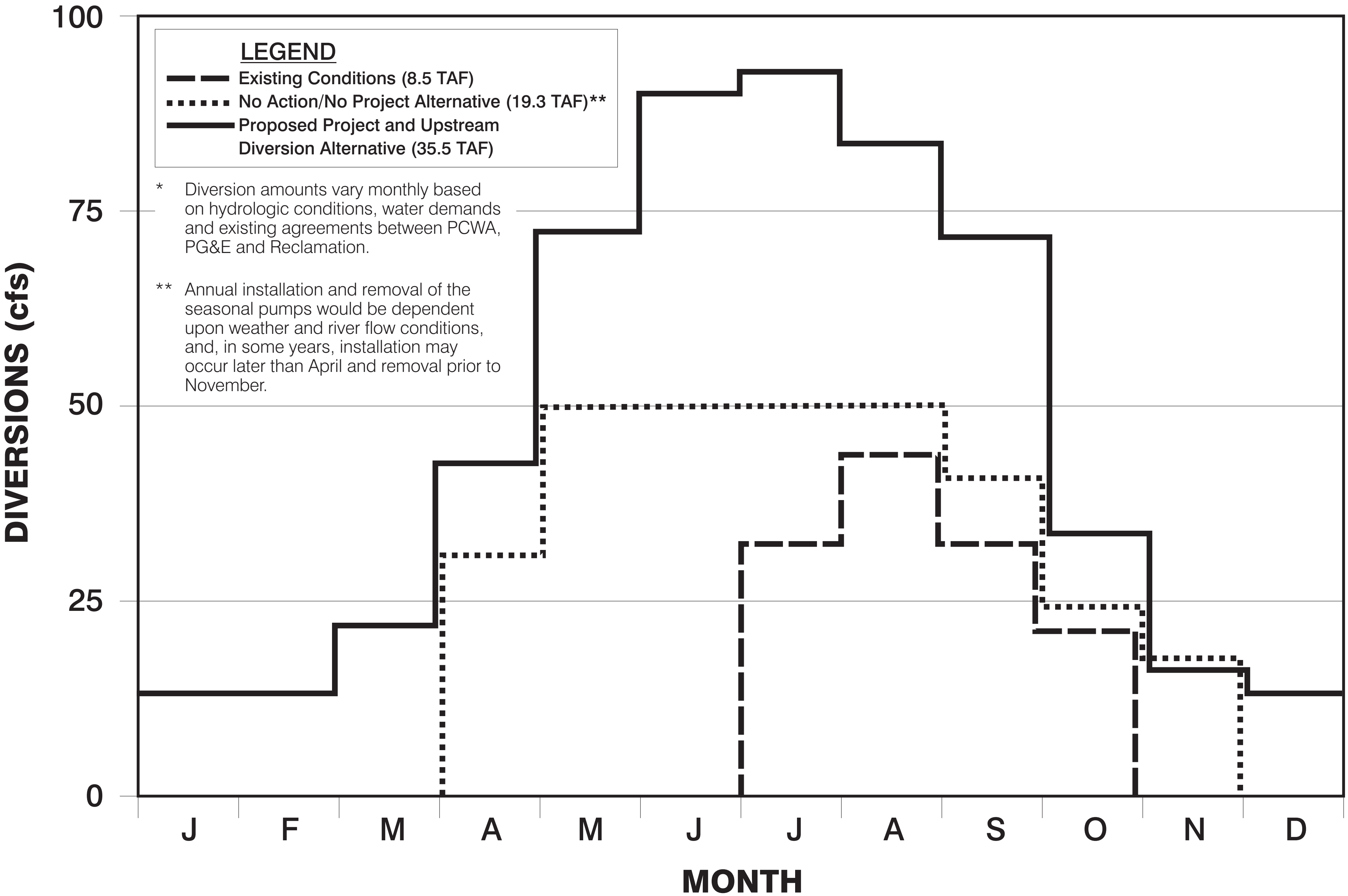


Figure 2-9 Estimated Diversion Patterns for Alternatives*

PCWA-043

inlet channel, and rehabilitation of project site access roads. These activities include implementation of construction Best Management Practices (BMPs) and terms and conditions of project permits, including a CDFG Streambed Alteration Agreement, Regional Water Quality Control Board (RWQCB) 401 Water Quality Certification, and U.S. Army Corps of Engineers (Corps) 404 Permit (Nationwide Permit No. 3). Turbidity levels are monitored twice daily during installation of the facilities per the 401 Water Quality Certification. Up to 200 cubic yards of material are removed from the sump pond and intake trench each year. These materials are typically placed above the high-water mark on a bench on the inside curve of the dewatered channel. Installation and removal of the seasonal facilities require few deliveries as the equipment and materials are either stored on-site or nearby at the PCWA maintenance yard (Maidu Drive). Typically, seasonal pump station facility placement and removal involves up to 15 construction workers at the site daily.

Table 2-4 shows the type and duration of construction equipment associated with annual construction for the No Action/No Project Alternative. Although the actual timing of installation and removal of the facilities would be influenced by weather and river flow conditions, it is assumed that installation generally would begin in March and removal would take place in late November or early December. It is expected that construction activities (equipment use and storage) would continue to occur in areas already disturbed either by the Auburn Dam-related construction activities or by previous seasonal pump station activities.

Table 2-4
Estimated Type and Duration of Construction Equipment and Activities for the No Action/No Project Alternative

Construction Equipment	Operating Hours		Number of Vehicles (Maximum)	Duration (Number of Weeks)
	Average Week	Maximum Week		
Bull Dozer	20	20	1	8
Loader	20	20	1	8
Backhoe	20	20	1	8
Pick-up Truck/Haul Truck	20	20	1	8
Crane	20	20	2	8

As presented in Table 2-2, under the No Action/No Project Alternative, the location of the seasonal pump station, intake/diversion, and associated facilities (pipelines, power lines, access roads), and configuration of the pumps would not change from the existing condition. There would be no provisions for future expansion by PCWA or GDPUD. There would be no removal of the cofferdam debris from the dewatered channel reach, and the bypass tunnel would remain open. Restrictions upon public river access would remain in place.

2.2.1.2 No Action/No Project Alternative Operation and Maintenance

Under No Action/No Project Alternative operations, PCWA would divert up to 50 cfs during April through November, following the diversion pattern in Table 2-3 and Figure 2-9, for a total volume of up to 19,300 acre-feet annually (AFA). Generally, No Action/No Project Alternative operation and maintenance activities would be similar to current activities.

For purposes of impact analyses, certain assumptions were identified for the No Action/No Project Alternative. These include earlier installation and later removal of the seasonal pump station facilities. Maintenance activities would include a daily site visit by the operator to inspect the pump station and diversion structure, and regular maintenance of the fish barrier.

The extended operational period would require some monitoring of river flows so that Reclamation would be prepared to remove the pump station facilities when the river approaches flows of 10,000 cfs. If river flows increase too rapidly and Reclamation is unable to remove the facilities in time, the pump station may be damaged by flood flows. High flows or flooding may require rebuilding of the sump pond and/or re-installation of the pump station facilities. Under these circumstances, the decreased reliability of the seasonal pump station would affect PCWA's ability to provide water supply within its service area.

2.2.2 PROPOSED PROJECT - MID-CHANNEL DIVERSION ALTERNATIVE

The Proposed Project would integrate the water supply intake features and river restoration components into the project design, thereby meeting all stated objectives (Table 2-1). The major features that would be constructed for the Proposed Project are summarized in Table 2-2 and shown on Figures 2-6 and 2-7. The estimated cost for construction of the Proposed Project would be $31 million. The pump station facility would cost approximately $18.1 million, bypass tunnel closure would cost approximately $1 million, and river channel excavation, including development of the public river access features would cost approximately $11.9 million. The following sections provide descriptions of the major features, construction activities, and operation and maintenance practices for the Proposed Project. These descriptions are based on preliminary design information evaluated in the Draft EIS/EIR as well as additional details developed in response to comments for the Final EIS/EIR. It is anticipated that further refinements would continue to be made during final design and in response to actual on-site conditions. However, it is anticipated that such adjustments would be minor and the analysis of the project area provided in the EIS/EIR adequately address site-specific resource issues that would be affected by construction and operation of the pump station facility. Any substantial change in the size or placement of project facilities would warrant reconsideration of environmental impacts in a separate document.

2.2.2.1 Major Features of the Proposed Project

The major features and activities associated with construction of the Proposed Project include:

- Construction of a new pump station, placed above the 100-year flood level;
- Construction of a water diversion/intake structure;
- Installation of a CDFG-approved fish screen;
- Closure of the Auburn Dam construction bypass tunnel;
- Restoration of flow to the American River channel;
- Installation of water conveyance pipelines;
- Improvement and development of all-weather access roads for project construction and operation;

- Extension of power supply lines; and
- Creation of public river access sites/safety features and related improvements at the Auburn Dam site and near Oregon Bar.

The Proposed Project evaluated in this EIS/EIR consists of increasing diversions from the American River from 50 cfs up to 100 cfs. Consistent with the project objectives (Chapter 1.0, Section 1.3), the design of the individual facilities would provide capacity for a future potential expansion diversion of up to 225 cfs. Sizing the facilities to accommodate the potential expanded diversion amount minimizes environmental effects and costs associated with meeting project objectives. The future expansion would involve installation of higher capacity pumps and increased diversion from the river, the details of which remain undetermined at this time. Expansion of the pump station and any increase of diversions above 100 cfs, including extension of infrastructure to GDPUD, would be subject to additional environmental review and resource agency approvals and permitting.

Pump Station

The pump station would be located on a stabilized bedrock bench, approximately 40 feet northwest of the intake structure (Figure 2-6). This structure would include an aboveground pump house and underground pump shafts connected to the intake pipeline (**Figure 2-10**). The pump house would be approximately 120 feet long, 30 feet wide, and 30 feet tall. The exterior would be composed of split-face concrete block of a neutral/earthtone color to blend with the surrounding environment and minimize glare. The structure also would insulate and reduce operational noise levels to 45 decibels (dB) at the nearest residential property lines, in accordance with the City of Auburn noise ordinance.

The pump station would contain five vertical turbine pumps on a raised steel platform. These pumps meet the operational criteria, require minimal underground construction and permit easy access for maintenance. The configuration would include four regular duty pumps (two at 38 cfs and two at 17 cfs capacity ratings) and one standby pump (38 cfs capacity).

The pump shafts would extend from the base of the pump house downward, through concrete-encased steel casing, to the intake pipeline at an approximate invert elevation of 478 feet msl. The pumps would lift water diverted to the intake pipeline and convey it to the discharge pipeline to the Auburn Ravine Tunnel.

Diversion/Intake Structures

The diversion structures provide the link between the water supply function and the river restoration elements of the Proposed Project. The diversion/intake structures would be located approximately 600 feet northwest of the bypass tunnel inlet, on the northern bank of the dewatered American River channel (Figure 2-6). This location was chosen because of its close proximity to the pump station, the relatively narrow channel width between the canyon wall and the cofferdam remnant, and hydraulic conditions that would minimize the accumulation of debris and sediment at the intake. The narrow channel formed by the cofferdam remnant creates a natural pooling of the river flow and permits control for the diversion. Creation of the diversion

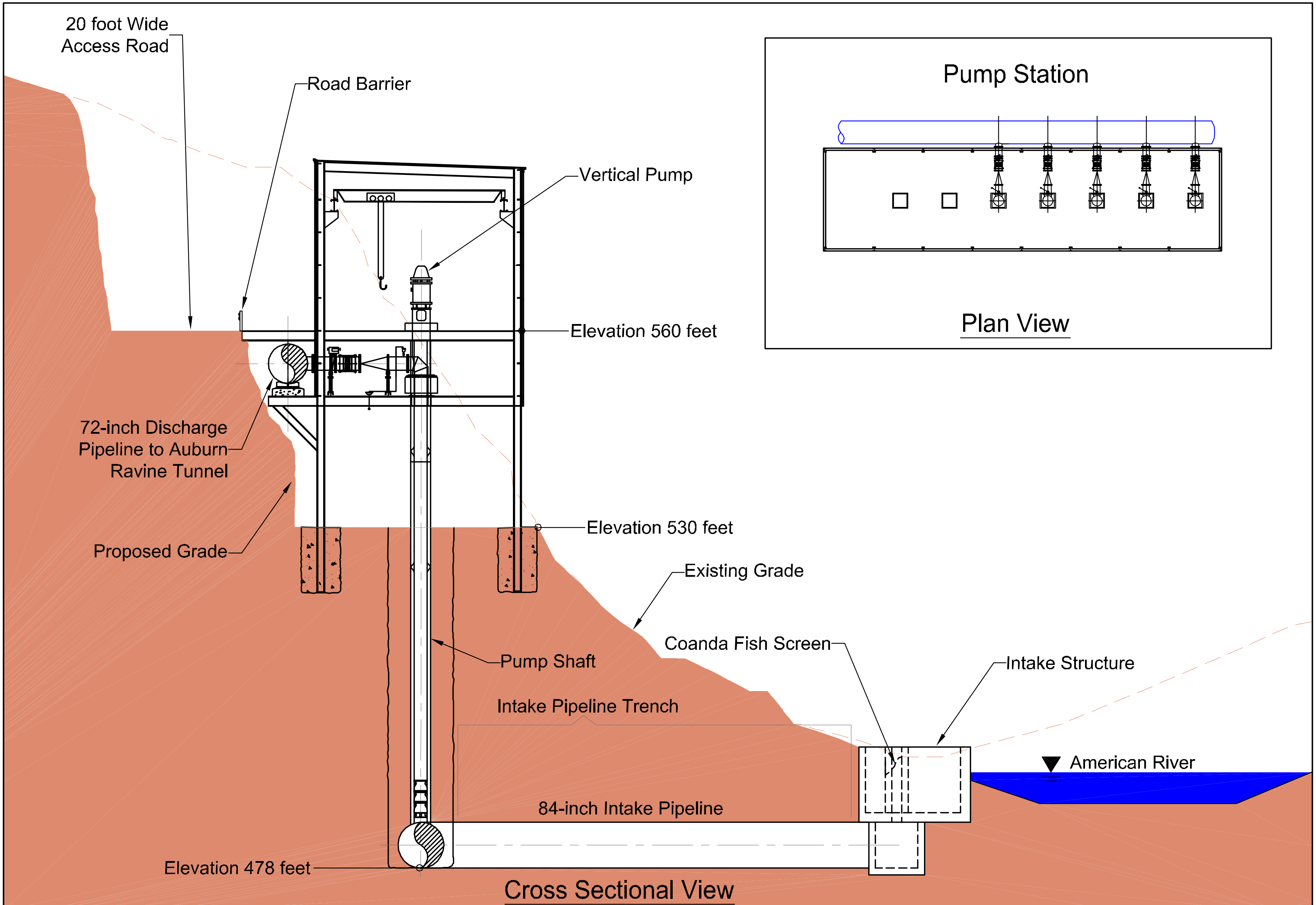


Figure 2-10 Relationship of Proposed Project Intake and Pump Station Facilities

structures would require excavation of breached cofferdam debris from the dewatered river channel and reshaping (grading) the base and sides of the channel to accommodate design flows. The structures would be constructed from a combination of boulders, grouted rock (possibly including cofferdam remnant materials), and possibly faux rock (concrete or other substance molded to look like natural rock formations). The structure would be approximately 1,000 feet in length and would provide the hydraulic drop required for proper functioning of the intake and safe passage of watercraft, even under low-flow conditions.

The main (river right) channel would contain the water diversion intakes. These intakes would be integrated into boat chutes whose geometry creates favorable hydraulics for recreational boating, such as standing wave and mild hydraulic jumps. The total drop of the secondary channel would be roughly 8 feet over a distance of approximately 400 feet. This would produce a bottom gradient of little more than two percent. The bypass channel would be separated by a berm (a rock divider), which would be overtopped during high water (about 4,000 cfs), thereby joining the two channels. The river left (east) bank adjacent to the diversion would be graded at a slope of 5:1 (or less) for some distance above the anticipated high water level of 4,000 cfs.

The primary water intakes would be located on the invert of the boat chutes. These intakes would be appropriately screened to prevent trapping boaters; the intake screening also would be approved by CDFG fish screen experts. A third boat chute would be constructed below grade, downstream of the two other boat chutes. Construction of this structure anticipates the lowering of the riverbed with time and would provide a variable transition for the diversion structure to the downstream riverbed.

The fish screen on the intake structure would prevent fish from entering the intake structure and protect them from injury or death. The design of the fish screen will be completed in coordination with CDFG fish screen experts. The final fish screen design would be subject to approval by the fish screen design experts at CDFG and would be designed to function over a range of stream flows and pumping rates and constructed to satisfy appropriate agency screening requirements.

River Channel Restoration

During construction of the Auburn Dam foundation, the river channel and canyon in the vicinity of the Proposed Project were drastically altered. A temporary earthen dam (cofferdam) measuring 257 feet high, 1,400 feet long, 30 feet wide at the crest, and 1,400 feet wide at the base, was constructed across the canyon. The Auburn Dam bypass tunnel (33 feet in diameter and 2,400 feet in length) was installed to route normal river flows around the dam construction zone. During the floods of 1986, water overtopped the cofferdam and, as designed, eroded the northwest section of the cofferdam, depositing millions of cubic yards of sediment and debris in the dewatered channel and in the river reach downstream of the bypass tunnel outlet (Reclamation 1996a). Except during high-flow conditions, when river flows exceed approximately 20,000 cfs, the entire flow of the river travels through the bypass tunnel and the dewatered reach of the channel remains dry.

The river channel restoration component of the Proposed Project incorporates several design elements with the overall goal of joining the dewatered segment of the river channel with the upstream and downstream river reaches to create, to the extent possible, a naturally functioning river system. The objectives of river restoration include:

- Development of a stable foundation for water supply diversion;
- Restoration of dewatered channel to appear and function like a natural river environment;
- Enhancement of fish and wildlife habitat; and
- Provision of recreational opportunities.

Implementation of the Proposed Project would satisfy the immediate need for water supply purposes. Within the near-term, the Proposed Project also would improve conditions for fish and wildlife and provide interim recreational benefits. Further enhancement of fish and wildlife habitat would occur over time as the channel and the surrounding environment respond to the returned river flows.

Water Supply Diversion

Location of the water supply diversion/intake within the dewatered river reach requires creation of a stable foundation for these structures and restoration of the channel to convey year-round flows and obtain predictable water elevations in this segment of the river. To accomplish this, approximately 700,000 cubic yards of cofferdam debris, alluvium, and large rocks would be excavated from the dry river channel. This material would be placed in various locations in the project area (Table 2-2 and Figure 2-6) to build and reshape the channel. Once the channel is re-formed, the bypass tunnel inlet and outlet would be closed and the river re-directed through the excavated channel. The bypass tunnel closure would prevent access to the tunnel and would be designed to blend into the surrounding landscape. Preliminary considerations for the closure involve placing sheet piles, sheet plates, reinforced concrete, and large rock across the face of both the inlet and outlet. These materials could be removed and the tunnel re-opened in the event the Auburn Dam Project becomes re-authorized.

Natural River System Functions

A key design goal for the restoration component of the Proposed Project is to imitate, to the extent possible, the appearance and form of a natural river channel, including the banks and floodplain benches. Placement of the excavation material (Figure 2-6) would be engineered and designed to accommodate anticipated natural processes and be visually and functionally compatible with river reaches up and downstream of the project site. Preliminary site-specific considerations that would be incorporated into the final design and implementation of the river channel restoration include:

- Sediment transport due to both past Auburn Dam activities and proposed river restoration;
- Bed and bank stability in light of the natural variability of erosion in the project area; and
- Range of flow conditions characteristic of the upper American River.

Fish and Wildlife Habitat Recovery and Enhancement

The premise for the recovery and enhancement of the project area ecosystem is that construction of channel, bank, and floodplain features that emulate, to the extent possible, the natural morphology and hydrology of a natural system would ultimately lead to recovery of the ecosystem. Therefore, design of the channel foundation features emphasizes physical non-uniformity to result in diverse water depths, velocities, and substrate complexity. The resultant physical and aquatic environment would eventually support a varied natural river and riparian ecosystem, including integrated fish passage.

The return of river flows to the historic riverbed would, over time, result in establishment of fish and aquatic resource and wildlife habitat thereby creating more favorable ecosystem conditions. The restored channel segment design would incorporate features to blend the project area segment with upstream and downstream reaches of the North Fork American River enhancing the existing degraded or "scarred" visual qualities of the area. Restoration of natural river functions, including growth of native vegetation species, is considered a long-range goal of the river restoration component. The river would be expected to scour pools and side channels and deposit finer sediments in localized backwater areas and overbank depressions. These areas eventually would be expected to provide suitable growing sites for willows, alders, and cottonwoods that occur in the canyon. It is assumed that vegetation would establish through natural seed recruitment as has been observed in certain areas of the project site.

Bank and slope erosion would be common for annual flows much less than the 100-year flood event, and passive restoration according to site potential would occur naturally once the disturbed areas within the project area stabilize in response to natural processes associated with channel formation and seasonal fluctuations in river levels. However, until the extent of floodplain inundation and other channel characteristics have been established, it would not be practical to implement a revegetation program because the benefits of these efforts may be lost during high water events. Reclamation, through implementation of the environmental commitments included in the Mitigation Monitoring and Reporting Program/Environmental Commitments Plan (Mitigation Plan) (Appendix D to the Final EIS/EIR), would monitor the area for natural vegetation growth and habitat establishment to determine whether adaptive resource management actions would be appropriate or needed in the project study area.

Recreation Opportunities

Restoration of the river channel would provide an opportunity for non-motorized boating (canoe, kayak, raft) through the project area. Design considerations for channel restoration would include the incorporation of diverse hydraulic features to enhance this part of the river, including drops, waves and eddies, similar to a natural river, and consistent with the character of the upstream and downstream river reaches. The diversion intake structures for the water supply intake would be integrated boat chutes (see Diversion/Intake Structures). Additionally, riverbank formation would include placement of materials to create eddies or gradual point bar slopes near access points for safe boat put-in and take-out (see Public River Access/Safety Features below). Generally, any features that would create hazardous conditions for recreationists would be avoided (such as uniform barriers across the entire channel).

Pipelines

The Proposed Project involves placement of large diameter pipelines between the intake structure on the riverbank to the pump station and from the pump station to the Auburn Ravine Tunnel portal. Construction of the pipelines would involve excavation of vertical-walled trench, placement of suitable pipe bedding material (i.e., gravel), and installation of the pipe. The pipeline routes would all be within or adjacent to proposed road alignments and are depicted on Figure 2-6.

Diversion/Intake Structure to Pump Station

A concrete pipeline would be constructed underground from the intake structure to the pump station. The concrete pipeline would be approximately 150 feet long and 7 feet in diameter. The pipeline invert would be set at an elevation of 478 feet.

Pump Station to Auburn Ravine Tunnel

A steel discharge pipeline would be installed in a trench under the project access road from the pump discharge manifold at the pump station to the Auburn Ravine Tunnel portal. This pipeline would be approximately 1,670 feet long and 6 feet in diameter. A reinforced concrete connection structure would be constructed to transition the pipeline into the tunnel.

Construction Access Roads and Project Operation and Maintenance Roads

Access to the site from the City of Auburn is by either Maidu Drive or Pacific Avenue. Both of these roads end at locked gates at the entrance to the Auburn Dam construction area. As depicted on Figure 2-6, the Proposed Project would create new roads and stabilize existing ones to provide year-round access to the project facilities, including the pump station, intake/diversion structures, and Auburn Ravine Tunnel portal. Maidu Drive would be the primary access route. (Please refer to Appendix C, Volume 1, Master Response 3.1.10, Project Access, for additional information.) Construction activity would include pavement of existing dirt and gravel roads. For new roads, extensive earthwork may be required in some places to remove existing debris or erosion spoils and stabilize the hillside.

Improvement of the routes for the public river access components would be through placement of crushed rock road base, rather than pavement (see Public River Access/Safety Features below and Figure 2-7).

Power Supply

Figure 2-6 shows both the existing and proposed power lines for the Proposed Project. Approximately 650 feet of new power line would be connected to existing lines to serve the project facilities. The power line would be designed in accordance with *Suggested Practices for Raptor Protection on Power Lines* (Olendorff et al. 1981). Line voltage would operate at distribution levels (i.e., 12 kilovolts).

Construction and River Restoration Excavation Material Disposal

The cofferdam debris and other earth and rock material removed during construction and river channel restoration excavation would be used in the project area. It is estimated that up to approximately one million cubic yards of material could be generated by these activities. The excavated materials would be placed to fill holes created during the original construction for Auburn Dam, close the tunnel, and along the river (Figure 2-6).

Past disturbances of the project site created a 75-foot deep hole near the Auburn Dam keyway, just west of the bypass tunnel inlet (Figure 2-6). The base elevation of the hole is estimated to be approximately 498 feet msl, which would be filled to an elevation of 575 feet msl, making the grade consistent with the surrounding ground surface. Approximately 90,000 cubic yards of material would be accommodated in this location.

Closure of the bypass tunnel inlet and outlet would include placement of excavated material in front of each sealed portal. At the inlet, approximately 30,000 cubic yards of material would be used to cover the sheet metal or stop-logs used to close the tunnel. The fill in this location would be graded and compacted to form a stable slope. At the outlet, another hole would be filled and material graded and compacted to seal the tunnel outlet. Approximately 20,000 cubic yards of material would be placed in this location.

The remaining excavated material, approximately 560,000 cubic yards, may be placed to form a bench along the east bank of the proposed river channel, south of the dam keyway. Preliminary design indicates that the face of the bench would be graded at an approximate 2:1 slope and the bench would have a top elevation of 670 feet msl.

Public River Access/Safety Features

The project area falls within the Auburn SRA, which is managed by CDPR under an agreement with Reclamation. Currently, to protect public health and safety, CDPR limits recreation use in the Auburn Dam construction area including one-half mile upstream and one-half mile downstream from the Auburn Dam foundation (Order #318-02-91). The order primarily restricts boating and other water-based activities due to the safety hazard of the bypass tunnel but permits equestrian use, hiking, and biking on selected trails that pass through the site.

Under the Proposed Project, closure of the bypass tunnel and restoration of river flows through the area would result in increased recreational demand and use in the immediate project vicinity and elsewhere within the Auburn SRA. In response to the anticipated increase in public use of the project area, the Proposed Project includes development of two limited public river access areas, one near Oregon Bar and one just upstream of the bypass tunnel outlet, as a temporary solution to permit safe public passage to and from the river. CDPR and Reclamation would develop long-term management plan alternatives as part of their update to the *Auburn State Recreation Area Interim Resource Management Plan* (CDPR and Reclamation 1992) to address other activities in the Auburn SRA. These efforts would take place over the next two to three years and include comprehensive management planning for the Auburn SRA. The planning effort would address the full range of resource use and management issues. This planning process would include public involvement and environmental impact evaluations that are outside of the scope of this project.

Proposed Project river access amenities include a gated entrance booth, road and trail improvements, a parking area at the Auburn Dam former batch plant site, a river-side parking area designated handicap-accessible, and sanitation facilities (restrooms and trash containers). The proposed facilities, consistent with management objectives for the area (CDPR and Reclamation 1992) would be relatively rustic and improved only to the level necessary to serve interim management needs including emergency vehicle access and public use of the immediate area. Figure 2-7 depicts the preliminary layout of these features.

The staffed entrance booth and gate would be located off of Maidu Drive, at the start of the existing main construction road. CDPR personnel would staff this station and provide oversight and management of recreation uses at the Auburn site and at Oregon Bar. Park rangers, aids, and volunteers would patrol the area and enforce park rules, control the hours of operation, and provide emergency assistance, as needed. Use of the area would be limited by the maximum capacity of the parking areas (up to 53 spaces). Hours of operation would be limited to daylight hours, but would permit afternoon boating associated with summer low-flow releases from the Oxbow Powerhouse. It is also a possibility, that initially, this river access may only be available on a seasonal basis.

Roads from Maidu Drive and to the proposed parking areas would be improved to permit travel by two-wheel drive vehicles. Generally, this would require grading, widening in some areas, including engineered cuts into side slopes, and placement of crushed rock road base to stabilize the surface and minimize erosion. Development of the roads would include stabilization of eroded slopes and installation of appropriate drainage control improvements (e.g., culverts, ditches) and creation of shaded fuel breaks for fire prevention purposes.

The existing road from the Auburn Dam former batch plant site to the river near the tunnel outlet would be improved as needed for access to the riverside turnaround and handicap-accessible parking spaces. The existing dirt road from the batch plant parking area to Oregon Bar would be improved as well. A vehicle turnaround would be created just east of the creek that empties into the North Fork American River at Oregon Bar to permit loading/unloading of boats and gear and space for vehicle movement to return up to the access road. This existing dirt road is currently the route of the Pioneer Express equestrian/pedestrian trail. This section is also called the Cardiac Hill Bypass Trail. To minimize potential trail and road user conflicts, a separate single-tack equestrian/pedestrian trail would be constructed from the turnaround near Oregon Bar to the former Auburn Dam batch plant. Wooden, metal, or rock barriers would be placed at the end of the turnaround to prevent vehicular travel on the pedestrian trail to the river (Figure 2-7). The distance from the river at Oregon Bar to the turnaround is approximately 500 feet. The section of new trail, from the turnaround at Cardiac Hill Bypass to the batch plant parking area, would be approximately 1,600 feet, or one-third mile. This trail would be available to river users to access vehicles parked at the batch plant. (It is noted that some of the improvements to the route between Oregon Bar and the former Auburn Dam batch plant parking area may be addressed through a remediation plan currently being prepared and implemented by the California

Department of Forestry and Fire Protection (CDFFP) and Reclamation to address environmental damage from fire-fighting related activities performed in 1999.)

Specific trail improvements would be provided to encourage and allow mixed recreation uses. The route from the Oregon Bar parking area to the turnaround location is currently used by equestrians. This use would continue to be accommodated along this route by widening of the trail and designation of the inside portion of the route for equestrian use only. A separate pedestrian trail would be provided from the form Auburn Dam batch plant parking area down to the river (Figure 2-7) to further minimize user conflicts. Minimal trail improvements also may be required for the portion of the path extending from the Oregon Bar turnaround to the river. Trail improvements would be made with hand tools to minimize the use of construction equipment in these areas.

In total, the two proposed parking areas would accommodate up to 53 vehicles at one time. CDPR staff would monitor use of the lots and limit entrance into the area based on parking space availability. If needed, a sign indicating that the parking areas are at capacity would be placed at the Maidu Drive/Auburn-Folsom Road intersection to minimize the number of vehicles that approach the facilities and then must immediately turn around. Parking enforcement also would include prohibiting roadside parking along project area roads or trails and a sweep of the parking areas prior to gate closure to determine whether all cars had exited the area.

The large parking area would be located at the upper flat area created by the former Auburn Dam concrete batch plant and storage yard (Figure 2-7). Preliminary plans for this location include designation of up to 50 parking spaces, animal-proof trash containers and restroom facilities. This location is approximately one-half mile from the bypass tunnel outlet access site and three-quarter of a mile from the river at Oregon Bar. Construction of this parking area would involve minimal grading and possibly placement of crushed rock. Signs or other guideposts also would be placed to clearly designate parking spaces. Large rock barriers would be placed around the perimeter of the parking area to designate boundaries and prevent off-road travel.

The second parking area for handicapped river users would be created just upstream of the bypass tunnel outlet, within the Auburn Dam construction site (Figure 2-7). This parking area would consist of three handicapped-accessible parking spaces, one of which would be van accessible. Development of this site may be through use of excavated material removed during channel restoration or other materials to build-up a flat bench area adjacent to the north bank of the river. Large boulders would be placed around the perimeter of the area to clearly mark the parking area and prevent motorists from driving into the river channel. Because this area would be subject to flooding during periods of high river flows, it would be designed to withstand periodic flooding. Extreme flooding events occasionally may result in the need to rebuild the parking area.

As part of the entrance gate development, CDPR would make improvements to the existing small parking area outside of the gate/entrance booth to provide limited parking for trail users who want to access the trails when the river access area is closed. This provision would better accommodate existing trail use parking and minimize the potential for roadside parking along the lower portion of Maidu Drive or other neighborhood streets.

Concrete slabs and animal-proof trash containers would be placed at the entrance station, batch plant parking area, tunnel outlet turnaround and Oregon Bar turnaround. Restroom facilities would be placed at the batch plant parking area and at the riverside and Oregon Bar turnaround areas.

Management of the public river access features would only provide day-use and would include enforcement of all rules and regulations to provide a safe, enjoyable experience for all recreationists as well as to minimize potential impacts to adjacent residential areas. Such activities include, but are not limited to, the following: (1) limited hours of operation; (2) prohibition of alcohol; (3) prohibition of open fires; (4) no overnight camping/parking or nighttime recreational vehicle use; and (5) enforcement of parking, speed limits, noise levels and litter regulations. Cars left unattended would be ticketed and then towed from the site if not removed or claimed.

Remnants from construction activity (e.g., pipe, wire and cables, and pieces of metal) would be removed from the site before it is opened for public use. The piles of rock would remain on site. Barriers and signs would be placed to discourage climbing. Existing wetland and associated drainages in this area would be protected and preserved as part of CDPR's resource management efforts within the Auburn SRA.

Georgetown Divide Public Utilities District Facilities

The design of the pump station accommodates future expansion to provide GDPUD up to a 25 cfs water diversion from this location. These facilities include a pipeline casing from the pump station, under the riverbed, to the east side of the restored river channel where it would be capped off and allow sufficient space within the pump station for a 25 cfs capacity booster pump. Initial construction would include a concrete pad for the booster pump, a take-off valve from the discharge pipeline, and the capped pipeline casing to the east side of the river. These facilities would be constructed as part of this project to avoid future and further disruption of the project area and riverbed after the river has been restored. GDPUD's ability to take water from this location would be dependent upon various "water exchange" agreements with PCWA and Reclamation. The details of such exchanges have not been worked out at this time. Additional environmental analysis and regulatory agency review would be required prior to installation of the booster pump facility and connection and transmission of water to GDPUD.

2.2.2.2 Proposed Project Construction Schedule and Activities

The Proposed Project would involve construction of all the major features described under Section 2.2.2.1. Construction of the Proposed Project would involve two phases over approximately 22 months. Phase I activities would begin in late 2002 and extend into spring 2004. Phase II construction would be initiated in spring 2003 and extend through summer 2004. Phase I construction would include access roads, initial site preparation, dry streambed excavation (rough grading) and construction of the pump station. Phase II would involve construction of the intake/diversion structure, fish screen, pump station sediment facilities, river gauging stations, standby power facilities, final channel grading, closure of the bypass tunnel and rerouting of river flows, and public river access improvements.

Table 2-5 shows the type and duration of construction equipment associated with construction of the Proposed Project.

Table 2-5
Estimated Type and Duration of Construction Equipment and Activities for the Proposed Project and Upstream Diversion Alternative

	Proposed Project				Upstream Diversion Alternative			
	Operating Hours		Number of Vehicles (Maximum)	Duration (Number of Weeks)	Operating Hours		Number of Vehicles (Maximum)	Duration (Number of Weeks)
Construction Equipment	Average Week	Maximum Week			Average Week	Maximum Week		
Compactor	50	120	6	42	25	60	2	17
Bull Dozer	182	300	8	45	42	140	4	20
Loader	80	80	2	29	20	20	1	4
Motor Grader	70	80	2	33	35	40	1	8
Paver	20	20	1	2	20	20	1	2
Pick-up Truck/Haul Truck	120	250	7	56	58	120	3	18
Roller	48	72	4	10	48	72	4	5
Scraper	480	600	15	13	120	240	6	7
Off-Highway Truck	320	360	9	35	20	20	1	17

2.2.2.3 Proposed Project Operation and Maintenance

Upon completion of construction and testing of the pump station, Reclamation would transfer the ownership of the facilities to PCWA, in accordance with the contract between PCWA and Reclamation to be executed prior to construction. PCWA would assume full responsibility for all operation, maintenance, and related activities associated with the pump station and operate such new facilities for the purpose of water supply. Reclamation would retain responsibility for all other operation and maintenance activities associated with the authorized Auburn Dam Project, and would have certain of those responsibilities performed by CDPR under its agreement to manage the Auburn SRA.

Operation

Under the Proposed Project, PCWA could divert up to 100 cfs for a total volume of 35,500 AFA following the diversion pattern in Figure 2-9 and in **Table 2-6**. Higher diversions would occur during summer and early fall months, May through September to meet customer demands, with lower diversions occurring during October through April.

Table 2-6 Diversion Pattern at Year-Round Pump Station Proposed Project and Upstream Diversion Alternative												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TAF[a]	0.9	0.9	1.5	2.7	4.5	5.5	5.7	5.2	4.4	2.2	1.1	0.9
Annual Percent[b]	2.6	2.6	4.1	7.6	12.6	15.6	16.0	14.6	12.5	6.1	3.1	2.6

[a] Maximum TAF in a given month. Diversions would vary annually based on water supply conditions, demand, and water delivery system operation conditions.
[b] Approximate percent of total annual diversions. Diversions would be in compliance with existing agreements and permits governing upstream storage, water rights, minimum instream flow, and other conditions.

In response to the public and agency comments on the Draft EIS/EIR, PCWA identified an operational change that would involve maintaining its North Fork American River water releases to Auburn Ravine as under the existing conditions instead of releasing additional North Fork American River water into Auburn Ravine in exchange for Yuba/Bear River water. Water diverted from the North Fork American River would now be conveyed to the PCWA water supply distribution system using a process called double-pumping. After being pumped from the North Fork American River, water would flow within the Auburn Ravine Tunnel, and from the tunnel would be pumped again into PG&E's South Canal by the Auburn Ravine Tunnel Pump Station. The water would then flow within the South Canal where it would be delivered to the Foothill Water Treatment Plant (WTP) (**Figure 2-11**). The American River water currently delivered to Auburn Ravine would remain within the limits of recent historical monthly maximum delivery rates, but there would be no increase or exchange with the PG&E Yuba/Bear River source.

Implementation of the Proposed Project would result in minor changes in PCWA's water releases from the MFP at Ralston Afterbay (Section 2.2.2.3), which must divert water from storage in the summer and, therefore, must increase the amount of water released at Ralston Afterbay in order to do so. Such changes include an increase (compared to existing conditions) in the amount of water released from Ralston Afterbay to meet the minimum 75 cfs bypass flow at the pump station and to ensure effective operation of the diversion/intake during low-flow conditions. Preliminary design information indicates that a minimum flow of 175 cfs may be required for optimum operation and maintenance of the pump station/intake system under the Proposed Project. The unregulated flows from the North Fork of the American River provide sufficient volume to meet this anticipated project requirement for most of the year; however, it is projected that PCWA may increase the minimum Ralston Afterbay releases in late summer months (June through October), relative to existing conditions. The net result during low-flow months would be that flows downstream of the diversion would be reduced by less than the diversion amount.

Additionally, as part of its commitment to the Water Forum Agreement (CCOMWP 1999), during dry years PCWA has agreed to release water from its MFP reservoirs to replace water to the American River (replacement water). As stated in its Water Forum purveyor-specific

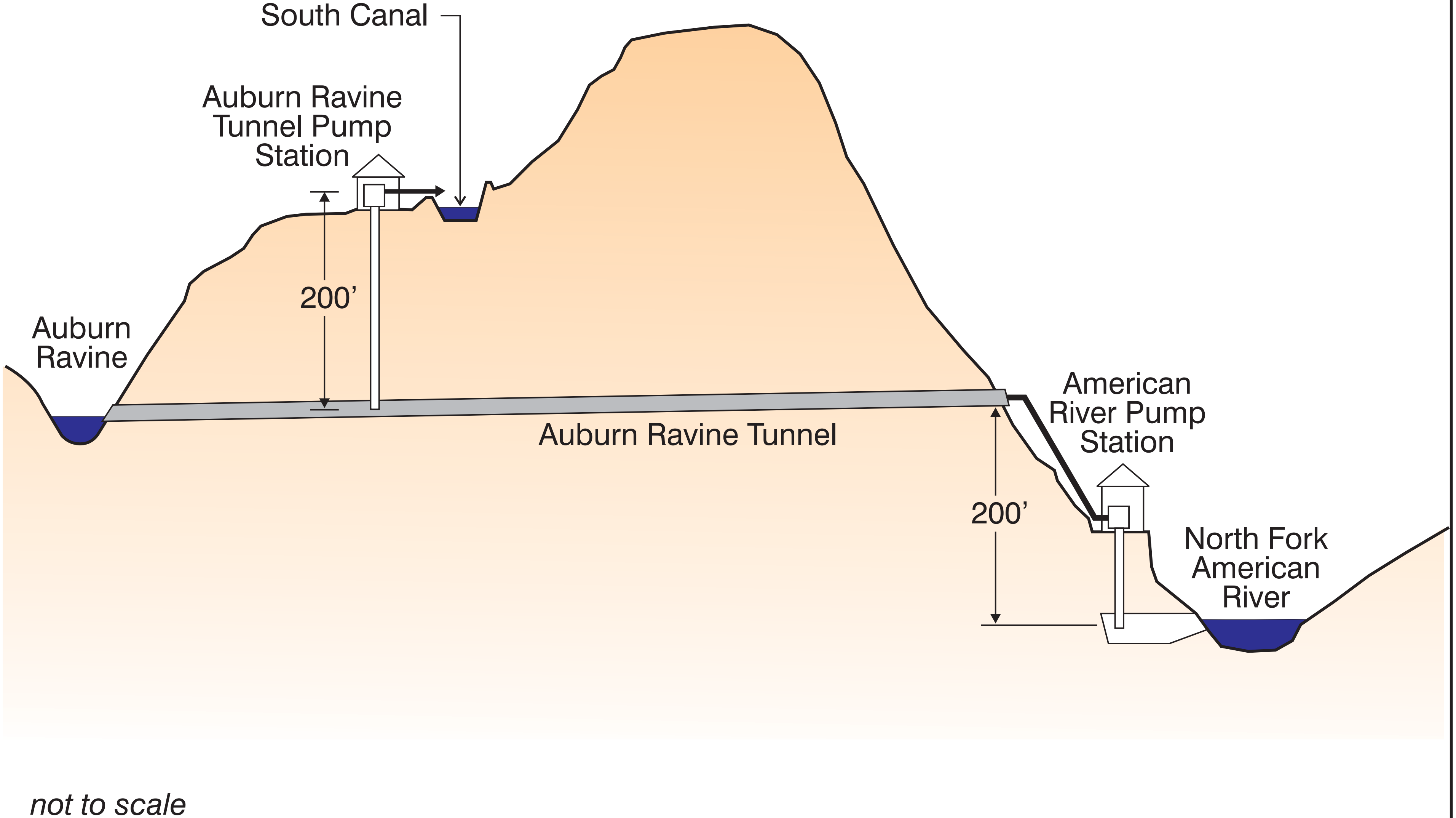


Figure 2-11 Hydraulic Profile of Water Deliveries from the American River Pump Station

PCWA-043

agreement, release of the replacement water would be contingent upon certain agreements with Pacific Gas and Electric Company (PG&E) and purchase of the water by a downstream entity. Arrangements related to these agreements are currently underway.

Dry years are defined as years when the projected March through November unimpaired inflow to Folsom Reservoir is less than 950,000 AF. The amount of replacement water released to the river is based on a linearly proportional amount with a maximum release of 27,000 AF when unimpaired inflow to Folsom Reservoir is at 400,000 AF. The Water Forum Agreement defines years when unimpaired inflow is less than 400,000 AF as conference years. In those years, PCWA and other Water Forum participants would meet to determine how the available water would be managed. The replacement water would be released for downstream use to meet environmental requirements and/or for use by other water purveyors, in accordance with their specific Water Forum agreements.

Facility Maintenance

Maintenance activities associated with the Project fall into three categories: basic; annual; and periodic or as needed. Basic maintenance includes daily visual inspection of the pump station and diversion structure to make sure they are operating properly. Annual maintenance includes seasonal inspection of the fish screen and diversion structures and removal of any objects that may interfere with proper operation of the diversion structure. Periodic, or as-needed, maintenance includes major maintenance activities such as inspections/removal of pump(s), clearing the river diversion inlet structure, and removal of any material that may be deposited against the diversion structure as a result of a major flood event.

Public River Access Maintenance

CDPR, through an agreement with Reclamation, would be responsible for maintaining the public river access features. Maintenance activities would include removal of trash and cleaning of restrooms on a regular basis; repair of damaged signs, as needed; and servicing of trails and access routes, as required. Road and trail maintenance may include regrading or placement of additional gravel on traveled surfaces, correction of erosion problems, clearing drainage ditches and culverts, and trimming of vegetation that encroaches upon the path, as needed.

2.2.3 UPSTREAM DIVERSION ALTERNATIVE

The Upstream Diversion Alternative would provide PCWA with a reliable, year-round diversion of its MFP water supply from the North Fork American River while alleviating Reclamation of its obligations to PCWA under the Land Purchase Agreement (Section 1.2.2). Additionally, the Upstream Diversion Alternative would provide the potential for future increased diversion capacity for PCWA as well as GDPUD (Section 1.3.6).

The major features that would be constructed for the Upstream Diversion Alternative include the water diversion/intake structures, including a fish screen to be designed in consultation with CDFG fish screen experts; water conveyance pipelines; a new pump station, placed above the 100-year flood level; all-weather access roads; power lines; and safety features. The Upstream

Diversion Alternative would site the diversion intake structure upstream of the bypass tunnel inlet. Locating the diversion upstream of the bypass tunnel would not require channel restoration or tunnel closure. The project area would remain closed to the public, except for authorized designated trail use. No additional public access facilities would be developed. The pump station location and associated facilities would be the same as proposed for the Proposed Project. These features are shown on Figure 2-8 and discussed below. The estimated cost for construction of the Upstream Diversion Alternative would be approximately $17 million.

2.2.3.1 Major Features of the Upstream Diversion Alternative

Many of the major features and activities for the Upstream Diversion Alternative would be as described for the Proposed Project (Section 2.2.2.1). Those features that are different for the Upstream Diversion Alternative, as compared to the Proposed Project, are described below.

Diversion and Intake Structure

The diversion and intake structure would be constructed approximately 100 feet upstream of the bypass tunnel, on the north river bank (Figure 2-8). The diversion structure would be constructed from earth and rock and extend between a natural high point in the river gradient and the proposed intake structure. During low-flow periods, the structure would create a pool in the vicinity of the intake allowing continued water diversion. A V-notch weir would be installed immediately upstream of the diversion structure, parallel to river flow for hydraulic gradient control. The intake structure would be constructed out of concrete and constructed along the west riverbank.

Pipelines

A seven-foot diameter pipeline would extend approximately 490 feet between the intake structure and pump station.

Excavated Material Disposal

Construction of the Upstream Diversion Alternative would result in the excavation of approximately 72,000 cubic yards of material. Under this alternative, all excavated material would be placed in the pit at the base of the eastern side of the Auburn Dam keyway (Figure 2-8).

Safety Features

The water-based safety hazards of the bypass tunnel are described in Chapter 1.0. The Upstream Diversion Alternative would include the placement of additional signs and buoys with cables across the river channel upstream of the bypass tunnel to warn people from entering the tunnel. The buoy line would direct recreationists to a flat location on the riverbank to exit the water. In addition to this feature, as part of the diversion structure, a flat-water pool area would be created in front of the bypass tunnel to provide one more opportunity for boaters or swimmers to exit the water rather than enter the tunnel. These features would reduce, but not eliminate, the potential safety hazard posed by the bypass tunnel.

2.2.3.2 Upstream Diversion Alternative Construction Schedule and Activities

Construction of the Upstream Diversion Alternative diversion intake structure, pump station, pipelines, roads, and associated activities would take approximately 21 months beginning in 2002 and ending by spring 2004. Table 2-5 shows the type and duration of construction equipment associated with construction of the Upstream Diversion Alternative.

Construction of the major project features would be similar to the methods described under the Proposed Project (Section 2.2.2.2), with the exception of treatment of the bypass tunnel and associated river restoration and public river access sites. Public river access sites would not be developed under the Upstream Diversion Alternative.

2.2.3.3 Upstream Diversion Alternative Operation and Maintenance

As described for the Proposed Project (Section 2.2.2.3), upon completion of construction and testing of the pump station facilities, Reclamation would transfer the ownership of the project facilities to PCWA. PCWA, in turn, would assume full responsibility for all operation, maintenance, and related activities for the project. The diversion amount and timing would be the same under the Upstream Diversion Alternative as described for the Proposed Project (Figure 2-7 and Table 2-6).

Overall, PCWA's operation and maintenance of the pump station facilities would be the same under the Upstream Diversion Alternative as described for the Proposed Project (Section 2.2.2.3).

2.3 ENVIRONMENTAL PROTECTION AND MITIGATION MEASURES

Implementation of the Proposed Project or alternatives would result in temporary construction-related impacts upon terrestrial resources, water quality, recreation activities, slope stability, ambient noise levels, air quality, and public health and worker safety. Additionally, operation and maintenance activities have the potential to affect wetlands vegetation and associated habitat, water quality, and cultural resources. Through the evaluation of potential impacts associated with the Proposed Project or Upstream Diversion Alternative, PCWA and Reclamation have identified several design considerations, features, practices, or plans that have been incorporated into the Mitigation Plan for the project (Appendix D to the Final EIS/EIR). The Mitigation Plan would be adopted by the lead agencies in accordance with regulatory requirements. The Mitigation Plan identifies compliance responsibilities, timing, documentation, responsible agency contacts, and reporting requirements to ensure that design and mitigation measures or other environmental commitments are successfully implemented.

Under the No Action/No Project Alternative, Reclamation would continue the annual installation of the seasonal pump station. Construction, operation, and maintenance-related impacts of the seasonal pump station activities would generally be the same as under the existing condition, with some exceptions, as noted in the analysis of Chapter 3.0. No formal environmental protection or mitigation measures have been identified for the No Action/No Project Alternative; however, it is assumed that Reclamation would continue to obtain the appropriate regulatory agency permits for the seasonal pump station and to implement appropriate terms and conditions to minimize environmental disturbances.

Construction activities would be conducted using standard BMPs to minimize environmental disturbances and impacts. The construction contractor would implement these measures with oversight by Reclamation, PCWA, and regulatory agencies, as appropriate. Reclamation, PCWA, and/or CDPR would be responsible for implementing operational and maintenance-related measures. PCWA and Reclamation, as the lead agencies for the project, would be responsible for ensuring compliance with the specific measures and related monitoring and reporting requirements.

In developing a final design, plans and construction specifications for project-specific construction-related environmental protection measures would be identified as the responsibility of the construction contractor to ensure environmental protection. The measures would be made part of the construction contract and would include provision for reporting and monitoring as appropriate for each measure.

The environmental protection measures identified and incorporated into the Action Alternatives' design, construction, implementation procedures, and ongoing management actions are identified below in **Table 2-7**. These measures are described in detail in the individual resource sections of Chapter 3.0 and in the Mitigation Plan (Appendix D to the Final EIS/EIR).

Table 2-7
Environmental Protection and Mitigation Measures

Fish Resources and Aquatic Habitat	3.1-1	Prevent Fish Entrainment and Impingement at the Water Supply Intake/Point of Diversion
	3.1-2	Avoid Impacts Upon Auburn Ravine Fish, Aquatic and Terrestrial (Riparian) Resources
Terrestrial Resources	3.2-1	Establish Buffer Zone to Avoid Disturbance of and Prevent the Permanent Loss of Riparian, Wetland and Pond Vegetation and Associated Habitat
	3.2-2	Minimize Impacts Upon State and Federal Special-Status Species in the Project Area
	3.2-3	Measures for Entrapped, Injured or Dead Special-Status Animal Species
	3.2-4	Restoration of Permanent Riparian, Wetland and Pond Vegetation/Habitat Loss

Table 2-7 (Continued) Environmental Protection and Mitigation Measures		
Water Quality	3.3-1	Removal of Construction Litter and Debris
	3.3-2	Construction-Related Water Quality Protection Measures
	3.3-3	Project Operation and Maintenance Water Quality Protection
	3.3-4	Minimize Water Quality Impacts From Increased Public Access
Recreation	3.4-1	Maintain Public Recreation Trail Access During Construction
	3.4-2	Avoid Recreation Trail Closures That Affect the Western States Endurance Run, Tevis Cup Western States Trail Ride or the American River 50-Mile Endurance Run
	3.4-3	Auburn-to-Cool Trail
	3.4-4	Minimize Trail User Conflicts Due to Increased Public Access
	3.4-5	Minimize Littering at Public River Access Locations
	3.4-6	Provide Disabled Access Parking Area
Visual Resources	3.5-1	Blend Project Features with Surrounding Landscape
Cultural Resources	3.6-1	Stop Construction Activities if Cultural Resources or Human Remains are Uncovered
	3.6-2	Develop and Implement Programmatic Agreement with State Historic Preservation Officer Regarding Potential Impacts at Shasta Reservoir
Transportation and Circulation	3.7-1	Develop and Implement a Construction Traffic Access Management Plan
	3.7-2	Provide Information Regarding New Public River Access
Air Quality	3.8-1	Minimize Ozone Precursor Emissions During Project Construction
	3.8-2	Minimize PM_{10} Emissions During Project Construction
	3.8-3	Minimize Potential for Disturbance of Asbestos and Exposure of Construction Personnel or General Public During Project Construction
Noise	3.9-1	Minimize Noise During Project Construction
	3.9-2	Minimize Operational Noise Levels by Enclosing Pumps
	3.9-3	Minimize Noise Levels Associated With Public Use of River Access Features
Public Health and Worker Safety	3.10-1	Minimize the Potential for Increased Erosion and Slope Instability During Project Construction
	3.10-2	Minimize Potential for Increased Exposure to Hazardous Materials or Fire Risk During Project Construction
	3.10-3	Remove All Construction-related Materials From Project Site Prior to Opening for Public Use
	3.10-4	Minimize the Risk of Public Exposure to Fire Hazards During Project Operations
	3.10-5	Prevent Vehicular Access in Undesignated Areas
	3.10-6	Minimize Inappropriate or Illegal Activities at Public River Access Locations
	3.10-7	Limit Public Access to Water Supply Facilities and Structures

2.4 SUMMARY OF THE ALTERNATIVES AND IMPACTS

The Executive Summary to the Final EIS/EIR, Table S-5, provides a summary of impacts identified in this EIS/EIR organized by resource topic and presents the results of the assessment of potential environmental impacts and mitigation measures of the Proposed Project and alternatives. Environmental impacts are grouped as either Facilities-Related Impacts or Diversion-Related Impacts. Facilities-related impacts are typically land-based and described as the direct, short- and long-term effects of constructing, operating and maintaining the facilities associated with each alternative. These effects generally are limited in geographic scope to the immediate project site footprint and, for some topics, portions of nearby communities. Diversion-related impacts are the direct, long-term water resource-based effects associated with PCWA's operation of a year-round pump station project and the associated increased diversion of MFP water rights water from the North Fork American River near Auburn, and the indirect, long-term effects associated with Reclamation's operation of certain CVP system facilities. Throughout the table, Cumulative Condition refers to the cumulative potential effects resulting from several reasonably foreseeable federal actions that over the next 25 years, would result in substantial changes in the CVP system operations and an increase of American River or Sacramento diversions for M&I and agricultural water supplies for use in the American River Basin. This includes providing increased water supplies to the lands within the service boundaries of water purveyors and includes lands within Placer, El Dorado, Sacramento, Alameda and Costa Contra counties impacts to environmental resources that could result from the collective actions associated with future planned urbanization.

The environmental setting and potential consequences of implementation of the Proposed Project and alternatives are presented and analyzed in detail in Chapter 3.0.

The No Action/No Project Alternative refers to continued installation of the seasonal pump station, as described in Section 2.2.1. The use of the term "Action Alternatives" in Table S-5 refers to an evaluation that applies to both the Mid-Channel Diversion and Upstream Diversion alternatives, where the consequences of either action would generally be the same. The Proposed Project is the Mid-Channel Diversion Alternative, as described in Section 2.2.2. The Upstream Diversion Alternative is described in Section 2.2.3.

The impact summaries are presented in comparison to both existing conditions and to the No Action/No Project Alternative to satisfy both CEQA and NEPA requirements. Additionally, an evaluation of the Cumulative Condition and the Action Alternatives' Incremental Contribution to the Cumulative Condition is provided. The Cumulative Condition represents a future scenario considering the timeframe of the Proposed Project and other local or regional projects that would have similar environmental effects within the project study area over the next 25 years. Assumptions regarding future probable actions within the regional and local areas of study were developed and are described in greater detail in Chapter 3.0, Section 3.3, Impact Assessment Framework and Methodology.

The American River Basin Cumulative Report (Appendix D to the Draft EIS/EIR) evaluates Reclamation's reasonably foreseeable CVP American River Division actions that, over the cumulative study period (2000 to 2025) potentially would result in substantial changes to CVP system operations and increased diversion from the American and Sacramento river basins for M&I and agricultural water uses within the American River Basin. This includes providing increased water supplies to the lands within the service area boundaries of water purveyors and includes Placer, El Dorado, Sacramento, Alameda, and Contra Costa counties. The Cumulative Report evaluation includes an assessment of potential water service area impacts upon terrestrial and other land resources within the regional study area. Refer to Appendix D of the Draft EIS/EIR for additional detailed information.

2.5 ALTERNATIVES CONSIDERED AND ELIMINATED

Table 2-8 summarizes alternatives considered and eliminated from further analysis. Potential alternatives were eliminated based on two primary criteria: (1) the alternative did not meet most of the project objectives; and/or (2) the alternative was technically, economically, or environmentally infeasible.

Table 2-8
Summary of Alternatives Considered and Eliminated from Further Analysis

Alternative	Reason for Elimination
Diversion Location	
❑ Diversion from an Auburn Reservoir/Dam	❑ Could not be completed within timeframe to meet PCWA's water supply needs.
❑ Bypass tunnel diversion variations using an underground intake tunnel or an intake pipe	❑ Economically and technically infeasible. Confined access to the intake structure could create safety hazards for maintenance personnel.
❑ Diversion from the western bank of the dewatered channel, approximately 3,200 feet downstream of the bypass tunnel inlet	❑ No environmental advantage. Wider channel reach would require larger in-river gradient structures and potentially less control of diversion flows; potentially higher sediment load and greater maintenance requirements.
❑ Diversion from a point upstream of the Auburn Dam construction site near Tamaroo Bar	❑ No environmental advantage. Nearly 8,000 feet of discharge pipeline would be needed for this alternative; site access would be more difficult.
❑ Sites other than Folsom Dam or Auburn Dam	❑ Economically infeasible. Additional costs make alternate location impractical.
❑ Diversion from Folsom Reservoir at various locations	❑ Economically infeasible; no environmental advantage. Excessively high costs for new pump station, intermediate booster pumps and pipeline.
Pump Station Location	
❑ Location on the western canyon wall, at elevation 705, down slope from the Auburn Ravine Tunnel	❑ Technically infeasible. This location has many spoil materials from construction of the Auburn Ravine Tunnel that could prove unstable.
❑ Location on top of the existing easterly remnant of the cofferdam at elevation 720, above the bypass tunnel	❑ Technically infeasible. Access to the site is difficult, and the pump station configuration for this site could lead to operational problems for pump equipment and would make maintenance difficult.
❑ Location above Tamaroo Bar	❑ No environmental advantage. Site access would be difficult and could present operational or maintenance difficulties.

Table 2-8 (Continued)
Summary of Alternatives Considered and Eliminated from Further Analysis

Alternative	Reason for Elimination
Pump Type	
❑ Submersible Pumps – Non-Clog, Deep Well, or Dry Pit Centrifugal	❑ No environmental advantage. These types of pumps are more costly than the selected pump type and have no environmental advantage.
❑ Vertical Mixed Flow Propeller	❑ Technically infeasible. This type of pump could not generate the lift necessary to move water from the intake to the Auburn Ravine Tunnel.
Safety Features	
❑ Create grated or fenced closure of the bypass tunnel inlet and outlet	❑ Technically infeasible; no environmental advantage. This could increase the safety hazard. During most flows, people and boats could become trapped against the grate/fence. It would be difficult to keep the structure free of debris.
❑ Excavate debris downstream of the tunnel to lower the tailwater on the bypass tunnel	❑ No environmental advantage. Risk of becoming trapped in the tunnel is not completely removed.
Other Water Supply Considerations	
❑ Reduce water demand through conservation metering	❑ Inapplicable. PCWA already implements 100 percent metering.
❑ Reduce water demand through aggressive fixture (shower head, toilet) replacement	❑ Does not meet most of project objectives. Limited potential for demand reduction. Not a reliable short- or long-term solution.
❑ Purchase replacement water from another source; including surplus water from neighboring districts	❑ Does not meet most of project objectives. Not a reliable (continuous) source of supply. Additionally, there are few available sources, lack of delivery systems, and would be costly to develop.
❑ Land fallowing or land retirement	❑ Excessive economic, social and environmental impacts because land converted from agricultural land would likely be converted for urban development, would represent a loss of open space and habitat (and, potentially endangered species habitat), and would displace farmers economically and socially.
❑ Use surplus Zone 3 contract supply	❑ Does not meet most of project objectives. Not a reliable (continuous) source of supply.
❑ Pump groundwater	❑ Does not meet most of project objectives. Not a reliable (long-term) source of supply.
❑ Use reclaimed water from City of Lincoln Wastewater Treatment Plant	❑ Does not meet most of project objectives. Not a short-term source of supply, and volume would be insufficient.
❑ Reduce water system losses	❑ Does not meet most of project objectives. Not a reliable (continuous) source of supply.
❑ Improve efficiency of water delivery system (pre- and post-customer delivery (e.g., pipe canals, increase raw water connection charges, restrict the maximum purchase amount, increase raw water rates for certain uses or for large quantities, provide technical assistance to customers regarding efficient water use))	❑ Does not meet most of project objectives. Not a short-term source of supply, and volume would be insufficient.
Sources: MW et al. 1998; Reclamation 2000	

2.6 PERMITS AND APPROVALS

Several laws and regulations that apply to the project require permits. Agencies and related permits or other environmental requirements are identified in **Table 2-9**. Final permitting requirements for the project were determined through agency review of the Draft EIS/EIR and other agency procedures.

Table 2-9
Anticipated Permits and Approvals for the Proposed Project

Agency	Permit or Other Environmental Requirements
California Department of Fish and Game	California Endangered Species Act [Fish and Game Code Section 2050 et. seq.] [a] Streambed Alteration Agreement (FGC S. 1601 et seq.)[b]
State Water Resources Control Board	Board approval to grant change in point of diversion under Water Rights Permits 13856 and 13858
Regional Water Quality Control Board	NPDES General Permit for Stormwater Discharges [Section 401 Water Quality Certification], [Section 402 Clean Water Act (33 U.S.C. § 1344)] [b]
U.S. Army Corps of Engineers	Section 10 of River and Harbor Act [33 U.S.C. 401-413] [a] Section 404 of Clean Water Act Nationwide Permit No. 27 [33 U.S.C. 1251 et seq.] [a]
U.S. Fish and Wildlife Service	ESA Section 7 requirements for fish, wildlife, and plants [PL 93-205; 16 U.S.C. § 1536] - Biological Opinion and Incidental Take Permit [a] Fish and Wildlife Coordination Act [P.L. 85-624; 16 CFR § 661-667] [a] - Fish and Wildlife Coordination Act Report
National Marine Fisheries Service	ESA Section 7 requirements for fish, wildlife, and plants [PL 93-205; 16 U.S.C. § 1536] - Biological Opinion and Incidental Take Permit [a] Magnuson-Stevens Fishery Conservation and Management Act. Consultation regarding potential project effects upon Essential Fish Habitat
Office of Historic Preservation	Reviews project for possible impacts to state and federal registered historical resources [Section 106 of the National Historic Preservation Act] [b] - Programmatic Agreement regarding mitigation of potential effects to unknown cultural resources.

[a] Permits or approvals that are expected to be required.
[b] Permits or approvals that could be required depending on final project design, construction methods, and other considerations.

Since publication of the Draft EIS/EIR, it has been determined that some of the permits preliminarily identified in the Draft EIS/EIR would not be required as a condition of project implementation. A Land Use Lease has been removed from Table 2-9 because the project area does not fall under the jurisdiction of the State Lands Commission pursuant to Section 6327 of the Public Resources Code which states that if a facility is for the "procurement of freshwater from and construction of drainage facilities into navigable rivers, streams, lakes and bays," and if the applicant obtains a permit from the local reclamation district, the Reclamation Board, Department of Water Resources, the California Debris Commission, or the Corps of Engineers of the United States, then an application is not required by the State Lands Commission. Similarly, according to the El Dorado County Grading Ordinance (Ordinance 3983), an El Dorado County Grading Permit is not required if the project is carried out by a public agency and/or the project is on federal land. Additionally, the project no longer foresees the need for a Placer County Air Pollution Control District Permit to Operate (Generator), as the design engineers have indicated that a diesel generator would not be used as part of the construction or operation of the alternatives.

Chapter 3.0
Affected Environment and Environmental Consequences

3.1 INTRODUCTION

This chapter of the Final Environmental Impact Statement/Environmental Impact Report (Final EIS/EIR) describes the affected environment and the environmental consequences of implementing the Proposed Project or other alternative as presented in Chapter 2.0, Description of Alternatives. This chapter also describes the analysis methodology, impact indicators, significance criteria, and results of the analyses used to determine the potential direct, indirect and cumulative environmental impacts associated with construction, operation, and maintenance of the Proposed Project or alternatives. Potential secondary effects that would occur due to urban development and growth within the water service study area is described in the Cumulative Report, Chapter 4.0, American River Basin Water Service Analysis (Appendix D of the Draft EIS/EIR) and incorporated by reference.

3.1.1 ENVIRONMENTAL ANALYSIS SECTIONS

The resource topics addressed by the Draft EIS/EIR were initially identified by the project team engineers, planners, and facility operators, through public and agency scoping meetings, and during preliminary consultations with regulatory and resource agencies. Sections 3.4 through 3.17 of this chapter provide an evaluation of the following resource topics:

- Water Supply and Hydrology
- Fish Habitat and Aquatic Resources
- Terrestrial Resources
- Water Quality
- Recreation
- Visual Resources
- Cultural Resources
- Power Supply
- Land Use
- Geology and Soils
- Transportation and Circulation
- Air Quality
- Noise
- Public Health and Worker Safety

Each resource section is organized into four subsections: Affected Environment, Environmental Consequences/Impact Analysis, Environmental Protection and Mitigation Measures, and Summary of Resource Impacts. The summary provides a comparison of the potential impacts of the alternatives and the net effect of the alternative considering incorporation of environmental protection measures. Section 3.18, Other Impact Considerations, provides an analysis and summary of additional impact considerations including:

- Indian Trust Assets (ITAs)
- Environmental Justice
- Essential Fish Habitat (EFH)
- Irreversible and Irretrievable Use of Resources
- Short-term Uses of the Environment Versus Long-term Productivity

In response to comments on the Draft EIS/EIR, Section 3.18 also includes a discussion of Climate Change. This, and other revisions or corrections made to the Draft EIS/EIR and incorporated into this Final EIS/EIR, are identified in Chapter 1.0, Section 1.4.4, Final EIS/EIR.

Section 3.19, Endangered Species Act (ESA) Compliance, provides information and analyses necessary for federal ESA consultations with U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). This section details how together the Draft EIS/EIR and Cumulative Report satisfy the ESA biological assessment requirements for use in the consultation and determination of effects on listed species.

3.1.1.1 Affected Environment

The Affected Environment discussions (Sections 3.4 through 3.17) provide a description of and characterize resource features of the regional and local environmental study area that may be affected by implementation of the Proposed Project or alternatives. The boundaries and considerations in determining these settings are described under Section 3.2, Project Study Area. Generally, the regional setting defines the indirect effect study area and the project area setting encompasses the local, direct effect study area.

The resources are described to characterize the affected environment and to serve as the California Environmental Quality Act (CEQA) basis for evaluation of potential impacts of the alternatives. The conditions described for the No Action/No Project Alternative provide the National Environmental Policy Act (NEPA) basis of impact analysis. The information is based on the best available information to describe historical, existing, and where appropriate, No Action/No Project Alternative conditions. Information was obtained through literature review, agency correspondence and consultations, and field data collection.

In addition to the research efforts, computer modeling was performed to establish the existing and No Action/No Project Alternative hydrologic and water resources conditions for the evaluation of potential effects due to the proposed increased surface water supply diversion. The models used include those developed by the U.S. Department of the Interior (Interior) Bureau of Reclamation (Reclamation) and the California Department of Water Resources (DWR), as described in Section 3.3, Impact Assessment Framework and Methodology. The hydrologic conditions under these simulations provide the basis of comparison and are described in the impact discussions.

3.1.1.2 Environmental Consequences/Impact Analysis

The Environmental Consequences/Impact Analysis sections describe the methods and results of the analyses used to determine the potential facilities- and diversion-related direct, indirect, and cumulative environmental impacts resulting from implementation of the Proposed Project or alternatives. The section is divided into several subsections including: Methodology; Applicable Laws, Ordinances, Regulations, and Standards; Impact Indicators and Significance Criteria; Impact Analysis; and Environmental Protection and Mitigation Measures. The summary of resource impacts and mitigation measures is provided in the Executive Summary (Table S-5).

Throughout the Chapter 3.0 diversion-related analysis, references are made to the hydrologic modeling results. Certain tables and graphs have been prepared to provide additional representation of the modeling results and comparison of simulated conditions. These figures and tables are included in Appendix H to the Draft EIS/EIR and are labeled by the appendix letter, resource section number, and sequence of occurrence in the discussion. For example, Table H-3.5-6 refers to a table presented in Appendix H of the Draft EIS/EIR in Section 3.5, Fish Resources and Aquatic Habitat, and is the sixth one indicated in that section. Appendix I to the Draft EIS/EIR is a CD that includes all of the modeling output used in the diversion-related impact analyses.

Methodology

The methodology discussion explains the process used to determine the resource condition, develop impact indicators and significance criteria, and evaluate the alternatives' influence on the resource. The methodology section also provides an explanation of how modeling results were interpreted for the assessment of potential impacts specific to the resource topic.

Applicable Laws, Ordinances, Regulations, and Standards

The regulatory framework, plans and policies, if any, under which the selected alternative would be implemented are described under this heading.

Impact Indicators and Significance Criteria

This section defines the indicators and criteria used to determine significant effects on the environment in the impact analysis. The significance criteria provide the basis for the EIS/EIR conclusions as to whether impacts would be significant. Impacts that do not exceed or violate the stated significance criteria described for each resource were assumed to be less than significant.

Impact Analysis

The impact analysis presents results of the assessment of potential environmental impacts of the Proposed Project and alternatives. The impact analysis is presented in two subsections: Facilities-Related Impacts and Diversion-Related Impacts. Facilities-related effects are typically land-based and described as the direct, short- and long-term effects of constructing, operating, and maintaining the facilities associated with each alternative. These effects generally are limited in geographic scope to the immediate project site footprint and, for some topics, portions of nearby communities. Section 3.3.1 describes the analysis framework and presentation of impacts for facilities-related aspects.

Diversion-related effects are the direct, long-term water resource-based effects associated with Placer County Water Agency's (PCWA) operation of a year-round pump station project and the associated increased diversion of Middle Fork Project (MFP) water rights water from the North Fork American River near Auburn, and the indirect, long-term effects associated with Reclamation's operation of certain Central Valley Project (CVP) system facilities. These effects are analyzed based on the results of the hydrologic modeling performed for the project. Fish and aquatic resources are further evaluated through the use of temperature and salmon mortality modeling. The diversion-related framework and modeling simulation comparisons made to evaluate existing and future conditions with and without the alternatives are described in Section 3.3.2 and in Appendix E, Hydrologic Modeling Technical Memorandum, to the Draft EIS/EIR.

Within each section of this chapter, the environmental impacts are numbered sequentially. For example, impacts in Section 3.4 are numbered Impact 3.4-1, Impact 3.4-2, Impact 3.4-3, etc. Each impact statement identifies the potential impact issue and area of concern. The discussion that follows the impact statement describes the substantial evidence upon which a conclusion is made as to whether the impact would be less than significant, potentially significant, or significant.

Environmental Protection and Mitigation Measures

The impact analyses indicate that the alternatives have the potential to result in potentially significant impacts to one or more resource categories. Environmental protection measures, including construction Best Management Practices (BMPs), considered feasible means of reducing potential resource impacts were incorporated into the design, construction and operation practices for the project. For some resources, additional mitigation measures have been identified to further reduce potentially significant effects to less than significant. These measures are summarized under this heading. Where no feasible protection or mitigation measures could be identified, impacts are identified as unavoidable. The Mitigation Monitoring and Reporting Program/Environmental Commitments (Mitigation Plan) has been completed and is included as Appendix D to this Final EIS/EIR. The Mitigation Plan would be included as part of the construction contractor specification package for the selected alternative.

Summary of Resource Impacts

Table S-5 in the Executive Summary of the Final EIS/EIR summarizes and compares potential impact issues and resultant significance of the impact for each alternative after incorporation of standard and feasible environmental protection and mitigation measures.

3.2 PROJECT STUDY AREA

The study area includes the following subareas: regional setting, project area setting, PCWA water service area, and American River Basin service area. These areas are described below. The full service area analysis is provided in the Cumulative Report (Appendix D of the Draft EIS/EIR).

3.2.1 REGIONAL SETTING

The regional setting area encompasses the Sacramento River and American River basin CVP and State Water Project (SWP) reservoirs and waterways, including the Sacramento-San Joaquin River Delta (Delta), that could be affected by Reclamation's changes in operation of the CVP or the Department of Water Resources' (DWR) changes in operation of SWP facilities. Changes in operations would primarily be due to annual water supply conditions as affected by system hydrology and increased demands. The resources within the regional setting area would not be affected directly by the construction, operation, or maintenance of the pump station project, and are therefore also considered to define the indirect effect study area. PCWA's increased diversion from the North Fork American River would, under certain conditions (water years), contribute to a reduction of inflow volume to Folsom Reservoir. Reclamation operates Folsom Reservoir as part of the CVP to meet water supply and environmental flow requirements within the American and Sacramento river watersheds. Folsom and Shasta reservoirs also are operated to meet water needs of the Delta. For these reasons, the Sacramento River (from the Trinity and Shasta reservoir facilities down to the Delta) is included in the regional study area. Changes in CVP operations as well as increased demands by SWP customers would potentially influence operations of Oroville Reservoir affecting resources there and in the Feather River below Oroville. Figure 2-1 shows the regional setting.

It was determined that Reclamation's reasonably foreseeable actions would not influence the management or operations of facilities of the Yuba or Bear rivers, or of the Cosumnes River. Additionally, no direct or indirect changes to the San Joaquin River would be expected due to changes in American River Division operations. Within the American River watershed, it was determined that PCWA's changes in operation of the MFP generally would not influence conditions at Hell Hole or French Meadows reservoirs or related waterways (i.e., Rubicon River, Long Canyon Creek), and that reoperation at Ralston Afterbay would be within historic operating ranges. Therefore, these water bodies, although within the study area, were not evaluated in any further detail.

The water-related resources that may be influenced by these operations (changes to reservoir releases, in-stream flows and water temperature) include water supply, fish and aquatic resources, riparian vegetation and backwater ponds, water quality, water-based and water-enhanced recreation, cultural and visual resources, and power supply. The resource descriptions for the water system components and associated waterways in the regional setting are provided in the Cumulative Report (Appendix D of the Draft EIS/EIR).

3.2.2 PROJECT AREA SETTING

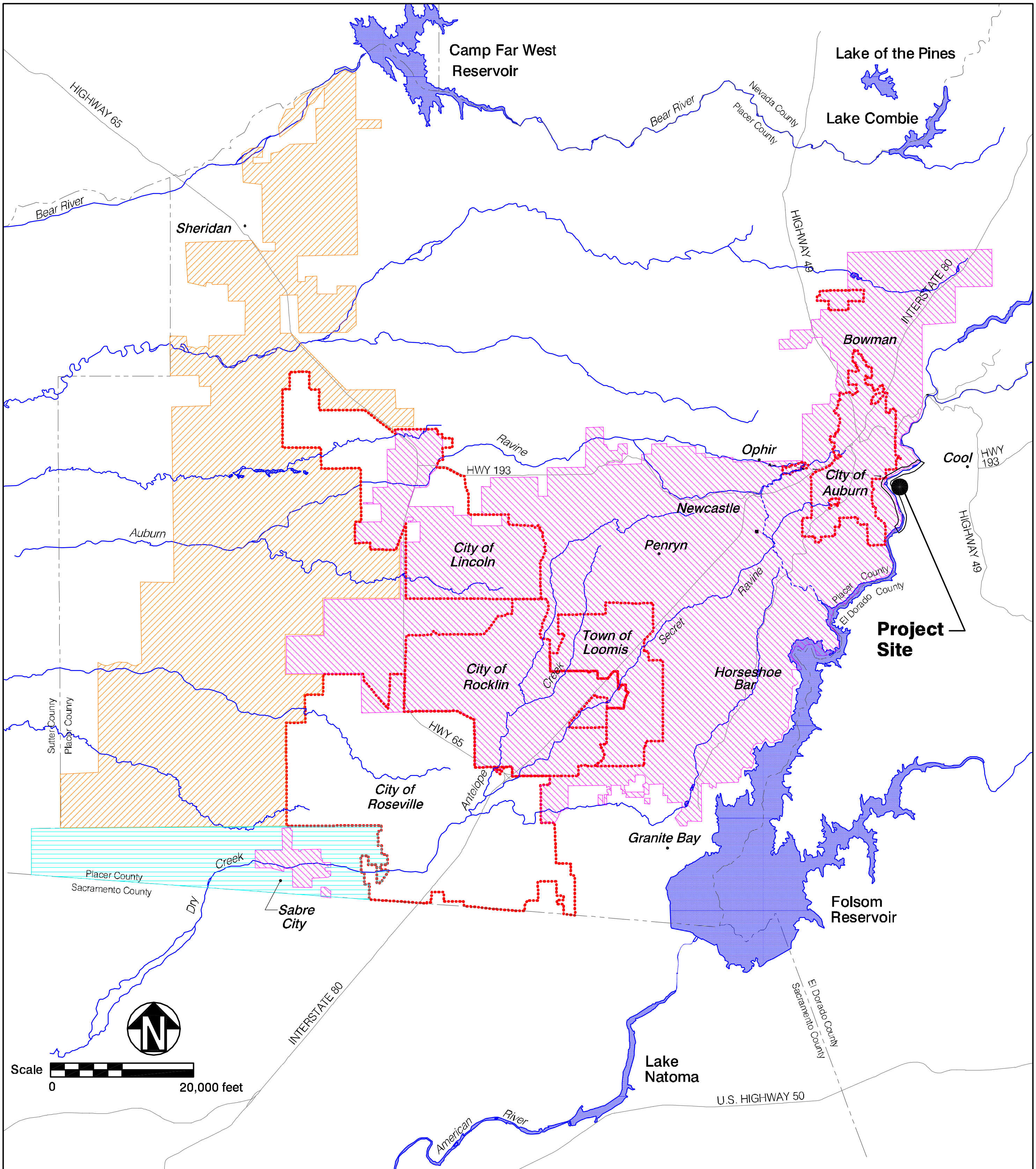
The project area setting represents the direct effect study area and encompasses all areas where the direct effects of construction, operation, and maintenance of the Proposed Project or alternatives would occur for a particular resource topic. Figure 2-2 shows the project area setting. Direct diversion-related effects on the upper American River (changes in river hydrology) would occur within the area between Ralston Afterbay and downstream to the Folsom Reservoir high-water line. At and downstream of Folsom Reservoir, changes within the CVP system are considered and discussed as part of the regional setting due to the indirect nature of these effects.

For land-based resource topics, such as geology and soils, the project area setting involves only the project construction zone and footprint of the project facilities. Figure 2-3 shows the project site boundaries. For other topics, such as visual resources and noise, the direct effect study area incorporates areas nearby and adjacent to the project site that may be affected by construction, operation, or maintenance activities. The extent of the direct effect study area is defined within the project area setting introduction for each topic.

3.2.3 PLACER COUNTY WATER AGENCY WATER SERVICE AREA

PCWA will continue to convey and deliver the MFP water diverted from the pump station to Service Area Zones 1 and 5 **(Figure 3.2-1)**. This water would be used to meet current needs, serve as back-up to the Drum-Spaulding Project water, and accommodate growth as projected in approved general, specific, and community planning documentation adopted for these areas of western Placer County. Water served to Zone 5 is primarily untreated and used to support agriculture. It is noted that American River raw water deliveries to Zone 5 (via Auburn Ravine) would not change from existing conditions. PCWA's proposed operational change, referred to as "double-pumping" is described in greater detail in Section 3.5, Fish Resources and Aquatic Habitat. Zone 1 includes the cities of Rocklin, Loomis and Auburn, and portions of the City of Lincoln, as well as the communities of Bowman, Horseshoe-Bar, Penryn, Newcastle, Ophir, Sabre City, and Granite Bay.

Implementation of the Proposed Project or alternatives would not directly result in land use changes within the PCWA water service study area. The Proposed Project or alternatives, however, would result in an increased availability of water supply that would support some level of planned growth within the service area and so is considered to be growth-accommodating. The secondary indirect effects of the provision of the MFP water supply within these zones is included in the Cumulative Report (Appendix D of the Draft EIS/EIR). The potential impacts associated with the supply of water from the Proposed Project or alternatives are evaluated at a program-level; a project-level analysis would follow as specific future facilities and developments are contemplated for construction. The land use decisions necessary to permit future urbanization in Placer County are made by city and county government authorities. PCWA has no land use authority over its service area and, therefore, does not have any jurisdiction over land use planning processes or development.



LEGEND

- PCWA Zone 1
- PCWA Zone 5
- California-American Water Company

Figure 3.2-1 PCWA's Water Service Area to be Served by the American River Pump Station Project

3.2.4 WATER SERVICE AREA FOR U.S. BUREAU OF RECLAMATION'S FUTURE CENTRAL VALLEY PROJECT ACTIONS IN THE AMERICAN RIVER BASIN

Reclamation has identified several reasonably foreseeable federal actions that, over the next 25 years, would result in substantial changes in CVP system operations and an increase of American River or Sacramento River diversions for municipal and industrial (M&I) and agricultural water supplies for use in the American River Basin. These actions include new and renewal CVP long-term contracts, Warren Act contracts for the use of federal facilities to obtain water rights water, agreements with Water Forum participants stipulating the conditions of dry year water use agreements, and various flood control projects (Folsom Reservoir), and infrastructure improvements, including the American River pump station project.

The Cumulative Report (Appendix D of the Draft EIS/EIR) provides a programmatic assessment of potential effects to environmental resources within the "service area" of water purveyors receiving water under new or renewal federal water supply contracts or otherwise facilitated by a federal action (Warren Act Contract, project funding or other discretionary approval).

The cumulative service area analysis evaluates the potential secondary, indirect effects of providing increased water supplies to lands within the service boundaries of the water purveyors and includes lands within Placer, El Dorado, Sacramento, Alameda, and Contra Costa counties where impacts to environmental resources could result from the collective actions associated with future planned urbanization. The determination of existing and future projected land uses was based on current general plans and input from local land use planning agencies.

The report evaluates potential land use, terrestrial vegetation and wildlife, fish resources and aquatic habitat, and other growth-related effects, including water quality, recreation, visual and cultural resources, power supply, flood control, and public services and utilities.

Detailed descriptions of Reclamation actions, associated service area and results of that analysis are provided in the Cumulative Report (Appendix D of the Draft EIS/EIR). The analysis is intended to provide an overview of potential changes within the American River Basin. Additional individual evaluations of specific purveyor water service areas would be required in project-specific environmental documentation and for resource agency consultations.

3.3 IMPACT ASSESSMENT FRAMEWORK AND METHODOLOGY

Implementation of the Proposed Project or alternatives is anticipated to produce two distinct types of effects within the local or regional setting: (1) direct impacts related to construction and operation of the facilities (such as noise); and (2) indirect diversion-related effects (such as changes in hydrology) resulting from the increased diversion of water from the North Fork American River. The facilities impacts are localized, and are mostly construction-related; the potential effects of increased diversions are long-term, and may affect environmental resources beyond the local project area. The general approach to the analysis of these topics is presented below. Additional topic-specific information is presented in each of the Methodology sections for the resources discussed in Sections 3.4 through 3.17. Service area impacts for PCWA and for the American River Basin study areas are discussed in the Cumulative Report (Appendix D of the Draft EIS/EIR).

3.3.1 FACILITIES-RELATED ANALYSIS FRAMEWORK

The EIS/EIR evaluates the specific environmental effects of construction of the facilities necessary to implement the pump station project and anticipated operations and maintenance practices. Generally, the approach for these analyses was to consider the type of construction, operation, and maintenance practices that would affect local resources. Information for these evaluations was collected through literature review, agency correspondence and consultation, and site surveys. Resource-specific methodologies are presented for each topic.

3.3.1.1 Presentation of Facilities-Related Impacts

The analysis provides a project-specific evaluation of how each alternative would affect the existing resources (as described in the Affected Environment section) under the following comparisons:

- No Action /No Project Alternative Compared to the Existing Condition
- Proposed Project Compared to the Existing Condition
- Upstream Diversion Alternative Compared to the Existing Condition

The impact indicators selected to evaluate the resource topics represent the potential impact issues. A discussion of each impact issue is presented for each alternative. The anticipated change that would occur under each scenario is compared against the significance criteria to determine whether the individual alternatives would result in a less than significant, potentially significant, or significant impact. In most instances, where a potentially significant or significant impact may occur, environmental protection measures to reduce environmental effects to less than significant have been identified and incorporated.

For many facilities-related issues, the No Action/No Project Alternative would not differ substantially from the existing condition. In instances where there are notable differences between existing and No Action/No Project Alternative conditions, the analyses under this heading also provide a discussion of Action Alternative impacts compared to the No Action/No Project Alternative. These comparisons are further highlighted in the impact summary table (Executive Summary of the Final EIS/EIR, Table S-5).

3.3.1.2 Cumulative Facilities-Related Impacts

The individual alternative comparisons are followed by a discussion of how the facilities-related effects of the Proposed Project or alternatives would contribute to cumulative conditions in the American River canyon and nearby communities. For this analysis, the effects of past, present, and reasonably foreseeable future projects were considered. Several agencies were contacted to determine the type and location of other projects that would be under construction or implementation within the timeframe of the pump station project and that may contribute to similar "facilities-related" effects. Other projects identified and included in the cumulative facilities-related analyses are described below.

Past Actions

Past actions within the project study area that have produced effects similar to environmental effects which could occur under the Proposed Project and alternatives include Auburn Dam construction and MFP development.

Auburn Dam Construction

Construction of the Auburn Dam foundation in the 1970s resulted in massive changes to the project study area. Two substantial modifications to the river canyon included installation of the bypass tunnel and construction of the earth-filled cofferdam. The bypass tunnel and cofferdam were used to dewater the dam construction zone. Additionally, canyon walls were cut and substantially modified to construct extensive foundations for the arch dam, power plant, tailrace, and service spillway stilling basin, and tributary creek canyons upstream and downstream of the site were filled with large volumes of excavated bedrock (Reclamation 1996a).

In 1986, several years after suspension of dam construction, a major flood overtopped and eroded away the northwest section of the cofferdam. An extremely large volume of water impounded behind the cofferdam poured through the failing section in a short period of time, with the instantaneous flow reaching several hundred thousand cubic feet per second (cfs) according to one estimation (Reclamation 1996a). An immense volume of dam-derived sediment filled the canyon floor up to 23 feet deep downstream of the breach and extending thousands of feet downstream. Large quantities of finer sediment were deposited further downstream and into Folsom Reservoir. Due to the instability of the river bed and presence of cofferdam materials, each new flood event reconfigures the canyon floor and river channel (Reclamation 1996a).

Middle Fork Project Development

In the mid-1960s, PCWA developed the MFP, a multi-purpose water development project designed to utilize waters of the Middle Fork American River and Rubicon River for irrigation, domestic and commercial water supplies, and hydroelectric generation. The project includes two reservoirs, five diversion dams, five power plants, and related facilities. The MFP is operated first to meet required fish flows, then to meet PCWA's water demands, and finally to maximize hydroelectric generation. Most of PCWA's MFP water is diverted from Folsom Reservoir and flows upstream are controlled by power production operations. Typically, flows are regulated by power generation water releases and, therefore, flows in the river are low during the night and early morning when electric demand also is low. Releases and river flow increase into the afternoon and evening as electrical use increases. The construction of the MFP has greatly altered the natural flow cycles of the Middle Fork American River, the Rubicon River, and the North Fork American River.

Present Actions

Present actions within the project study area which produce effects similar to environmental effects that could occur under the Proposed Project and alternatives include the annual installation, operation, and removal of the seasonal pump station; the PCWA/Sacramento Suburban Water District (SSWD, formerly Northridge Water District (NWD)) Groundwater Stabilization Project; and the development of camp sites at the American River Canyon Overlook Recreation Area.

American River Seasonal Pump Station

Reclamation has met its obligation to supply water to PCWA through the annual installation and removal of a seasonal pump station. Each spring Reclamation installs the seasonal pumps and then removes the equipment in late autumn to avoid damage from rain and high river flows (R. Hall, pers. comm. 1997). Often, installation of the seasonal pump station requires rehabilitation of access roadways, reinstalling pipeline from the seasonal pump station site to the Auburn Ravine Tunnel portal, and excavating/dredging the sump pond in front of the pump station's intake structure (Figures 2-4 and 2-5).

Placer County Water Agency/Sacramento Suburban Water District (formerly known as Northridge Water District) Long-Term Groundwater Stabilization Project

The PCWA/SSWD (NWD recently combined with Arcade Water District and renamed SSWD) project provides a surface water supply to SSWD from PCWA's MFP under its American River water rights as a means of stabilizing the regional groundwater aquifer. This surface water supply allows SSWD to curtail its historic and significant reliance on groundwater, thereby contributing to groundwater stabilization through the reduced withdrawals at, or near, the centroid of the groundwater cone of depression in this area. It also provides SSWD with greater conjunctive use opportunities, operational flexibility and reliability in meeting current and anticipated water needs, and perhaps provide water for portions of the service areas of McClellan Air Force Base, California-American Water Company (CAWC) (formerly known as Citizens Utility Company of California), and Rio Linda/Elverta Community Water District with part of this surface water supply.

To deliver water to SSWD, PCWA makes scheduled releases of MFP water that are diverted at Folsom Reservoir. Up to 29,000 AF are expected to be delivered to SSWD in this manner, subtly altering flows in the North and Middle forks of the American River including flows through the project study area.

American River Canyon Overlook Recreation Area Campground

The Auburn Recreation District (ARD) is preparing to develop a campground immediately south of the Auburn Dam Overlook. These grounds will include designation of up to 50 campsites accommodating up to 200 visitors. Peak use is anticipated to occur in spring and summer months. The campsites will be fairly rustic, walk-in sites. The ARD campsite would be accessed by Pacific Avenue and would be available for seasonal use when there is a campground host on site. Vehicles would park at the existing Auburn Dam Overlook parking lot and recreationists would hike to the designated tent sites. The ARD anticipates that very little earthwork will be required to create flat areas for tent sites. Picnic tables, trash containers, and portable restrooms will be provided. The site will be managed and maintained by ARD.

At the time when the Draft EIS/EIR was being prepared, it was believed that construction of the ARD campground would begin in the immediate future and that the site would be on schedule to open in 2001. This timeframe has been revised and the current expectation is for the campground to be completed by the summer of 2003. At present, the proposal is under environmental review and pending final board approval.

<u>Reasonably Foreseeable Future Actions</u>

Future actions within the project study area that could produce effects similar to environmental effects under the Proposed Project and alternatives include construction activities anticipated to take place within the same general timeframe as the Proposed Project (late 2002 through summer 2004) as well as future projects that would contribute to modification of the pump station and/or reoperation of the MFP.

Placer County Seismic Retrofit and Painting of Foresthill Bridge

Placer County Department of Public Works is in the early planning stages for two improvement projects involving the Foresthill Bridge. Seismic retrofit activities would include operation of heavy construction equipment (i.e., crane) within the North Fork American River canyon. The restoration activities (i.e., painting) also would involve the use of construction equipment, although these activities may avoid placement of vehicles within the river canyon. Related construction activities would include protective measures to minimize environmental impacts and protect river water quality. Implementation of these projects could coincide with the Proposed Project construction activities, depending upon the length of time required to complete planning studies and environmental review processes.

Georgetown Divide Public Utility District Folsom North Pumping Project

The Folsom North Pumping Project is intended to deliver water from the North Fork American River to Georgetown Divide Public Utility District (GDPUD). The project would utilize PCWA's proposed intake structure and year-round pump station. Water would be pumped from the North Fork American River by PCWA's intake and pump station, then conveyed through a pipe crossing the North Fork to an outlet in the eastern bank (El Dorado County side) of the river. New pipeline would be constructed by GDPUD from this outlet upwards along the canyon then proceeding to a new regulating reservoir of 60 to 100 acre-feet (AF) in capacity. An additional pipeline and small pump station would be used to convey water from the regulating reservoir to a new 2.0 to 2.5 million gallons per day (mgd) capacity water treatment plant in the community of Cool. The project would be operated conjunctively with GDPUD's existing Stumpy Meadows Project. The objective would be to fully utilize Stumpy Meadows Project water and to use the more expensive Folsom North Pumping Project only as necessary. As demands increase, the Folsom North Pumping Project would operate more frequently, diverting up to 5,788 AF by the year 2030. Water taken by the Folsom North Pumping Project would be served to GDPUD's Western Service Area, including the Cool and Pilot Hill areas and the peninsula between the North and South forks of the American River west of Highway 49.

The Folsom North Pumping Project would require the installation of an additional pump at the year-round pump station, a pipeline along to the eastern river bank, and also may require construction of an additional lift station. These facilities would introduce additional sources of noise into the canyon and would further alter the visual character of the project study area.

Placer County Water Agency American River Pump Station Expansion

As described in Chapter 2.0, Description of Alternatives, PCWA identified the potential future expansion of the pump station project from a capacity of 100 to 200 cfs to meet future anticipated demands for PCWA MFP water supplies. Such expansion would require additional CEQA documentation and public review, but physical changes to the project site would be limited due to the design of the Proposed Project. Specifically, space is included in the pump station housing to accommodate additional pumps to increase the pump station capacity in the future to 200 cfs. Such changes would have limited environmental impact to the project site, and would include some additional reoperation of MFP storage and hydroelectric facilities to provide sufficient water to divert up to 200 cfs at the project site. Such increases in releases would increase American River flows during low-flow conditions between Ralston Afterbay and the project study area.

Placer County Water Agency Ralston Afterbay Fish Habitat Improvements

PCWA is evaluating the feasibility of removing gravel from behind Ralston Afterbay Dam and placing it in the river downstream of the dam to improve fish habitat in this reach of the Middle Fork American River.

City of Auburn Development

The City of Auburn has identified several subdivision projects along or near Maidu Drive that are at various planning or development stages. Depending upon the timing of environmental review and permitting activities for these projects, one or more may coincide with pump station project construction.

Placer County Development

Various residential, commercial, and public works projects are anticipated to take place within the same general timeframe as the Proposed Project.

3.3.2 DIVERSION-RELATED ANALYSIS FRAMEWORK

Under the Proposed Project or Upstream Diversion Alternative, PCWA and Reclamation would construct a year-round pump station project capable of diverting up to 100 cfs for an annual water supply diversion of up to 35,500 AF. This diversion represents an increase of up to 27,000 AF over the existing condition (8,500 AF) and an additional 16,200 AF over what may be obtained under the No Action/No Project Alternative (19,300 AF). PCWA would reoperate Ralston Afterbay to ensure sufficient river flow at and below the pump station intake for the diversion as well as to meet minimum instream flow requirements. It is anticipated that such reoperation would only be required during low flow months when the unregulated North Fork flows do not satisfy flow requirements. In some years (dry water years) during low-flow periods, operation of the MFP would include additional releases from the upstream storage reservoirs, French Meadows and Hell Hole.

The diversion-related analysis addresses the potential effects of the operation of the alternatives on those resources potentially affected by changes in surface water hydrology and are based on comparisons made between computer model simulations that represent existing and future hydrologic conditions with and without the Proposed Project.

An overview of the computer simulation models used for analysis of alternative impacts, the simulations performed from which impacts were estimated, and the primary assumptions and model inputs used to represent hydrologic, regulatory, structural, and operational conditions is provided below. Detailed information is provided in Appendix E of the Draft EIS/EIR. Select representations (graphs, tables, charts) of the modeling results, as cited throughout the Chapter 3.0 impact analyses, are provided in Appendix H of the Draft EIS/EIR, Modeling Tables and Figures Cited in Chapter 3.0, Affected Environment and Environmental Consequences. Appendix I of the Draft EIS/EIR, the full set of modeling output for each simulation and comparison, is available on compact disk (CD). The CD may be obtained upon request through the lead agency representatives (see Cover Page for contact information).

3.3.2.1 Hydrologic Framework

The project site is located on the North Fork American River, upstream of the Folsom Reservoir high water line. Flows through the project area are a combination of North Fork and Middle

Fork flows. The North Fork flows are unregulated, while the Middle Fork flows are regulated by operation of the MFP. Folsom Reservoir, approximately 14 miles from the project area, is the most upstream CVP facility on the American River.

Both the CVP and State Water Project (SWP) store and deliver water for various purposes, including meeting water supply and environmental requirements. Flow levels in the lower American River are largely determined by Reclamation's operation of Folsom Dam, a component of the CVP. Flow levels in the Sacramento River and the Sacramento-San Joaquin River Delta (Delta) are governed largely by the integrated operations of the CVP and SWP.

Upper American River - Middle Fork Project

PCWA's MFP is a multi-purpose hydropower, water supply, irrigation, recreation, and water conservation project on the Middle Fork American River and includes the Rubicon River and other tributaries (Figure 2-2). It includes two large storage reservoirs, five diversion dams, five power plants, water transmission facilities, tunnels, and related facilities. The two large storage reservoirs of the MFP, French Meadows and Hell Hole, have a combined storage capacity of approximately 344,000 AF.

French Meadows Reservoir is situated in the upper Middle Fork American River watershed about 16 miles west of Lake Tahoe. A diversion tunnel with a capacity of 400 cfs also delivers water to Hell Hole Reservoir via the French Meadows Power Plant (DWR 1997). Hell Hole Reservoir is located about three miles southeast of French Meadows Reservoir on the Rubicon River. Water is released from these storage reservoirs downstream to Ralston Afterbay. Ralston Afterbay, located approximately 20 miles east of Auburn, is operated as a re-regulating reservoir for the MFP. The confluence of the North Fork of the Middle Fork and the Middle Fork American River is less than one mile downstream of Ralston Afterbay.

Approximately 20 miles downstream from this confluence is the confluence of the Middle Fork American River and the North Fork of the North Fork of the American River, near the crossing of Highway 49 over the North Fork of the American River near Auburn. The flows of the North Fork of the Middle Fork and the North Fork of the North Fork are unregulated. The flows of the North Fork of the Middle Fork are important to meeting the 75 cfs minimum instream flow requirements for downstream of Ralston Afterbay, specified in Article 37 of PCWA's Federal Energy Regulatory Commission (FERC) license (Federal Power Commission 1963), and agreed to by the California Department of Fish and Game (CDFG). The flows of the North Fork of the North Fork are important to meeting the 75 cfs minimum instream flow requirements established by State Water Resources Control Board (SWRCB) D1400, downstream of the American River pump station.

Central Valley Project and State Water Project Operation

The respective operations of the CVP and SWP are coordinated to manage streamflows in many Central Valley streams and the Delta. Many factors are considered in the operation of the CVP and SWP facilities. Releases from CVP and SWP reservoirs must be sufficient to achieve downstream environmental conditions such as flow, water quality, and temperature objectives.

These environmental conditions are required at various locations within the river system and in the Delta.

Considerations in determining the required releases include the diversions of CVP and SWP water contractors from the river system, diversions by non-CVP and SWP entities, the contribution of flow into the river system from streams not controlled by the CVP and SWP, the contribution of return flows into the system from agricultural drains and wastewater treatment plants, and operation of other projects. Environmental obligations must be met, and therefore in years of low water supply, reduction in water deliveries to some CVP and SWP contractors becomes necessary.

Lower American River

Reclamation operates Folsom Dam to meet the objectives and environmental obligations of the San Francisco Bay-Sacramento-San Joaquin River Delta Estuary (Bay-Delta) Water Quality Control Plan (WQCP), the biological opinions for winter-run chinook salmon, Delta smelt, and splittail, and the management of Central Valley Project Improvement Act (CVPIA) Section 3406(b)(2) water.

Additionally, efforts are underway to develop and implement a lower American River Flow Management Plan to increase the minimum release requirement for the river in conjunction with establishing an adaptive management process for Folsom Reservoir and lower American River operations, geared toward the protection and enhancement of fish species of priority management concern.

Sacramento River and Sacramento-San Joaquin River Delta

Instream flow objectives for the Sacramento River and the Delta are governed by state and federal laws and regulations established for the protection of fishery and aquatic resources. Requirements are defined in the following:

- SWRCB WQCP for the Bay-Delta
- NMFS Winter-run Chinook Salmon Biological Opinion
- USFWS Delta Smelt Biological Opinion
- USFWS Sacramento Splittail Biological Opinion

The Bay-Delta WQCP established measures to protect the beneficial uses of the Bay-Delta and includes objectives that influence the operations of the CVP and SWP. Some of these objectives (specific flow, temperature, reservoir storage, and diversion requirements) in the Sacramento River and Delta were developed through consultation with NMFS for the Biological Opinion for Winter-run Chinook Salmon. Reclamation currently operates the CVP in accordance with the 1993, as amended in 1995, Biological Opinion for Winter-run Chinook Salmon and Bay-Delta Plan. The delta smelt and Sacramento splittail biological opinions both concluded that operations as specified by the Biological Opinion for Winter-run Chinook Salmon and the Bay-Delta Plan would probably benefit these species.

Feather River

Minimum flows in the lower Feather River are established by a 1983 agreement between CDFG and DWR. The major provisions include minimum flow standards between the months of October and March for preservation of salmon spawning and rearing habitat, as well as streamflow reduction limits to prevent salmon redds from drying out (DWR 1994). In normal water years, the minimum flow requirement is 1,700 cfs from October through March and 1,000 cfs from April through September. Lower minimum flows are allowed in dry and critical water years. Additionally, the agreement does not allow for more than 2,500 cfs from October 15 through November 30. If the 2,500 cfs maximum flow is surpassed, the river must be maintained at 2,500 cfs from the point of initial violation through March.

Water Rights and Central Valley Project Contractors

Surface water rights in California are governed under a complex, hierarchical system administered by the SWRCB. Most surface water rights can be categorized either as riparian rights, which are attached to property that abuts a waterway, or pre-1914 or post-1914 appropriative water rights. Riparian and pre-1914 water rights are granted the prior right to use water; when these needs are met, post-1914 water rights holders are allowed to divert water. The priority of appropriative water rights holders is governed by the principle of "first in time, first in right." In other words, earlier (senior) water rights holders are allowed to appropriate water before junior water rights holders. The CVP (and SWP) hold post-1914 appropriative water rights from the SWRCB.

In order to resolve potential conflicts with the CVP, Reclamation entered into contracts with many senior water rights holders early in the CVP development. These settlement contracts recognize senior water rights and clarify the responsibilities of Reclamation and the other parties. Reclamation also has entered into long-term water contracts with various water purveyors (irrigation districts and municipal water agencies) for delivery of CVP water. These water service contracts are a type of wholesale agreement in which water is delivered to the CVP contractor subject to availability. Reclamation operates the CVP to meet environmental requirements and to accommodate diversions by settlement contractors and other water rights holders senior to the CVP. Water is delivered to Water Service Contractors to the extent that water is available in excess of these obligations, in accordance with allocation deficiency criteria.

3.3.2.2 Models Used for the Hydrologic (Diversion-Related) Impact Analysis

Computer simulation models of water systems provide a means for evaluating changes in system characteristics such as carryover storage, reservoir water elevation, river flow rate and power generation, as well as the effects of these changes on environmental parameters such as water temperature, early-lifestage chinook salmon survival, and recreational opportunities. The models used to evaluate the alternative operations include the following:

- Reclamation's Project Simulation (PROSIM) model of the CVP and SWP;
- DWR's Upper American River Model (UARM) of the major reservoirs and river reaches above Folsom Reservoir;
- Reclamation's American and Sacramento river water temperature models; and
- Reclamation's American and Sacramento river early-lifestage chinook salmon mortality models.

PROSIM provides a monthly simulation of the CVP and SWP water and power operations. Output from PROSIM serves as input to the temperature models that simulate monthly American River and Sacramento River water temperatures. Temperature model output serves as input to the early-lifestage chinook salmon mortality models.

PROSIM Model

PROSIM simulates CVP and SWP operations and the hydrologic effects of those operations on the major Central Valley river and reservoir systems. The model simulates system operations within the geographical area affected by CVP and SWP facilities, including the Delta. PROSIM Version 2000 was used in this study and incorporates modifications to code and data sets determined through resource agency consultations and coordination meetings held in 1999 and 2000.

PROSIM uses a mass balance approach to simulate the occurrence, regulation, and movement of water from one node (i.e., computation point) to another. Various physical processes (e.g., surface water inflow or accretion, flow from another node, groundwater accretion or depletion, and diversion) are simulated or assumed. Operational constraints, such as reservoir size and seasonal storage limits or minimum flow requirements, also are defined for each node. The model uses a monthly time step. Flows are specified as a mean flow for the month and reservoir storage volumes are specified as end-of-month content. Appendix E provides additional information regarding the PROSIM model and how it is used to simulate system operations.

Upper American River Model

The UARM simulates the American River system upstream of Folsom Reservoir by combining use of the U.S. Army Corps of Engineers (Corps) HEC-III Program for hydrologic routing and storage accounting purposes with a spreadsheet model that simulates operations of the MFP.

Temperature Models

Reclamation has developed water temperature models for five reservoirs (Trinity, Whiskeytown, Shasta, Oroville, and Folsom) and three river systems (Sacramento, Feather, and American). The models for reservoirs are distinctly different than the models for rivers. Because of the monthly time step and relatively small volumes, regulating reservoirs (Lewiston, Keswick, Thermalito, and Natoma) are modeled similar to river reaches rather than as storage reservoirs.

These models estimate mean monthly water temperatures based on flow and storage quantities simulated by PROSIM. They are used to identify changes in water temperature caused by changes in CVP and SWP operations.

Reservoir Models

Reservoir inflow, outflow, and end-of-month storage content as calculated by PROSIM is input to the reservoir temperature models. Additional input data include meteorological information and monthly temperature targets which are used by the model to select the level from which reservoir releases are drawn. Temperature control devices (TCD), such as the outlet control device in Shasta Reservoir, the temperature curtains in Whiskeytown Reservoir, and the penstock shutters in Folsom Reservoir, are incorporated in the simulation. Model output includes water temperature at each level in the reservoir as well as temperature of the reservoir release. The reservoir release temperature is then used in the downstream river temperature model.

River Models

The river temperature models utilize the calculated temperatures of reservoir release, much of the same meteorological data used in the reservoir models, and PROSIM output on river flow rates, gains and diversions. Mean monthly water temperatures are calculated at multiple locations on the Sacramento, Feather, and American rivers.

Automated Temperature Selection Procedure

The Folsom Reservoir and lower American River temperature models are utilized in an iterative manner referred to as the Automated Temperature Selection Procedure. This procedure operates the reservoir and river models with the objective of achieving multi-species fish monthly target water temperatures in the lower American River at Watt Avenue. Targets are achieved through choice of reservoir level from which the release is drawn.

Salmon Mortality Models

Water temperatures calculated for specific reaches of the Sacramento and American rivers are used in Reclamation's chinook salmon mortality models to estimate annual percentage mortality of early-lifestage chinook salmon. On the Sacramento River, a calculation is performed for each of the four chinook salmon runs: fall, late-fall, winter, and spring. On the American River, estimates are made for the fall-run chinook salmon.

Application of Modeling Output

The models used in this analysis (DWR's UARM, Reclamation's PROSIM, reservoir temperature models, American and Sacramento water temperature models, and the lower American and Sacramento river chinook salmon early-lifestage mortality models) are tools that have been developed for comparative planning purposes, not for predicting actual river conditions at specific locations at specific times. The 70-year and 69-year periods of record for PROSIM and temperature modeling, respectively, provide an index of the kinds of changes that would be expected to occur with implementation of a specified set of operational conditions. Reservoir storage, river flows, water temperature, and salmon survival output for the period modeled should not be interpreted or used as definitive absolutes depicting actual river conditions that will occur in the future. Rather, output for the with-project and the cumulative condition can be compared to that for the without-project condition to determine:

- Whether reservoir storage or river flows and temperatures would be expected to change with implementation of the project alternative;
- The months in which potential reservoir storage and river flow and temperatures changes could occur;
- A relative index of the magnitude of change that could occur during specific months of particular water year types, and whether the relative magnitude anticipated would be expected to result in impacts to fish resources within the regional area; and
- The relative degree to which alterations in operations of Folsom Dam and Reservoir, as directed by the principles of coldwater pool management, could eliminate or minimize temperature increases.

The models used, although mathematically precise, should be viewed as having "reasonable detection limits." Establishing reasonable detection limits is useful to those using the modeling output for impact assessment purposes, and prevents making inferences: (1) beyond the capabilities of the models; and (2) beyond an ability to actually measure changes. Although data from the models are output to the nearest 100 AF, tenth of a foot in elevation, tenth of a cfs, tenth of a degree Fahrenheit (F), and tenth of a percent in salmon mortality, these values were rounded when interpreting differences for a given parameter between two modeling simulations. For example, two simulations having river flows at a given location within one percent of each other were considered to be essentially equivalent. Because the models provide reservoir storage data on a monthly time-step, measurable differences in reservoir storage were evaluated similarly. Similar rounding of modeled output was performed for other output parameters in order to assure the reasonableness of the impact assessments.

3.3.2.3 Description of Simulations and Impact Analysis Comparisons

Model simulations were developed to represent existing and future hydrologic conditions with and without implementation of the Proposed Project. The simulations were then compared to identify the potential changes in the CVP/SWP hydrologic conditions (i.e., instream flow, reservoir elevations, end-of-month storage, and water temperature) that could influence environmental resources. The evaluation of environmental impacts was performed by considering the modeling results from the comparison in light of the impact indicators and significance criteria developed for each resource topic. Additional detail regarding the cumulative analysis is provided in the Cumulative Report (Appendix D of the Draft EIS/EIR).

Model Simulations

Five simulations were performed to meet the CEQA and NEPA analysis requirements for the project, as described below.

- Existing
- Proposed Project
- No Action/No Project Alternative
- Cumulative Condition
- Future Base

Modeling Simulation 1 - "Existing" - The Existing simulation represents the diversion at the seasonal pump station obtained under historical existing practices of installing the pumps in July, operating as needed throughout the summer (diversion rate of up to 50 cfs), and removal of the pumps in late October/early November. The historical maximum annual diversion amount for operation of the seasonal pumps is 8,500 AF.

The simulation represents existing hydrologic conditions within the CVP and SWP before the project is implemented. It includes existing surface water diversion and operation practices and policies (such as minimum instream flows, flood control, and Delta water quality standards) of the CVP/SWP. The modeling includes certain assumptions associated with accretion and depletions from the system which incorporates the exercise of water rights by non-CVP/SWP users.

The existing condition analysis satisfies CEQA requirements to evaluate a proposed project as if it were fully implemented under the existing environmental conditions. This comparison of the project to existing conditions is used to determine the potential significance of environmental changes that would occur with implementation of the Proposed Project or alternatives.

Modeling Simulation 2 - "Project" - The project simulation includes a year-round pump station with annual diversions of up to 35,500 AF. This simulation was conducted with all other CVP/SWP system demands at existing levels.

The simulation assumes implementation of PCWA's Purveyor-Specific Agreement from the Water Forum Action Plan (Water Forum 2000). Under this agreement, when projected March through November unimpaired inflow to Folsom Reservoir is less than 950,000 AF, PCWA will replace to the American River a portion of the water diverted at the pump station by reoperation of the MFP reservoirs (referred to as "replacement water"). The replacement would start when the unimpaired inflow is less than 950,000 AF and would reach a maximum of 27,000 AF when the unimpaired inflow is less than 400,000 AF. Replacement water operations were modeled as delivery to Folsom Reservoir from MFP reservoirs in equal monthly amounts during the months of March through September. The maximum replacement was 27,000 AF corresponding to a Folsom Reservoir unimpaired inflow of 400,000 AF. For a Folsom Reservoir unimpaired inflow between 950,000 AF and 400,000 AF, the replacement water is linearly interpolated between zero and 27,000 AF.

Modeling Simulation 3 - "Future No Project" - The Future No Project simulation represents the No Action/No Project Alternative and incorporates all reasonably foreseeable actions with the exception of a year-round pump station. The diversion pattern for this model simulation corresponds with the extended operational period where Reclamation would install the seasonal pumps during April and remove them in early November for an annual supply of up to approximately 19,300 acre-feet annually (AFA).

Modeling Simulation 4 - "Cumulative" - The Cumulative simulation includes all reasonably foreseeable future actions including implementation of either the Proposed Project or Upstream Diversion Alternative, increasing PCWA's pump station annual diversion up to 35,500 AF and providing replacement water up to 27,000 AF in dry years. This simulation includes future build-out demands by all purveyors, subject to delivery restrictions defined through known agreements such as the Water Forum, as well as any reasonably foreseeable system operational changes or environmental obligations. Consistent with the Water Forum, dry year restrictions defined in the purveyor-specific agreements are included in the modeling assumptions. This simulation represents the future with the project.

Modeling Simulation 5 - "Future Base" - The Future Base simulation represents the existing condition pump station diversion (8,500 AF) under hydrologic conditions and demands assumed to be in place in the future. This simulation is used in the evaluation of the project's incremental contribution to the cumulative condition (CEQA consideration).

Impact Assessment Comparisons

The following comparisons were performed to assess the potential environmental effects of the Proposed Project and alternatives. The name of the simulation is indicated in parenthesis after the name of the alternative or condition as used in the impact analysis.

Action Alternatives (Project) Compared to the Existing Condition (Existing). Required by CEQA to identify, in an existing context, the potential impacts and benefits of installing the proposed year-round pump station. A permanent pump station with an annual diversion amount of 35,500 AF was compared to continued use of a seasonal pumping facility with an annual diversion of 8,500 AF.

Action Alternatives (Cumulative) Compared to the No Action/No Project Alternative (Future No Project) in the Future. Required by NEPA to identify, in a future context, the potential impacts and benefits of installing the year-round pumping facility. A year-round pump station with an annual diversion amount of 35,500 AF (with replacement water up to 27,000 AF in dry years) was compared to continued use of the seasonal pump station over an eight-month period with annual diversions of approximately 19,300 AF.

Cumulative Impacts (Cumulative Versus Existing). Required by CEQA and NEPA to identify the cumulative impacts of all reasonably foreseeable actions related to the American River Basin. A year-round pump station with an annual diversion of 35,500 AF (with replacement water up to 27,000 AF in dry years) was compared to the existing use of a seasonal pumping facility with diversions at 8,500 AFA.

The simulation of the cumulative condition represents "probable future projects" considering the timeframe of the project and other water supply projects that would influence the American River system (including the Sacramento River and Delta). The Cumulative simulation includes the additional diversion amounts under the Water Forum Agreement (which includes the pump station project), American River diversion CVP long-term contract renewals, and other potential future system-wide actions (out-of-basin CVP and SWP demands and increased Sacramento Valley demands).

Incremental Contribution to the Cumulative Condition (Cumulative Versus Future Base). The evaluation of the project's incremental contribution to the cumulative condition is based on a comparison between predicted CVP operations in the cumulative condition (2025), and a future base condition (essentially future without the project where the pump station diversion is maintained at the existing level of 8,500 AFA).

3.3.2.4 Modeling Assumptions

Assumptions and parameters used in the simulations are summarized in Appendix E of the Draft EIS/EIR, Table 1 and described briefly below.

Period of Record

The period of record used in the hydrologic modeling (UARM and PROSIM) extends from October 1921 through September 1991 (70 years). The period of record used for water temperature modeling and the associated simulations for early-lifestage chinook salmon mortality extends from 1922 through 1990 (69 years) because the temperature model operates on a calendar year, rather than a water year basis. These periods are considered representative of the natural variation in climate and hydrology experienced in the Central Valley during recent times, and include periods of extended drought, high precipitation and runoff, and variations in-between.

Hydrology/Level of Land Use

The hydrology used is based on DWR Bulletin 160-98. The existing condition uses a 2000 level of land use, estimated as a linear interpolation between 1995 and 2020 land uses. The hydrology used for the future condition (2025 system demands) is consistent with the 2020 land use projections.

Demands

Modeled demands for water diversion are based on contract amount, historical use, the CVPIA Programmatic Environmental Impact Statement (PEIS), and the Water Forum Agreement (Water Forum 2000). The modeled demand associated with each water purveyor is provided in Appendix E of the Draft EIS/EIR, Tables 2 through 5.

Existing condition demands were updated from the assumptions in the CVPIA PEIS and Water Forum evaluations and represent 2000 demand levels. Future condition demands are based on system demands projected for 2025. Demands that change between existing conditions and future conditions include purveyors in the American River Basin, East Bay Municipal Utility District (EBMUD), Contra Costa Water District (CCWD), and the SWP.

CVP project demands are modeled based on the conditions that apply to the four classes of contract type: agricultural, M&I, Settlement and Exchange Contractors, and refuges. SWP demands are simulated as defined and referred to by DWR's Office of Planning.

American River Basin

Water demands estimated for the American River Basin are summarized in Appendix E of the Draft EIS/EIR, Tables 2 and 3. Included in these tables are diversions from the Sacramento River that serve land in the American River Basin. Water Forum participants' agreements to incrementally reduce diversions in dry years are indicated in the tables and included in the modeling.

Facilities and Operations

Assumptions regarding CVP system facilities and associated operations, including flood control and temperature management, are explained in Appendix E, and displayed in Appendix E of the Draft EIS/EIR, Table 1.

Central Valley Project and State Water Project Allocation

Reclamation operates the CVP to balance many competing objectives, including water quality, fish and wildlife protection, irrigation and domestic water supply, hydroelectric power production, and flood control. In some years, the demand for water exceeds available supplies, and Reclamation must adjust its allocation of water among the uses. Authorizing legislation, statutes, regulations, and agreements guide Reclamation's decisions in determining water allocations. Similarly, DWR balances the SWP's many competing objectives.

One of the critical operating decisions for the CVP and SWP is the annual water supply allocation. When specific water supply indices indicate an insufficient amount of water supply to meet all demands, allocation deficiencies are imposed depending upon the contract type. The Settlement and Exchange Contractors and the CVP wildlife refuges receive either 100 percent (normal and wet years) or 75 percent (critical years) allocation based on the Shasta Index.

The remaining, and majority, of CVP contracts receive allocations on a sliding scale based on a comparison of forecast demand and supply for the March through September period. As the simulation is run, PROSIM compares water demand and available water supply for the March through September period. If the supply is greater than the demand, a full allocation is made. If the supply is less than the demand, allocations are reduced incrementally in response to the severity of the simulated shortfall. CVP M&I contracts receive allocations ranging from 100 to 50 percent. CVP agricultural contracts receive allocations ranging from 100 to 0 percent. Agricultural allocations are reduced first; reductions to the M&I allocations start after the agricultural allocations have been reduced to 75 percent of the full contract allocation. SWP allocation imposes deficiencies equally to agricultural and M&I water users.

Regulatory Standards

Various laws and regulatory decisions provide for protection of environmental conditions. These protections include minimum instream flow requirements, minimum reservoir storage content and protection of the Delta against excessive salinity. Specifics regarding these requirements, including references to the regulatory documentation are provided in Appendix E of the Draft EIS/EIR. As an overview, **Table 3.3-1** summarizes the locations and applicable conditions which are either incorporated into the modeling or used as objectives in evaluating the modeling results.

Table 3.3-1
Modeling Standards and Applications

Location	Regulatory Standard	Modeling Application
Trinity River/Reservoir	Minimum instream flow requirements Minimum end-of-year reservoir storage	Both incorporated into PROSIM
Clear Creek	Minimum instream flow requirements below Whiskeytown Reservoir	Incorporated into PROSIM
Upper Sacramento River	Minimum end-of-year storage in Shasta Reservoir Minimum instream flow requirements below Keswick Dam Navigation flow requirement upstream of City of Sacramento (at Wilkins Slough-navigation control point)	Objective evaluated in interpretation of PROSIM results Incorporated into PROSIM Incorporated into PROSIM
Feather River	Minimum instream flow requirements	Incorporated into PROSIM

Table 3.3-1 (Continued) Modeling Standards and Applications		
Location	**Regulatory Standard**	**Modeling Application**
Upper American River	Minimum instream flow requirements below the American River pump station diversion site	Incorporated into UARM
Lower American River	Minimum instream flow requirements (1) below Nimbus Dam and (2) for the reach from Nimbus Dam to the confluence with the Sacramento River	Incorporated into PROSIM
Lower Sacramento River	Minimum instream flow requirements at (1) Freeport and (2) Rio Vista	Incorporated into PROSIM
Mokelumne River	Minimum release rates from Camanche Reservoir	Incorporated into SANJASM modeling which serves as input to PROSIM
Stanislaus River	Minimum instream flows below Goodwin Dam	Incorporated into SANJASM/ STANMOD modeling which serves as input to PROSIM
Tuolumne River	Minimum instream flow requirements at LaGrange Bridge	Incorporated into SANJASM modeling which serves as input to PROSIM
San Joaquin River	Minimum instream flow requirements at Vernalis	Incorporated into SANJASM/ STANMOD modeling which serves as input to PROSIM
Delta	Maximum salinity, minimum dissolved oxygen, minimum outflow, and maximum export	Incorporated into PROSIM

3.3.3 COMPLIANCE WITH ENDANGERED SPECIES AND FISH AND WILDLIFE COORDINATION ACTS

The Fish Resources and Aquatic Habitat (Section 3.5), Terrestrial Resources (Section 3.6), and ESA Compliance (Section 3.19) sections, combined with the biological resources evaluations of the Cumulative Report (Appendix D of the Draft EIS/EIR), provide information needed to meet state and federal regulations for the protection of biological resources.

3.3.3.1 Endangered Species Acts

A summary discussion of listed and proposed for listing species protected under the federal ESA of 1973, as amended, and the California Endangered Species Act (CESA) is provided in the Terrestrial Resources and Fish Resources and Aquatic Habitat sections of the EIS/EIR and the Cumulative Report (Appendix D of the Draft EIS/EIR). An assessment of biological and other resource issues for previously prepared environmental documents and from general, specific, and master plans for land development activities in the project service area is included as part of the analysis and is provided in the Cumulative Report (Appendix D of the Draft EIS/EIR). The assessment provides an overview of impacts anticipated to result from future development as currently approved by those agencies with local land use jurisdiction and authority.

3.3.3.2 Fish and Wildlife Coordination Act

The Fish Resources and Aquatic Habitat and Terrestrial Resources sections of the EIS/EIR and Cumulative Report provide information needed to meet Fish and Wildlife Coordination Act (FWCA) requirements (i.e., a discussion of wildlife species with the potential to be affected by the Proposed Project or alternatives), with the exception of federally listed and proposed for listing species.

3.4 WATER SUPPLY AND HYDROLOGY

3.4.1 AFFECTED ENVIRONMENT

3.4.1.1 Regional Setting

The regional setting includes water supply components and associated waterways of the CVP and SWP system that may be indirectly affected by implementation of the Proposed Project or alternatives and other reasonably foreseeable actions within the American River Basin. These facilities include: Trinity and Shasta reservoirs, the upper and lower Sacramento River, Oroville Reservoir, the Feather River, Folsom Reservoir, Lake Natoma, the lower American River, and the Delta. The area is defined in Section 3.2.1 and shown on Figure 2-1. The water supply and hydrology of these system components and the purveyors that utilize them for water supplies are described in the Cumulative Report (Appendix D of the Draft EIS/EIR).

Water is supplied to the region from PCWA's MFP, water rights from the American River Basin, the CVP, the SWP, and groundwater. Water storage and conveyance components of these systems are operated in an integrated manner to meet the regulatory requirements (environmental instream flows and flood control) and to provide water for M&I and agricultural uses. These waterways and resources potentially would be affected by implementation of the Proposed Project or alternatives and future changes in CVP operations. Detailed descriptions of the CVP and SWP systems, the integrated operations, and water purveyors that utilize them for water supplies are described in the Cumulative Report (Appendix D of the Draft EIS/EIR).

Central Valley Project

The CVP is a multi-purpose project operated by Reclamation that stores and transfers water from the Sacramento, San Joaquin, and Trinity river basins to the Sacramento and San Joaquin valleys. The CVP was authorized by Congress in 1937 for water supply, hydropower generation, flood control, navigation, fish and wildlife, recreation, and water quality control purposes. The CVP service area extends about 430 miles through much of California's Central Valley, from Trinity and Shasta reservoirs in the north to Bakersfield in the south.

State Water Project

The SWP supplies water to 30 agencies (contractors) in the San Francisco Bay area, the San Joaquin Valley, and southern California. The northernmost portion of the SWP consists of three small lakes on tributaries of the Feather River. The flows from the tributaries augment Feather River flows as the branches and forks of the Feather River converge at Oroville Reservoir, the principal reservoir of the SWP. From Oroville Reservoir, water flows through three hydro-electric power plants before continuing down the Feather and Sacramento rivers to the Delta.

Regional Groundwater Basin

An extensive groundwater aquifer system underlies the Central Valley. The system is categorized into a shallow aquifer zone and an underlying deeper aquifer zone. Since 1970, with steadily increasing groundwater pumping, groundwater levels and groundwater storage have declined throughout the Central Valley.

3.4.1.2 Project Area Setting

The water supply resources of the project study area include the Middle and North forks of the American River. The area of study encompasses the Middle Fork American River from below Ralston Afterbay to its confluence with the North Fork American River and downstream past the Auburn Dam site to Oregon Bar. PCWA's seasonal pump station is the only existing intake/diversion facility in this reach. The project area setting is depicted on Figure 2-2.

3.4.1.3 Water Supply System and Water Service Area

Placer County Water Agency Water Supply

PCWA primarily uses surface water as its source of supply for M&I and agricultural uses throughout its service area. A small amount of groundwater is used in Service Area Zones 2 and 4.

PCWA has three water source entitlements that can be used for western Placer County: (1) the Drum-Spaulding Project; (2) the MFP; and (3) CVP American River water. The surface water and groundwater sources are described below. Additionally, provisions of PCWA's purveyor specific agreement in the Sacramento Area Water Forum Agreement is discussed.

Drum-Spaulding Project Raw Water Supply

The Pacific Gas and Electric Company (PG&E) Drum-Spaulding Project supply originates from Lake Spaulding, located on the south Yuba River and Fordyce Creek, and Rollins Reservoir, located on the Bear River. The water supply is conveyed primarily via the Drum, Bear River, and Upper Boardman canals. The contract between PCWA and PG&E states that PCWA can receive up to 100,400 AFA. Because of physical restrictions on the Bear River Canal through which all of the supply is conveyed, PCWA is limited to a diversion of 244.8 cfs. PCWA delivers this water to Zone 1.

Middle Fork Project Raw Water Supply

PCWA's MFP is a multi-purpose project designed to conserve waters of the Middle Fork American River, the Rubicon River and certain tributaries for irrigation, domestic and commercial purposes, and for the generation of electrical energy. Principal project features include two storage and five diversion dams, five power plants, diversion and water transmission facilities, five tunnels and related facilities.

SWRCB Permits 13856 and 13858, both issued in 1963 and amended in 1975, allow for diversion of MFP water at Auburn (the seasonal pump station) or at Folsom Dam (PCWA 1993). PCWA's consumptive use of its water rights is limited under an agreement with Reclamation to no greater than 120,000 AFA. PCWA's power purchase agreement with PG&E limits the amount of MFP consumptive use diversions to 90,000 AF until 2002. In addition, the PG&E contract limits diversions according to the monthly diversion schedule presented in **Table 3.4-1**.

Of the 120,000 AFA MFP water available to PCWA, a total of 55,000 AFA has been contracted to SJWD (25,000 AFA) and the City of Roseville (30,000 AFA). In addition, in years when PCWA experiences a surplus in supply, PCWA has contracted to deliver up to 29,000 AFA to SSWD.

Table 3.4-1
Allowable MFP Monthly Diversion Schedule
Per Pacific Gas and Electric Company Contract Limits

Month	Permissible Range of Diversions (Percent)
January	0 to 5
February	0 to 5
March	2 to 6
April	5 to 10
May	9 to 16
June	12 to 19
July	13 to 19
August	13 to 16
September	12 to 13
October	4 to 8
November	0 to 6
December	0 to 5

Source: PCWA 1993

Central Valley Project Water Supply

PCWA entered into a CVP water supply contract with Reclamation on September 18, 1970. The original contract allowed for a maximum water allotment of 117,000 AFA. In February 2002, this contract was amended, limiting the amount of water available to PCWA from this source to 35,000 AFA prior to the completion of Auburn Dam. This supply is subject to water shortages in a manner similar to shortages imposed on other CVP contractors. PCWA does not anticipate using any of its CVP entitlement prior to putting to use the full amount of the 120,000 AF available to it annually from the American River pursuant to PCWA's water rights.

Groundwater Supply

PCWA currently obtains about 64 AF of water from two wells located in Zone 2 and about 927 AF of water from two wells located in Zone 4. Water from these wells supplements the amount of water that is obtained under PG&E water supply contracts.

Due to concerns about groundwater pumping exceeding groundwater recharge within the North American River Groundwater Basin, which underlies the western portion of Placer County, Placer County has established a policy that all urban and suburban development should rely on public water systems using a surface water supply. PCWA's water demand projections for western Placer County assume that surface water will be used to supply all new development.

Sacramento Area Water Forum Agreement

The Water Forum Agreement was the result of the efforts of a diverse group of community leaders formed in 1994 to formulate principles for a regional solution of future water supply. The Water Forum is a comprehensive package that will achieve two coequal objectives:

- Attempt to provide a reliable and safe water supply for the region's economic health and planned development to 2030; and

- Preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River.

The key water supply provisions in the specific agreement for PCWA are as follows:

- Water that PCWA sells to the City of Roseville, SJWD, and SSWD are not addressed in PCWA's specific agreement.

- In most years, when the projected March through November unimpaired inflow to Folsom Reservoir is greater than 950,000 AF, PCWA could divert and use up to 35,500 AF from the American River and 35,000 AF from the Sacramento and/or Feather rivers with certain conditions.

- In the drier and driest years, when the Folsom Reservoir inflow is less than 950,000 AF, PCWA will divert up to 35,500 AF plus replace up to 27,000 AF of water in the American River from reoperation of the MFP reservoirs.

A Regional Water Master Plan (RWMP) is being prepared to develop water resource management strategies to protect and enhance water supply availability, reliability, and quality for the water users of Folsom Reservoir, the American River, and the connected groundwater basin, while preserving the environmental and aesthetic values of the lower American River. The RWMP will define facilities that will facilitate the use of the American River water in wet years and the use of groundwater in dry years. The RWMP will provide the mechanism for implementing elements of the Water Forum Agreement. Through these planning efforts, it is possible that PCWA eventually may be able to either obtain water from others or supply water to others in dry and wet years.

<u>Water Demand</u>

Figure 3.2-1 depicts the portion of PCWA's water service area to receive water from the Proposed Project. Water demand projections have been prepared based on data from several sources. The Placer County General Plan and general plans from cities throughout the county each contain data regarding projected population and housing units. The Sacramento Area Council of Governments also has prepared population projections for Placer County. PCWA has compared this information with historical records and prepared a range of growth rates. The projected water demands contained within PCWA's water supply master plan are based on a mid-range estimate of probable growth rates.

PCWA anticipates that build-out of its service area will occur in approximately 2035. By 2020, water demands are expected to increase by 50 percent, from 114,047 AF in 1999 to 171,572 AFA in 2020 for the entire service area. The projected annual water demand increase between 1999 and 2020 is two percent per year.

Table 3.4-2 presents the projected water demands for Service Area Zones 1 and 5. The table shows that demands will exceed the current supply of 108,900 AFA (100,400 AFA from PG&E and 8,500 AFA from the MFP) sometime before 2005. In fact, in recent years, PCWA had to purchase surplus water from neighboring water districts. This water would not remain available for PCWA's use in the future.

Table 3.4-2
Projected Water Demands in Service Area
(AF)

	2000	2005	2010	2015	2020
Zone 1	89,300	106,100	116,000	128,500	145,500
Zone 5	17,000	17,000	17,000	17,000	17,000
Total	**106,300**	**123,100**	**133,000**	**145,500**	**162,500**

Source: PCWA 2000

The remaining source of water to supplement Drum-Spaulding Project supplies to Zone 1 is additional water from PCWA's MFP. PCWA has agreed not to take CVP water until it is using 120,000 AFA of its MFP water.

Water Conservation/Water Shortage Contingency Plan

PCWA has installed water meters on each water connection in its service area and bills usage accordingly. PCWA's treated water service customers are 100 percent metered, which is rate in the Sacramento region. PCWA's in-house conservation actions have included:

- 1992 Rate Study (with emphasis on conservation-oriented billing rates)
- Pipe replacement program
- Pressure reducing program
- Meter testing and replacement program
- Leak detection program
- Corrosion control program
- Telemetry system expansion (to control pressures and reservoir overflows)

PCWA's conservation-related community outreach activities include:

- Conservation publications distribution
- Newsletter (mailed directly to PCWA customers)
- Elementary school conservation education program

- Conservation logo on agency letterhead
- Participation in conservation information distribution at local fairs

PCWA has a five-stage rationing plan that it invokes during declared water shortages. The rationing plan includes voluntary and mandatory rationing, depending on the causes, severity, and anticipated duration of the water supply shortage. The five stages are delineated in **Table 3.4-3**

Table 3.4-3
Placer County Water Agency Water Rationing Stages and Reduction Goals

Shortage Condition	Stage	Customer Reduction Goal	Type of Rationing Program
None	I - Normal Conditions	0%	Normal Operation
Up to 10%	II - Water Alert	10%	Voluntary
10%-25%	III - Water Warning	25%	Mandatory
25%-35%	IV - Water Emergency	35%	Mandatory
35-50%+	V - Critical Water Emergency	50% or greater	Mandatory

Source: PCWA 1997

Additionally, as a member of the Water Forum, PCWA has committed to either continue or initiate implementation of a number of conservation measures designed to improve water use efficiency. The measures (BMPs) incorporated into the Water Forum purveyor-specific agreement include the following:

- Provide interior and exterior water audits and incentive programs for single-family residential, multi-family residential and institutional customers;
- Offer plumbing retrofit kits to residential customers;
- Provide distribution system water audits, leak detection, and repair;
- Provide non-residential meter retrofit;
- Provide large landscape water audits and incentives for commercial, industrial, institutional, and irrigation accounts;
- Support city/county landscape water conservation requirements for new and existing commercial, industrial, institutional, and multi-family developments;
- Provide a public information program;
- Provide a school education program;
- Provide a commercial and industrial water conservation program;
- Implement conservation pricing;
- Provide a landscape water conservation program for new and existing single-family homes;
- Enact a water waste prohibition ordinance;

- Designate a staff member as a water conservation coordinator; and
- Provide an ultra-low-flush toilet replacement program for non-residential and residential customers.

PCWA also is committed to improving the efficiency of its raw water delivery system and in aiding raw water customers to become more water efficient. Each year, PCWA installs lining along additional sections of the raw water delivery canals and pipelines to minimize water loss.

Placer County Water Agency Facilities

PCWA does not have the facilities to provide storage beyond that needed for normal operations. PCWA's seven reservoirs serving Zone 1 have a total usable capacity of 480 AF, which is less than one maximum day's demand for Lower Zone 1. When installed, the seasonal pump station on the American River provides back-up supply to the Drum-Spaulding Project supply.

Drum-Spaulding Project water is generally conveyed southwest along the Interstate 80 corridor by a network of canals. The most important conveyance facility in the Drum-Spaulding Project is the Bear River Canal, because all project water flows through it at some point. This canal extends 23 miles through relatively steep terrain and is subject to outages due to landslides. The reliability of the Bear River Canal also is threatened by several road crossings that make the canal vulnerable to outages because of physical damage and/or contamination by hazardous materials resulting from accidental traffic spills. Furthermore, the Bear River Canal is taken out of service each year for maintenance beginning in the latter half of October for three to five weeks. The Caperton Canal, which serves the Sunset Water Treatment Plant (WTP), also traverses steep terrain for several miles and is subject to outages from physical damage or contamination from hazardous material spills.

River Flows

The upper American River system includes the North and Middle forks of the American River, which drain the upper watershed. The Middle Fork American River originates above 7,500 feet mean sea level (msl), west of Squaw Peak in Placer County and joins the North Fork east of the City of Auburn. The North Fork American River originates in the Sierra Nevada above 6,500 feet msl in Placer County. Hydrologic conditions within the Middle Fork of the American River downstream of Ralston Afterbay, and the North Fork American River below the confluence with the Middle Fork American River, are partially dependent upon releases from Ralston Afterbay. Flow releases from Ralston Afterbay during the June through October period, which would change under the alternatives, are primarily a function of upstream hydroelectric power generation. Flow patterns generally cycle on a daily basis, with peak flows occurring during hydropower generation and low-flow releases to meet minimum instream flow requirements for the remainder of the day. However, based on water availability, peak flows may not be released on every day of the June through October period. Reduced releases and/or minimum instream flow releases prevail in late summer and fall of most years. The North Fork American River flows into the north end of Folsom Reservoir. Folsom Reservoir releases water from Folsom Dam into Lake Natoma, its regulating afterbay. Water is released from Lake Natoma into the lower American River below Nimbus Dam. The lower American River extends 23 miles to its confluence with the Sacramento River.

River flows past the proposed pumping plant site originate from the Middle and North Forks of the American River. Flows on the Middle Fork are regulated upstream by the Hell Hole and French Meadows reservoirs, and are re-regulated by Ralston Afterbay. Ralston Afterbay, the most downstream dam in the MFP system, releases flows to the Middle Fork American River upstream of its confluence with the North Fork of the Middle Fork. Downstream of this confluence, Middle Fork flows are a combination of regulated and unregulated flows.

North Fork American River flows at the project site have been estimated based upon upstream gage measurements. Dry season (summer) flows at the project site fluctuate within the day from 100 cfs when power is not being generated at Ralston Afterbay to about 1,100 cfs when power production peaks. The estimated peak flow of the 1.5-year flood event is 12,400 cfs. The peak flow of the 100-year flood event is estimated to be 220,000 cfs (Reclamation 1996a).

Average monthly river volumes on the American River for the project vicinity for nine water years (October through September) from 1988 to 1996 are shown in **Table 3.4-4**. The data represent historical flows as measured at two upstream gauging stations (U.S. Geological Survey (USGS) Stations 11433300 below Ralston Afterbay and 11427000 below Lake Clementine). These values are not corrected for any accretions that may occur between the gages and the project site. Depicted in **Figure 3.4-1** are the average, minimum, and maximum historical monthly flows for these nine water years.

Table 3.4-4
Average Monthly American River Volume in Vicinity of Auburn Pump Station (1987 – 1996)
(thousand acre-feet (TAF))

Year [a]	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Totals
1987	-	-	-	-	-	-	-	-	-	12	9	40	-
1988	74	39	49	49	40	37	35	29	23	7	48	37	469
1989	48	66	382	234	140	78	56	54	33	35	54	42	1,222
1990	42	43	99	79	52	56	58	57	35	36	28	12	596
1991	8	10	129	114	120	82	55	49	33	25	33	15	671
1992	16	88	80	70	33	30	31	27	19	12	16	61	482
1993	242	184	336	244	214	153	78	67	37	38	28	37	1,657
1994	28	42	70	55	53	44	34	33	13	17	34	75	498
1995	474	184	614	359	447	312	138	74	38	52	42	95	2,829
1996	164	337	294	257	432	123	69	58	46	-	-	-	-

[a] Data are presented in water years, therefore some months are excluded.
Source: SWRI, unpublished data, 1998.

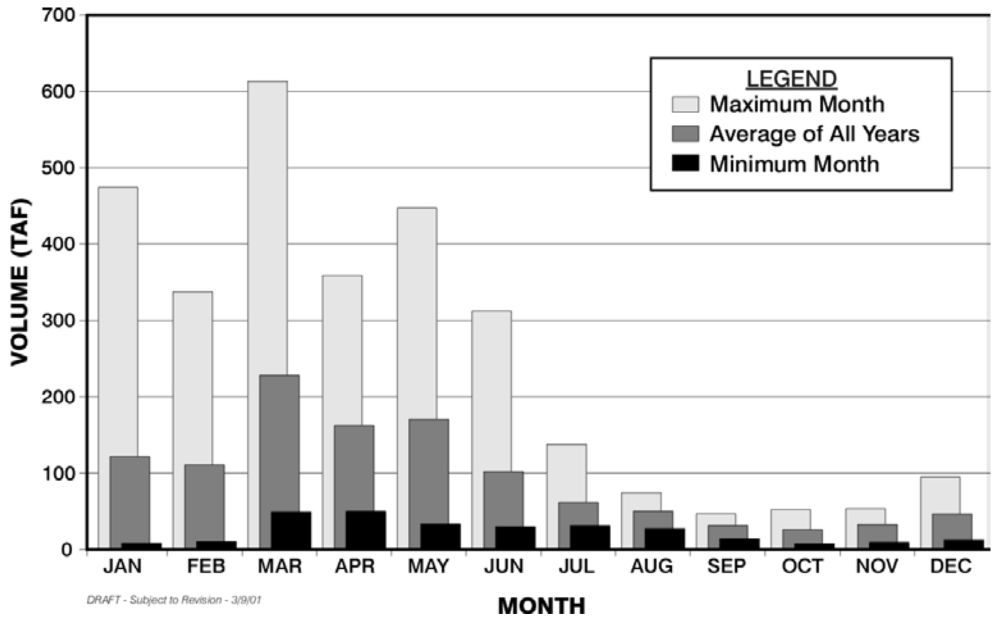


Figure 3.4-1. Average, Minimum and Maximum Monthly River Volumes, Water Years 1988-1996 North Fork American River (USGS gaging station data below Ralston Afterbay and below Lake Clementine)

Using historic data from 1991, which was a median flow year for the nine-year period of record, **Figure 3.4-2** shows flows from June to November that reflect the erratic nature of hydropower releases. August 1991 is represented on **Figure 3.4-3** to show more clearly how the river flows rise and fall each day. The Upstream Hydrologic Analysis (SWRI 1998) was based on this period of record because it represents the best available data set from which to calculate flows at the site.

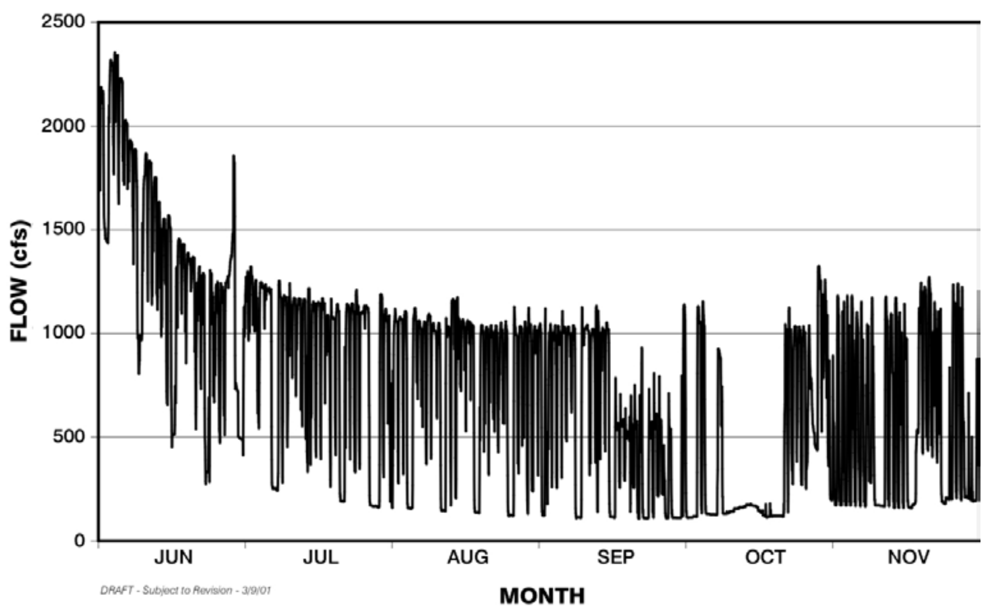


Figure 3.4-2. North Fork American River Flows, June - November 1991 (USGS gaging station data below Ralston Afterbay and below Lake Clementine)

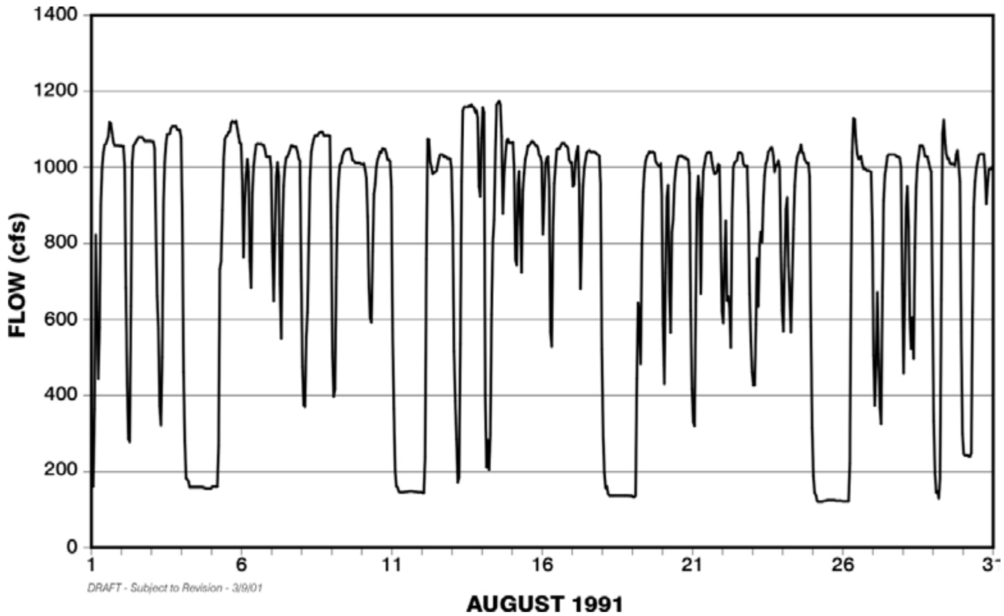


Figure 3.4-3. North Fork American River Flows, August 1991
(USGS gaging station data below Ralston Afterbay and below Lake Clementine)

The flows at the project site are directly affected by fluctuations in Ralston Afterbay releases, but are attenuated somewhat by the unregulated flows from the North Fork of the Middle Fork and the North Fork American River, which exhibit less fluctuation within a day. Ralston Afterbay releases reflect upstream regulation to maximize hydropower generation while meeting an instream flow requirement of 75 cfs. This fish flow release is specified in Article 37 of the FERC license, was agreed to by CDFG and is, indirectly, a part of the SWRCB permits. Ralston Afterbay releases can vary greatly over the course of a day, month, and year. Hydropower generation generally increases over the course of the day, peaks in the late afternoon, and decreases as the evening progresses.

During the peak diversion season (May to September), water releases are fairly predictable. For example, during 1989, which is considered a typical year by PG&E, a continuous 1,000 cfs was typically released from Ralston Afterbay 20 hours a day during the diversion season, and a continuous 240 cfs was released for the remaining four hours. Beginning in October, however, the water releases became erratic ranging from zero to 1,000 cfs, and could not be relied on as a continuous water supply again until the beginning of March (MW et al. 1998).

3.4.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.4.2.1 Methodology

Facilities-Related Analysis Approach

Facilities-related water supply impacts were analyzed by consulting various PCWA reports and with staff regarding the historical reliability of the PG&E water supply and the historical reliability of the seasonal pump station. Preliminary design information was reviewed to determine the projected reliability of the diversion structure configurations and locations. The preliminary design information also was reviewed to assess the effect of the diversion structure configurations and locations and operation upon channel stability.

Diversion-Related Analysis Approach

The assessment of diversion-related water supply impacts focuses on the potential increase in diversions to result in changes to annual delivery allocations to CVP and SWP contractors and annual deliveries to non-CVP purveyors that divert water from Folsom Reservoir and the lower American River due to changes in river flows and reservoir volumes. Reclamation's PROSIM model was used to simulate hydrologic conditions over a 70-year period of record for Folsom Reservoir, the lower American River, and Sacramento River, including the Delta.

The evaluation of water supply is based on a comparison of CVP reservoir surface water storage volumes and American and Sacramento river flows under the existing and future conditions with and without the project. Because the timing and amount of the proposed diversion increase under the Proposed Project and Upstream Diversion Alternative are identical, the "Action Alternatives" condition represents the hydrologic condition for both alternatives. The analysis of impacts is, therefore, combined into one discussion. Hydrologic modeling results from these modeling simulations were reviewed and compared to determine whether implementation of a year-round pump station project would result in substantial changes to the reservoir storage volumes or river flows that would affect the water supply of these water bodies compared to existing and No Action/No Project Alternative conditions.

3.4.2.2 Applicable Laws, Ordinances, Regulations, and Standards

The SWRCB and nine Regional Water Quality Control Boards (RWQCB) regulate water resources in California. The SWRCB protects water quality and determines rights to surface water use. Specifically, the SWRCB appropriates surface water, oversees disputes over rights to water bodies, establishes surface and groundwater quality standards, and oversees the RWQCBs, which implement water quality standards and regulations.

3.4.2.3 Impact Indicators and Significance Criteria

There are no formal, specific regulations that indicate criteria or thresholds associated with impact significance related to changes in water supply. Therefore, significance criteria have been developed specifically to address the potential regional and local area effects of implementing the Proposed Project or alternatives. The impact indicators and significance criteria developed for the evaluation of water supply and hydrology impacts are presented in **Table 3.4-5**.

Table 3.4-5
Water Supply and Hydrology Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ Location of pump station facilities relative to flood flows (elevation).	❑ An increase in flooding of the facilities, relative to the basis of comparison, such that reliable operation of the pump station as a back-up and increased water supply source would be affected.
❑ Availability to meet PCWA's annual water demands.	❑ The months of the year the MFP water supply can be diverted by PCWA, more specifically measured by the number of months each year that the pump station is operational.
❑ Use of groundwater.	❑ Increased use of groundwater, relative to the basis of comparison, sufficient to adversely affect overdraft conditions.
❑ Area of backwater effect created by the water intake/diversion structures.	❑ Decrease in channel stability upstream of the water intake, relative to the basis of comparison, of sufficient magnitude and frequency that water supply operations would be impaired.
❑ Deliveries to non-CVP Folsom Reservoir customers and lower American River water rights holders.	❑ Reduction in the deliveries to non-CVP Folsom Reservoir and lower American River water rights holders, relative to the basis of comparison, for the corresponding year over the 70-year period of record.
❑ Delivery allocations to SWP customers.	❑ Reduction in the percent delivery allocation to any SWP customer, relative to the basis of comparison, for the corresponding year over the 70-year period of record.
❑ Delivery allocations to CVP customers.	❑ Reduction in the percent delivery allocation to any CVP customer category, relative to the basis of comparison, for the corresponding year over the 70-year period of record.

3.4.2.4 Impact Analysis

This section presents the analysis of potential facilities- and diversion-related water supply and related hydrology impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

Facilities-Related Impacts

No Action/No Project Alternative

Impact 3.4-1: Reliability of water supply facilities.

Factors considered in the evaluation of the reliability of the seasonal pump station include the location (elevation within the floodplain) of the seasonal pump station facilities and their susceptibility to flooding.

Because the seasonal pump station, at elevation 525 feet msl, is below the 100-year and 50-year flood stage elevations (elevations 557 feet and 550 feet msl, respectively), high flows in April, May, or November could result in flooding of the facilities. Daily average river flows for the period 1969 through 1996 were evaluated to assess the potential for high river flows and associated pump station damage during the April through November operations period assumed for the No Action/No Project Alternative.

Flows of approximately 20,000 cfs exceed the capacity of the bypass tunnel and begin to flow down the dewatered river channel where the seasonal pump station pipeline is routed (E. Maisch, pers. comm. 1998). However, when river flows approach 20,000 cfs, Reclamation can no longer gain access to the seasonal pump station or pipeline. To provide time for removing the pumps and the pipeline, river hydrology and watershed characteristics require that Reclamation be on standby to remove the facilities when flows reach about 10,000 cfs. **Figure 3.4-4** charts flow events of 10,000 cfs and above by month.

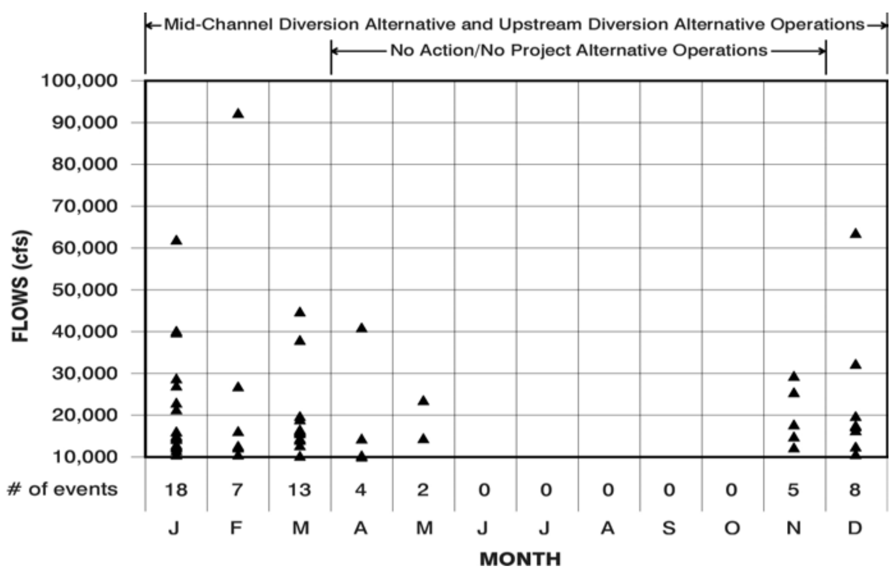


Figure 3.4-4. Number of Peak Flow Events that Produced Average Daily Flows Greater than 10,000 cfs, North Fork American River, 1969 Through 1996.
Note: Data points represent the sum of two USGS river gages. Gages exclude over 10% of the total river basin area. Data represent average daily flows, not maximum daily values.

Review of the daily flow data on Figure 3.4-4 shows that certain high-flow events developed rapidly, in four cases so quickly that removal of the seasonal pump station would not likely have been possible. The four events, and the daily flows (rounded to the nearest 100 cfs), were as shown in **Table 3.4-6**.

Table 3.4-6
American River High-flow Event Data

November 1981		April 1982		November 1983		May 1996	
Date	cfs	Date	cfs	Date	cfs	Date	cfs
Nov 20	2,300	Apr 9	5,000	Nov 15	2,700	May 14	2,700
Nov 21	6,700	Apr 10	6,500	Nov 16	3,500	May 15	4,600
Nov 22	12,900	Apr 11	41,000	Nov 17	29,400	May 16	23,600
Nov 23	13,100	Apr 12	29,700	Nov 18	9,200	May 17	14,400
Nov 24	25,500	Apr 13	16,100	Nov 19	7,300	May 18	15,500
Nov 25	7,700					May 19	7,300
Nov 26	5,200						

These data indicate that damage to the seasonal pump station facilities would have been likely under a No Action/No Project Alternative operations scenario. River flows in those instances increased so rapidly that facility removal efforts, even on a standby basis, would not have been possible. Since the 1969 through 1996 period, there have been additional high-flow events (e.g., April and May 1997) when flow levels either would have prevented the spring installation of the seasonal pump station or caused damage to an already installed pump station.

Additionally, flood flows of recent years have eroded channel features (including remnant cofferdam materials) that are critical to the stability of the seasonal pump station pipeline. It is expected that future flood flows will continue downcutting the remaining cofferdam debris, thereby decreasing the flow levels at which the river would return to the normally dry channel and damage the seasonal pipeline in the future. Figure 3.4-4 shows that the seasonal pump station facilities, if operated as assumed under the No Action/No Project Alternative, would likely have been removed and reinstalled several times to avoid potential flood damage over the 1969 through 1996 period.

Section 1.2, Project History, discusses the record runoff of January 1997 that destroyed both the access road to the seasonal pump station and the foundation for the seasonal pipeline connecting the pumps to the Auburn Ravine Tunnel. Repair and rehabilitation of the site cost Reclamation $650,000 more than the annual budget ($250,000) and delayed installation of the seasonal pump station until the late summer. Unless a project is implemented which relocates or constructs a pump station on higher ground, PCWA's MFP water supply would continue to be vulnerable to problems of this magnitude.

Seasonal operation of the pump station under the No Action/No Project Alternative would result in an increased risk of flooding potentially affecting the reliability of water supply for PCWA's service area. This would be a potentially significant and unavoidable impact.

Impact 3.4-2: Ability to meet PCWA water supply demands with seasonal pump station.

In addition to the potential flooding problems, the 50 cfs capacity limit of the seasonal pump station under the No Action/No Project Alternative would not meet PCWA's seasonal capacity demands, provide sufficient back-up for scheduled or unscheduled outages of PG&E's Drum-Spaulding Project, and may fail to meet projected annual customer demands beginning as early as 2008. It also is noted that under the No Action/No Project Alternative, Reclamation could not fully meet its obligations to PCWA under the Land Purchase Agreement.

Reliability concerns for the No Action/No Project Alternative also would increase over time as PCWA customer demands increase because the seasonal pump station facility would be PCWA's only water delivery mechanism for meeting the increased demands. The seasonal pump station capacity would be adequate to meet demands during Drum-Spaulding Project scheduled system maintenance outages in the late-fall, but it would not be adequate to meet current or future unscheduled outages during spring or summer, when PCWA obtains up to 244.8 cfs from the Drum-Spaulding Project.

Based on the above information, the No Action/No Project Alternative would not provide a long-term reliable water supply source. The pump station could not be installed or would be at risk of failure in years with high spring river flows. In addition, due to its limited capacity, the No Action/No Project Alternative would not provide the needed back-up water supply for Drum-Spaulding Project outages. These conditions result in a potentially significant impact on the reliability of PCWA's water supply system.

Without additional water supplies, PCWA likely would begin implementing water delivery policies that apply during water shortage conditions. To consider PCWA's probable response to water supply shortages, PCWA's projected demands were reviewed. Sometime near 2005, PCWA likely would implement stringent conservation policies that, combined with anticipated market pressures, would initiate a shift in water supply deliveries from raw water/agricultural customers to urban customers. The shift in water deliveries would initially impact commercial agricultural customers, mostly rice farmers, in western Placer County. Then, continued shortages in deliveries would begin to impact non-commercial rural customers, mostly small farm and ranchette operations, that currently utilize raw water deliveries for irrigated pasture, small orchard, and related purposes. Of the total, approximately 70,000 AFA of water deliveries go to raw water/agricultural customers, about 10,000 to 12,000 AFA is delivered to commercial agriculture, and the balance (58,000 to 60,000 AFA) is delivered to rural small farm and ranchette raw water customers.

If a shortage occurred, the 10,000 to 12,000 AF delivered to commercial agricultural uses would be used to satisfy growing urban demands (this change in operations would reduce flow in Auburn Ravine by 10,000 to 12,000 AFA). The commercial farmers would be expected to use groundwater, which is the only alternative water supply readily available. Groundwater may be used only to the extent that the local supplies are economically viable. In western Placer County, there is currently a groundwater overdraft condition that makes this alternative source uncertain in the long-term but viable in the short-term. Where there are wells, there would be increased groundwater pumping. Where no wells exist or where groundwater is not a viable supply, it is possible that certain agricultural lands would no longer be farmed due to the high costs of installing new wells. Because of the groundwater overdraft condition, it is likely that many farmers over time would discontinue farming operations, or convert existing, water intensive, or higher value crops into less water-intensive crops or housing.

Deliveries to non-commercial rural customers would be reduced following reduced deliveries to commercial farmers. These reductions would be further into the future and it is more likely that PCWA might be able to develop alternative delivery mechanisms for its MFP supplies. However, if PCWA would not be able to develop such future options, then anticipated growth in urban water demands for PCWA's supplies would begin to redirect raw water deliveries from the rural farms and ranchettes beginning sometime around 2011. This scenario could result from a combination of several factors including PCWA water delivery policies, urban development pressures on the value of available water supplies, and conversions of rural or agricultural lands for urban uses.

The No Action/No Project Alternative would not meet the overall long-term project objectives of providing a year-round reliable water supply source, resulting in a potentially significant and unavoidable water supply impact.

Impact 3.4-3: Groundwater overdraft.

The No Action/No Project Alternative would fail to meet projected water needs sometime before 2008. At that time, PCWA’s increasing urban water demands would exert pressure on the agency to not supply future users, to reduce untreated/agricultural supplies in Zone 1, and to eliminate untreated agricultural water supply to Zone 5. Agricultural customers could turn to groundwater or could abandon their agricultural pursuits. As agricultural land is increasingly available for urbanization, urban water demands would subsequently increase. If the mostly non-commercial agricultural customers in Zone 1 turn to groundwater supplies, they would encounter an unreliable, overdrafted water source (J. Warren, pers. comm. 1998). Groundwater supplies are more reliable in Zone 5; however, groundwater throughout Placer County is overdrafted and requires deep wells (DWR 1997). The No Action/No Project Alternative would, therefore, have a potentially significant impact on groundwater overdraft (after 2008).

Impact 3.4-4: Channel instability from backwater effects.

The existing diversion structure does not create a backwater effect. The No Action/No Project Alternative diversion pond would be the same configuration (sump pond) as the existing one. Therefore, there would be no impact on channel stability as it relates to operation of the intake.

Proposed Project and Upstream Diversion Alternative (Action Alternatives)

Impact 3.4-5: Reliability of water supply facilities.

With a year-round pump station, PCWA would obtain year-round back-up supply. Scheduled or accidental interruptions in the PG&E Drum-Spaulding Project supply system would be accommodated by the MFP system. Because the proposed pump station would be year-round, increase water delivery capacity from 50 cfs to 100 cfs, and increase reliability of deliveries even during flood events, the Action Alternatives would have a significant beneficial impact on the reliability of PCWA's water system.

Impact 3.4-6: Ability to meet water supply demands with year-round pump station.

Increasing pump station diversions to 35,500 AFA, in combination with Drum-Spaulding Project supply, would meet projected annual water demand through 2015. PCWA would be able to meet all of its demands resulting in a beneficial impact.

Impact 3.4-7: Groundwater overdraft.

PCWA's increasing urban water demands would be met by increased surface water supplies from a year-round facility. PCWA's increased diversion to up to 35,500 AFA would meet water demands until about 2015. Therefore, there would be no anticipated increased use of groundwater resulting in a less-than-significant impact on the overdraft condition.

Impact 3.4-8: Channel instability from backwater effects.

A backwater effect upstream of the diversion structures could create deposition as the river attempts to compensate for the flatter gradient imposed upstream of the site. Over time, an increased backwater depth causes sediment deposition resulting in an increase in water surface, bed elevation, and possibly bank instability. Destabilizing the channel banks would result in additional deposition of material into the river, thereby affecting river flow patterns.

At the project site, inundation of Tamaroo Bar rapids is likely to occur somewhat more frequently than under the existing condition. However, the river flows would be within existing ranges and would not be expected to cause additional stability issues upstream of the diversion or of Tamaroo Bar rapids.

Given the expected extent of the backwater effect, the potential for increased channel instability and related effects on the intake reliability would be expected to be less than significant under either alternative.

Cumulative Facilities-Related Impacts

The Action Alternatives would contribute to an improvement of water supply reliability and availability conditions that potentially would be further developed with future expansion of the pump station facility for PCWA and GDPUD. This would be considered a local beneficial water supply impact.

The backwater effect created by the Action Alternatives would not be considered significant, and would not be expected to be further influenced by other future projects. This is a less-than-significant cumulative impact.

The Action Alternatives also would provide a potentially significant influence over groundwater overdraft conditions, by avoiding increases in the use of groundwater in Placer County. Other regional water supply planning efforts would continue to work toward improvement of the groundwater basin conditions. The Action Alternatives would not result in a considerable adverse contribution to groundwater conditions.

Diversion-Related Impacts

The diversion-related analysis refers to certain tables and graphs prepared to provide additional representation of the modeling results and comparison of simulated conditions. These tables and figures are included in Appendix H to the Draft EIS/EIR and are labeled by the appendix letter, resource section number, and ordered as it is referenced in the impact analysis (H-3.4-1, H-3.4-2, etc.).

No Action/No Project Alternative

The increased pump station diversion under the No Action/No Project Alternative would be less than evaluated for the Action Alternatives (see below). Based on the evaluation of modeling performed for the Action Alternatives, it is expected that the No Action/No Project Alternative would not result in significant water supply effects on American River water rights holders, SWP customers, or CVP Settlement and Exchange contractors. Some small and infrequent reduction of CVP water service contractor delivery allocations may occur. However, because any reduction of water supply delivery allocations would be considered significant, this would be a significant impact.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the Existing Condition

Under the Action Alternatives, PCWA's diversion would increase from the current 8,500 AFA up to 35,500 AFA. Although it is assumed that PCWA would eventually divert 35,500 AFA, in most years, the impact is likely to be less than the 27,000 AFA increase in diversion. This is because the PCWA return flows (which occur between the Feather and American rivers) would alter the water balance downstream, which, in turn may result in a reduction of required Folsom Reservoir releases to meet CVP obligations in the Delta. Consequently, supplies to water users downstream of the lower American River may be reduced by less than 27,000 AFA. Furthermore, as a participating agency in the Water Forum Agreement, PCWA agreed to replace (in dry years) any water diverted in excess of its allocation under the Water Forum Agreement. While this commitment is conditioned on PG&E approval and the purchaser of the water, experience over the past decade demonstrates the reasonableness of the assumption that these conditions will be met. The combination of the offsetting effect of return flows and the replacement water could result in an increased water supply particularly in dry years.

Impact 3.4-9: Effects on water supply to American River water rights holders.

Water rights holders have a greater priority to the available water supply than CVP for export. Consequently, the Action Alternatives would impact the CVP allocation before impacting water rights holders. The hydrologic modeling reflects this, showing identical deliveries to water rights holders under the existing condition and the Action Alternatives. Therefore, no impact to American River water rights holders would result from the Action Alternatives.

Impact 3.4-10: Effects on delivery allocations to SWP customers.

SWP customers receive deliveries from the Feather River and the Delta. Although deliveries to SWP customers would be less than 100 percent of demand in many years as a function of the hydrology or annual water supply conditions, both the Feather River and the Delta service area customers would receive the same delivery allocation under the Action Alternatives as under the existing condition. Therefore, there would be no water supply impact to SWP customers from the Action Alternatives.

Impact 3.4-11: Effects on delivery allocations to CVP contractors.

The CVP provides water to users along the Sacramento and American rivers, within the Bay-Delta, and south of the Delta. There are three types of CVP contractors: Sacramento River Water Rights Settlement Contractors, San Joaquin River Exchange Contractors, and CVP Water Service Contractors. Their priority rights with respect to water supply curtailments due to insufficient supplies are described below:

- Sacramento River Water Rights Settlement Contractors claimed water rights in the Sacramento River Basin prior to the construction of Shasta Dam. Contract provisions allow for reductions of up to 25 percent of contracted amount during dry conditions, as determined by the Shasta Inflow Index.

- San Joaquin River Exchange Contractors claimed water rights from the San Joaquin River and agreed to forgo these rights in exchange for CVP water diverted from the Delta and delivered to the Mendota Pool. Contract provisions allow for reductions of up to 25 percent of contracted amounts under dry conditions, as determined by the Shasta Inflow Index.

- CVP Water Service Contractors (agricultural and M&I Water Service Contractors both north and south of the Delta) entered into agreements with Reclamation for delivery of CVP water as a supplemental supply. Water deliveries to agricultural Water Service Contractors can be reduced up to 100 percent in particularly dry years. Maximum curtailment levels are not specified for most M&I Water Service Contractors. Historically, Reclamation has limited maximum curtailments to M&I contractors to 25 percent. Future system demands are assumed to potentially require curtailments of up to 50 percent. Water availability for delivery to CVP Water Service Contractors during periods of insufficient supply is determined based on a combination of operational objectives, hydrologic conditions, and reservoir storage conditions.

Settlement and Exchange Contractors

As described above, delivery allocation, and therefore, water supply impact is dependent on the category of contract. Because the delivery allocation for the Sacramento River Settlement

Contractors and the San Joaquin River Exchange Contractors is dependent solely on the Shasta Inflow Index, these two types of contractors would not experience any change in allocation as a result of the Action Alternatives. Therefore, there would be no impacts to either settlement or exchange contractors as a result of the Action Alternatives.

Central Valley Project Water Service Contractors

Agricultural and M&I contractors south of the Delta and M&I contractors north of the Delta would experience a reduction in percent delivery allocation in one year out of the 70 years simulated. Agricultural contractors would experience a reduced allocation in two years out of the 70 years simulated. **Table 3.4-7** summarizes the reduced allocation associated with the Action Alternatives as compared to the existing condition.

Table 3.4-7
Changes in Central Valley Project Percent Allocation Under the Existing Condition and Action Alternatives

Year	Year Type	Existing Conditions				Action Alternatives				Difference			
		North of Delta		South of Delta		North of Delta		South of Delta		North of Delta		South of Delta	
		M&I	Ag	M&I	Ag	M&I	Ag	M&I	Ag	M&I	Ag	M&I	Ag
1935	BN	90	65	90	65	85	60	85	60	-5	-5	-5	-5
1972	BN	100	100	100	80	100	95	100	80	0	-5	0	0

BN = Below Normal (Sacramento 40-30-30 Index), Ag = Agricultural, M&I = Municipal and Industrial

The PROSIM modeling shows small and infrequent differences in allocations to CVP Water Service Contractors. Nonetheless, because of the impact threshold criteria adopted for water supply, the impact of the implementation of the Action Alternatives to CVP service contractors would be considered significant.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the No Action/No Project Alternative in the Future (2025)

Impact 3.4-12: Effects on water supply to American River water rights holders.

Because water rights holders are given first priority to the water supply available, their supply would not be diminished under the future condition (2025). American River water rights holders would receive the same amount of water under the No Action/No Project Alternative and the Action Alternatives. Therefore, no impact to American River water rights holders would result from the Action Alternatives as compared to the No Action/No Project Alternative.

Impact 3.4-13: Effects on delivery allocations to SWP customers.

SWP customers receive deliveries from the Feather River and the Delta. Although deliveries to SWP customers would be less than 100 percent of demand in most years as a function of the hydrology or water supply conditions, both the Feather River and the Delta service area customers would receive the same delivery allocation under the future condition with the project as under the No Action/No Project Alternative. Therefore, there would be no water supply impact to SWP customers from implementation of the Action Alternatives.

Impact 3.4-14: Effects on delivery allocations to CVP contractors.

Settlement and Exchange Contractors

Delivery allocation, and therefore water supply impact is dependent on the category of contract (see additional description under Impact 3.4-11). Because the delivery allocation for the Sacramento River Settlement Contractors and the San Joaquin River Exchange Contractors is dependent solely on the Shasta Inflow Index, these two types of contractors would not experience any change in allocation as a result of the future condition including implementation of the Action Alternative. Therefore, there would be no water supply impacts to either Settlement or Exchange Contractors.

Central Valley Project Water Service Contractors

The percent delivery allocation differs slightly under the No Action/No Project Alternative as compared to the Action Alternatives. Agricultural and M&I contractors north of the Delta would experience a five percent decrease in allocation in one year and a five percent increased allocation in another year, under the Action Alternatives relative to the No Action/No Project Alternative condition.

South of the Delta agricultural contractors experience two years with a five percent decrease and two years with a five percent increase in allocation. South of the Delta M&I contractors experience two years with increased allocation and only one year with decreased allocation. **Table 3.4-8** summarizes the difference in allocation under the future condition with and without one of the Action Alternatives.

Table 3.4-8
Changes in CVP Percent Allocation Under Future No Action/No Project and Future Conditions

		Future No Action/No Project				Future Condition				Difference			
		North of Delta		South of Delta		North of Delta		South of Delta		North of Delta		South of Delta	
Year	Year Type	M&I	Ag	M&I	Ag	M&I	Ag	M&I	Ag	M&I	Ag	M&I	Ag
1927	W	100	100	100	90	100	100	100	85	0	0	0	-5
1928	AN	100	85	90	65	100	85	95	70	0	0	5	5
1935	BN	80	55	80	55	75	50	75	50	-5	-5	-5	-5
1987	C	70	20	70	20	75	25	75	75	25	5	5	5

W = Wet, AN = Above Normal, BN = Below Normal, D = Dry, C = Critical (Sacramento 40-30-30 Index),
Ag = Agricultural, M&I = Municipal and Industrial

As shown in Table 3.4-8, a reduction in water supply availability associated with PCWA's increased diversion may cause an allocation cut (1927 and 1935). An allocation reduction in one year may result in an allocation increase in the following year (1927-1928). Under the No Action/No Project Alternative, PCWA can divert up to 19,300 AFA, over an eight-month period, with no reductions in dry years. Under the Action Alternatives, the year-round pump station would divert 35,500 AFA in years when the March to November Folsom Reservoir unimpaired inflow would be above 950,000 AF. When the March to November Folsom unimpaired inflow was projected to be less than 950,000 AF, PCWA would replace diversions in excess of 8,500 AFA as agreed to in the Water Forum Agreement. This agreement includes provisions for PG&E approvals and arrangements with a downstream buyer. The replacement water could be up to 27,000 AF in dry years. As a consequence, the Proposed Project could result in an increased water supply to the CVP in dry years, and therefore, increased supply available for meeting allocations to other CVP Water Service Contractors (1987).

The PROSIM modeling suggests small and infrequent differences in allocations to CVP Water Service Contractors. Nonetheless, because of the impact threshold criteria adopted for water supply, the impact of the Action Alternatives and related changes in CVP operations upon CVP Water Service Contractors would be considered significant. It is recognized that use of water by PCWA is in accordance with its water rights in its place of use has a priority to the CVP's rights at Folsom to the extent that such CVP rights are used for export.

Cumulative Impacts

Impact 3.4-15: Effects on water supply to American River water rights holders.

Water rights holders have a higher priority to the available water supply higher than CVP south of Delta contractors. Consequently, the Action Alternatives would impact the CVP allocation before impacting water rights holders. The hydrologic modeling reflects this, showing identical deliveries to water rights holders under the existing condition and the cumulative condition. Therefore, no impact to American River water rights holders would result under the cumulative condition.

Impact 3.4-16: Effects on delivery allocations to SWP customers.

SWP customers receive deliveries from the Feather River and the Delta. The Feather River service area customers would not experience allocation reductions under the cumulative condition.

SWP customers dependent on water supplies from the Delta would, however, be subject to allocation reductions resulting from CVP/SWP operations under the cumulative condition. Such reductions would be caused by a decrease in surplus Delta inflow caused by the cumulative condition. Deliveries to SWP contractors are not distinguished by contract type (i.e., irrigation or municipal) in PROSIM, therefore, impacts reported are aggregate reductions in deliveries.

Modeling results show that SWP contractors would experience allocation reductions in 42 out of the 70 years simulated and allocation increases in three years under the cumulative condition. The allocation reductions range from five percent to 45 percent (Appendix H of the Draft EIS/EIR, Figure H-3.4-1). Given the frequency and magnitude of decrease in allocation to SWP customers, this is considered a significant cumulative impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis indicates that the delivery allocation to SWP customers would remain unchanged between the future base and the cumulative condition. Consequently, there would be no impact associated with the Action Alternatives' contribution to future impacts to SWP customers.

Impact 3.4-17: Effects on delivery allocations to CVP contractors.

Settlement and Exchange Contractors

Because the delivery allocation for the Sacramento River Settlement Contractors and the San Joaquin River Exchange Contractors is dependent solely on the Shasta Inflow Index, these two types of contractors would not experience any change in allocation as a result of the project alternatives. Therefore, there would be no impacts to either Settlement or Exchange Contractors as a result of the Action Alternatives.

Central Valley Project Water Service Contractors

CVP contract demands on the American River associated with future level of development are 195,850 AFA, while the same demands under the existing condition are 65,850 AFA. Because of the increased demands, it is likely that lower allocations to all categories of CVP contractors would occur in the future. However, lower allocations do not necessarily mean lower deliveries, particularly in drier years. For example, a 50 percent allocation under the future condition would mean 97,925 AFA delivery, which is more than a 100 percent allocation under the existing condition.

Figures H-3.4-2 through H-3.4-5 show the year-by-year change in allocation simulated by PROSIM (cumulative compared to the existing condition). All categories of CVP Water Service Contractors would experience reductions in allocation ranging from five percent to 25 percent.

CVP M&I contractors north of the Delta would experience reductions in allocation in 24 out of the 70 years simulated (Figure H-3.4-2). CVP agricultural contractors north of the Delta would experience allocation reductions in 42 out of the 70 years simulated (Figure H-3.4-3).

CVP M&I contractors south of the Delta would experience reductions in allocation in 24 out of the 70 years simulated, and increases of five percent in three years (Figure H-3.4-4). Out of the 70 years simulated, CVP agricultural contractors south of the Delta would experience allocation reductions in 35 years and increases in nine years (Figure H-3.4-5).

The PROSIM modeling shows changes in allocations to CVP Water Service Contractors. Because of the magnitude and frequency of change in allocation to CVP Water Service Contractors, the cumulative impact to these contractors would be considered significant.

Action Alternatives' Incremental Contribution to the Cumulative Condition

All categories of CVP Water Service Contractors would experience small reductions in delivery allocation as a result of the Action Alternatives under the future condition. Figures H-3.4-6 through H-3.4-9 show the year-by-year change in CVP delivery allocation simulated by PROSIM. CVP M&I and agricultural contractors north of the Delta would experience a five percent reduction in allocation in one out of the 70 years simulated (Figures H-3.4-6 and H-3.4-7).

CVP M&I contractors south of the Delta would experience a five percent reduction in allocation in one year and a five percent increase in allocation in another year, out of the 70 years simulated (Figure H-3.4-8). Therefore, there would be no long-term net change in the CVP M&I contractors south of the Delta delivery allocation. Out of the 70 years simulated, CVP agricultural contractors south of the Delta would experience allocation reductions of five percent in two years and an increase of five percent in one year (Figure H-3.4-9).

The PROSIM modeling suggests small and infrequent changes in allocations to CVP Water Service Contractors related to implementation of one of the Action Alternatives. The allocation, although small and infrequent, must be considered a significant impact. It is recognized that use of water by PCWA in accordance with its water rights in its place of use has a priority to the CVP's rights at Folsom to the extent that such CVP rights are used for export.

3.4.2.5 Environmental Protection and Mitigation Measures

The net reduction in CVP water delivery allocation to north of the Delta agricultural contractors has been identified as a significant unavoidable impact. This change in delivery allocation would result as an indirect effect of the Action Alternatives due to Reclamation's changes in operation of the CVP system in response to changes in PCWA's river diversions upstream of Folsom Reservoir.

The Proposed Project consists of diversion and use of American River water to benefit interests in Placer County. Because the American River flows through Placer County, state and federal law protect it from adverse water supply impacts associated with the operation of the CVP and SWP. Both the County of Origin Protection and the Watershed of Origin Protection guarantee Placer County a priority right to water that is senior to the water rights held by the CVP and SWP for water export. This protection guarantee applies even if it means a reduction of water supply that is available for service to existing CVP and SWP customers. The net result of the statutory and policy protections embodied in the County of Origin Protection and the Watershed of Origin Protection is to ensure that even if the project has a significant adverse impact on the CVP and SWP customers, the project may proceed.

Unavoidable Adverse Impacts

Areas north of the Delta are protected, in terms of overall CVP operations, by the area of origin statues. Because PCWA cannot assure that water supply impacts would be reduced to less-than-significant levels, to fulfill the disclosure requirements of CEQA, this EIS/EIR must indicate that water supply impacts are considered significant and unavoidable.

3.5 FISH RESOURCES AND AQUATIC HABITAT

3.5.1 AFFECTED ENVIRONMENT

3.5.1.1 Regional Setting

The regional setting for fish resources includes the American and Sacramento rivers and reservoirs, as well as Oroville Reservoir and the Feather River, that may be influenced by implementation of the Proposed Project or alternatives and other reasonably foreseeable future actions within the American River Basin that influence future CVP operations. The area is defined in Section 3.2.1 and shown on Figure 2-1. The fish resources, including lifestage histories, are described in the Cumulative Report (Appendix D of the Draft EIS/EIR). For the lower American River, Sacramento River and Delta, species of primary management concern include those that are recreationally or commercially important (fall-run chinook salmon (*Oncorhynchus tshawytscha*), American shad (*Alosa sapidissima*), striped bass (*Morone saxatilis*)), and federal- and/or state-listed species of the region (winter- and spring-run chinook salmon, steelhead (*Oncorhynchus mykiss*), delta smelt (*Hypomesus transpacificus*), Sacramento splittail (*Pogonichthys macrolepidotus*)), and candidate species under the federal ESA (fall-run chinook salmon).

Section 3.19, ESA Compliance, identifies ESA Section 7 requirements and provides an evaluation of impacts upon federally listed special-status species. The discussion identifies conclusions and determinations for each species and associated critical habitat, where designated.

3.5.1.2 Project Area Setting

The project area represents the direct effect study area for fish resources and aquatic habitat and encompasses the Middle Fork American River from Ralston Afterbay to the confluence with the North Fork and downstream to Oregon Bar (see Figure 2-2). Federal- and state-listed species are not known to occur in the upper American River. Species of management concern within the project area in the upper American River include rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*). Upstream migration of anadromous fish in the American River system is limited to the 23-mile reach of the lower American River below Nimbus Dam, which physically blocks further upstream migration.

Middle Fork American River

The Middle Fork American River supports both warm and coldwater fish species year-round. Operation of PCWA's MFP, constructed in 1962 (including Ralston Afterbay), results in cooler summer and fall water temperatures, thereby improving habitat suitability for rainbow trout and brown trout for a portion of the river below Ralston Afterbay (Corps 1991; Reclamation 1996a). Brown trout are resident stream fish, meaning they spend their entire lifecycle in fresh water. Spawning generally occurs during November and December (Moyle 1976). Brown trout fry typically hatch in seven to eight weeks, depending on water temperature, with emergence of young three to six weeks later.

Optimal riverine habitat for brown trout reportedly consists of cool to coldwater, silt-free rocky substrate, an approximate 1:1 pool-to-riffle ratio, and relatively stable water flow and temperature regimes (Raleigh et al. 1986). Moyle (1976) reported that while brown trout will survive for short periods in water temperatures in excess of 80.6°F, optimum water temperatures for growth range from 44.6°F to 66.2°F, with a preference for temperatures in the upper half of this range. Brown trout tend to utilize lower reaches of low to moderate gradient areas (less than one percent) in suitable, high gradient rivers (Raleigh et al. 1986).

As with brown trout, rainbow trout also are resident stream fish whose optimal riverine habitat reportedly consists of coldwater, silt-free rocky substrate, a 1:1 pool-to-riffle ratio, and relatively stable water flow and temperature regimes (Raleigh and Duff 1980 *in* Raleigh et al. 1984). Moyle (1976) reported that while rainbow trout will survive in water temperatures of up to 82.4°F, optimum water temperatures for growth and completion of most lifestages reportedly range from 55.4°F to 69.8°F. Rainbow trout spawning generally occurs from February to June (Moyle 1976). Rainbow trout fry emerge from spawning nests approximately 45 to 75 days after spawning, depending on water temperatures.

In addition to rainbow and brown trout, fish sampling surveys of the Middle Fork American River conducted by the USFWS in 1989 from Ralston Afterbay downstream to the confluence with the North Fork American River documented the presence of hitch (*Lavinia exilicauda*), Sacramento sucker (*Catostomus occidentalis*), pikeminnow (*Ptychocheilus grandis*), and riffle sculpin (*Cottus gulosus*) (Corps 1991). No federal- or state-listed species or species proposed for listing under the federal ESA or CESA are reported in the Middle Fork American River.

North Fork American River

Downstream of its confluence with the Middle Fork, the North Fork American River supports warmwater fish species year-round, including smallmouth bass (*Micropterus dolomieu*), pikeminnow, Sacramento sucker, riffle sculpin, brown bullhead (*Ictalurus nebulosus*), and green sunfish (*Lepomis cyanellus*). Although some rainbow and brown trout are present, summer and fall water temperatures are generally too warm for significant spawning and early-lifestage rearing of trout. The majority of trout that do occur in the North Fork American River below the confluence with the Middle Fork American River are believed to be transitory downstream adult and/or sub-adult migrants that have dispersed into the area from upstream habitats (i.e., Middle Fork American River).

Project Site to Oregon Bar

The primary fish species that exist within the American River through the project area and downstream to Oregon Bar include those listed previously for the North Fork and Middle Fork American River, as well as spotted bass (*Micropterus punctulatus*), largemouth bass (*Microptemus salmonides*), and other centrarchid species. Coldwater fish, such as the native rainbow trout and introduced brown trout, also occur within the project area. However, use of the project area by trout is primarily limited to transitory downstream adult or sub-adult migrants with little, if any, use of the project area for spawning or early-lifestage rearing (J. Hiscox, pers. comm. 1997; S. Lehr, pers. comm. 1997; J. Nelson, pers. comm. 1997). No anadromous salmonids or federal- or state-listed or species proposed for listing under the federal ESA or CESA are known to occur in the project area.

Auburn Ravine

Auburn Ravine flows include natural streamflow augmented by agricultural delivery and return flows, hydroelectric generation releases, wastewater treatment plant discharges from the City of Auburn, and stormwater runoff from the City of Auburn. The existing Auburn Ravine mean monthly flows are presented in **Table 3.5-1**.

Table 3.5-1
Estimated Streamflows in Auburn Ravine under Present Management Conditions
(Mean Monthly Flow, cfs)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
117	120	132	66	88	82	114	99	43	30	39	84

Source: Eco:Logic Engineering Water Balances; Nevada Irrigation District (NID) Gauge in Auburn Ravine below Highway 65 *in* City of Lincoln 1999

Auburn Ravine - Estimated Natural Flow Conditions

Natural flows estimated for Auburn Ravine exhibit significant monthly variations. Relatively high flows associated with storm runoff occur during winter months, particularly January, and flows decline to very low levels during spring months, with no natural flow during summer months. Estimated mean monthly natural streamflows in Auburn Ravine at the Highway 65 Bridge in the City of Lincoln range from approximately 70 cfs in January to 0 cfs in summer and early fall months (City of Auburn 1997 *in* City of Lincoln 1999) (**Table 3.5-2**).

Table 3.5-2
Estimated Natural Streamflows in Auburn Ravine Near Highway 65 Bridge in Lincoln
(Mean Monthly Flow, cfs)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
70.6	50.9	32.3	20.1	2.4	0.2	0.1	0.0	0.0	4.1	11.7	38.2

Source: City of Auburn 1997 *in* City of Lincoln 1999.

Auburn Ravine - Existing Flow Conditions and Supplemental Source Waters

Historically, Auburn Ravine has been used to convey water from multiple sources. Under existing conditions, the natural streamflow of Auburn Ravine is supplemented by four primary sources: (1) PG&E Drum-Spaulding Project source water; (2) PCWA deliveries from the North Fork American River through the Auburn Ravine Tunnel; (3) City of Auburn treated effluent discharges from its wastewater treatment plant; and (4) Auburn Ravine watershed stormwater runoff.

These supplemental sources result in streamflows that vary considerably from estimated natural flow conditions in Auburn Ravine. Without the influence of these supplemental water sources, Auburn Ravine would remain an intermittent stream carrying only flow originating at its headwaters and runoff from the watershed. Although Auburn Ravine flows can vary substantially on a daily and monthly basis, in general, these supplemental flows significantly augment the estimated natural late summer and early fall streamflows. Therefore, in comparison to the estimated natural flows, existing condition flows in Auburn Ravine are higher in summer months and lowest during fall months.

Pacific Gas and Electric Company Drum-Spaulding Project Source Water

PG&E's Drum-Spaulding system and Nevada Irrigation District's (NID) Upper Yuba River system are integrated to meet the water demands of western Placer and Nevada counties, while at the same time maximizing hydroelectric power production. This joint system is one of the oldest and most complex water systems in California, with storage reservoirs and canals that can capture runoff from the north, middle and south forks of the Yuba River, the Bear River, and the Upper North Fork of the American River, and route that water through a series of hydroelectric plants and to customers all the way to Folsom Reservoir.

Much of the water supplies provided by the Drum-Spaulding system are delivered either to NID or PCWA to meet the consumptive demands of their customers. Consumptive deliveries to NID and PCWA via Auburn Ravine occur during the "irrigation season" (April 15 to October 15). Most of the consumptive demand satisfied through deliveries to Auburn Ravine is for irrigated commercial agriculture in Zone 5 (primarily rice and pasture), most of which occurs on land between Highway 65 and the Sacramento River. Over the course of the current planning horizon (2030) it is not anticipated that the consumptive demand for irrigation water deliveries via the Auburn Ravine will change.

In addition to these consumptive use deliveries to PCWA and NID during the irrigation season, PG&E often spills substantial amounts of hydroelectric system water to Auburn Ravine. PG&E's Drum-Spaulding system originally terminated at its Wise Powerhouse in the Auburn Ravine, and all of the water that ran through the hydroelectric system that was not delivered for consumptive use at other locations was spilled into the Auburn Ravine. A lawsuit by downstream landowners on the Auburn Ravine to prevent flooding by these spills forced PG&E to construct the South Canal in 1931. Since then, the South Canal delivers most of the spill water into Folsom Reservoir. However, the capacity of the South Canal is less than the Wise Canal, which delivers water into Auburn Ravine upstream of the Wise Powerhouse. The result is that, in winter and spring, when demand for consumptive deliveries from the Wise Canal is low and the Wise Canal is running at full capacity for hydroelectric power production, a substantial amount of water is still spilled into the Auburn Ravine.

Today, the South Canal also is used for consumptive delivery at a capacity of about 450 cfs, of which PCWA has contractual entitlement to 244.8 cfs, with NID entitled to the remainder. The

South Canal is at about elevation 900 at its point of discharge to Auburn Ravine. At the peak of the summer delivery season, 100 percent of the capacity of the PG&E canal system below Rollins Reservoir is used to meet consumptive deliveries to NID and PCWA. During these periods the hydroelectric operation becomes secondary to the water delivery requirements, and there is no excess spill water in Auburn Ravine.

PG&E operates the Wise Powerhouse with flows from the Yuba and Bear rivers to generate power year-round, with the exception of the four to six weeks in the late fall when it shuts down the hydroelectric system for maintenance. As indicated above, PG&E powerhouse releases to the South Canal are conveyed to Auburn Ravine for use by NID and PCWA deliveries to irrigation customers within their respective service areas. These releases are made over the course of the entire irrigation season. Additionally, throughout much of the summer, PG&E continuously releases flows of approximately 31 cfs (20 mgd) from the Wise Powerhouse South Canal into Auburn Ravine, thereby providing supplemental streamflows when the ravine would naturally become dry. **Figure 3.5-1** shows the Auburn Ravine watershed and related water supply delivery infrastructure. **Figure 3.5-2** provides a regional view of the Auburn Ravine watershed and related water supply service areas for PCWA and NID.

PCWA North Fork American River Source Water

PCWA currently has the ability to pump approximately 50 cfs of American River water to Auburn Ravine during the irrigation season. The transferred water is pumped through the Auburn Ravine Tunnel using the seasonal (temporary) American River pump station.

When PCWA's consumptive water demands increase beyond the amount available from PG&E (244.8 cfs), PCWA operates the seasonal American River pump station and delivers water into Auburn Ravine via the Auburn Ravine Tunnel. This water is delivered to PCWA customers along Auburn Ravine west of Highway 65.

The seasonal American River pump station has been used at times to deliver the full capacity (50 cfs) of North Fork American River water to Auburn Ravine. For instance, during the 1977 drought event, the seasonal American River pumps were used to supply Auburn Ravine with 8,500 AF of North Fork American River water and an exchange of water took place with NID. North Fork American River water was delivered to NID via the Auburn Ravine Tunnel and PG&E water that normally would have been delivered to NID via Auburn Ravine was instead delivered to PCWA's water treatment plants and canals within the Auburn, Newcastle, Penryn, Loomis, Rocklin, and Lincoln areas.

In more recent years, the seasonal pump station has provided a maximum annual delivery of approximately 2,900 AF of North Fork American River water to Auburn Ravine. The American River supply is used to meet peak irrigation demands, primarily during summer months. Agricultural return flows also contribute to the streamflow conditions of Auburn Ravine from April through September/October.

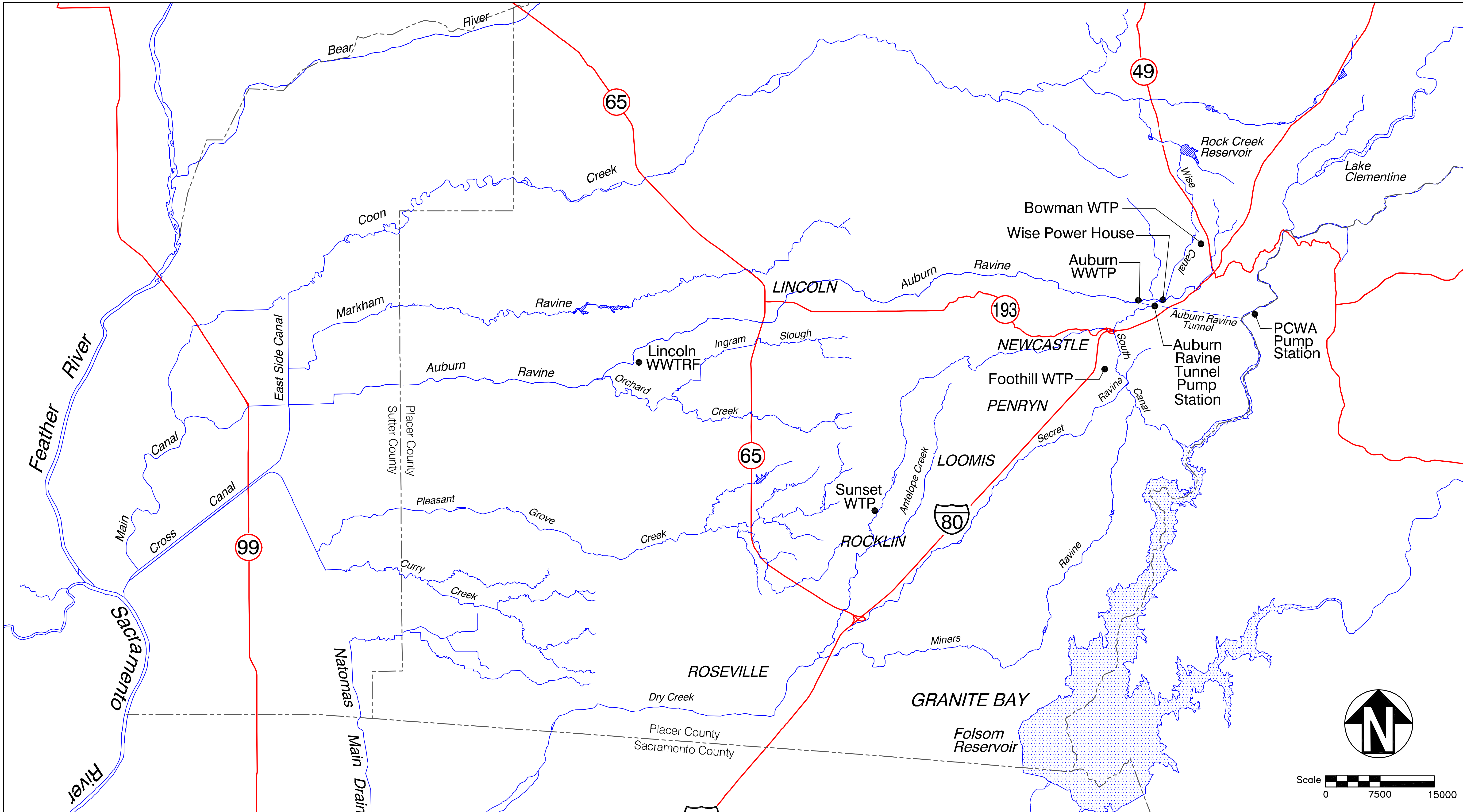


Figure 3.5-1 Auburn Ravine Watershed and Related Delivery System Infrastructure

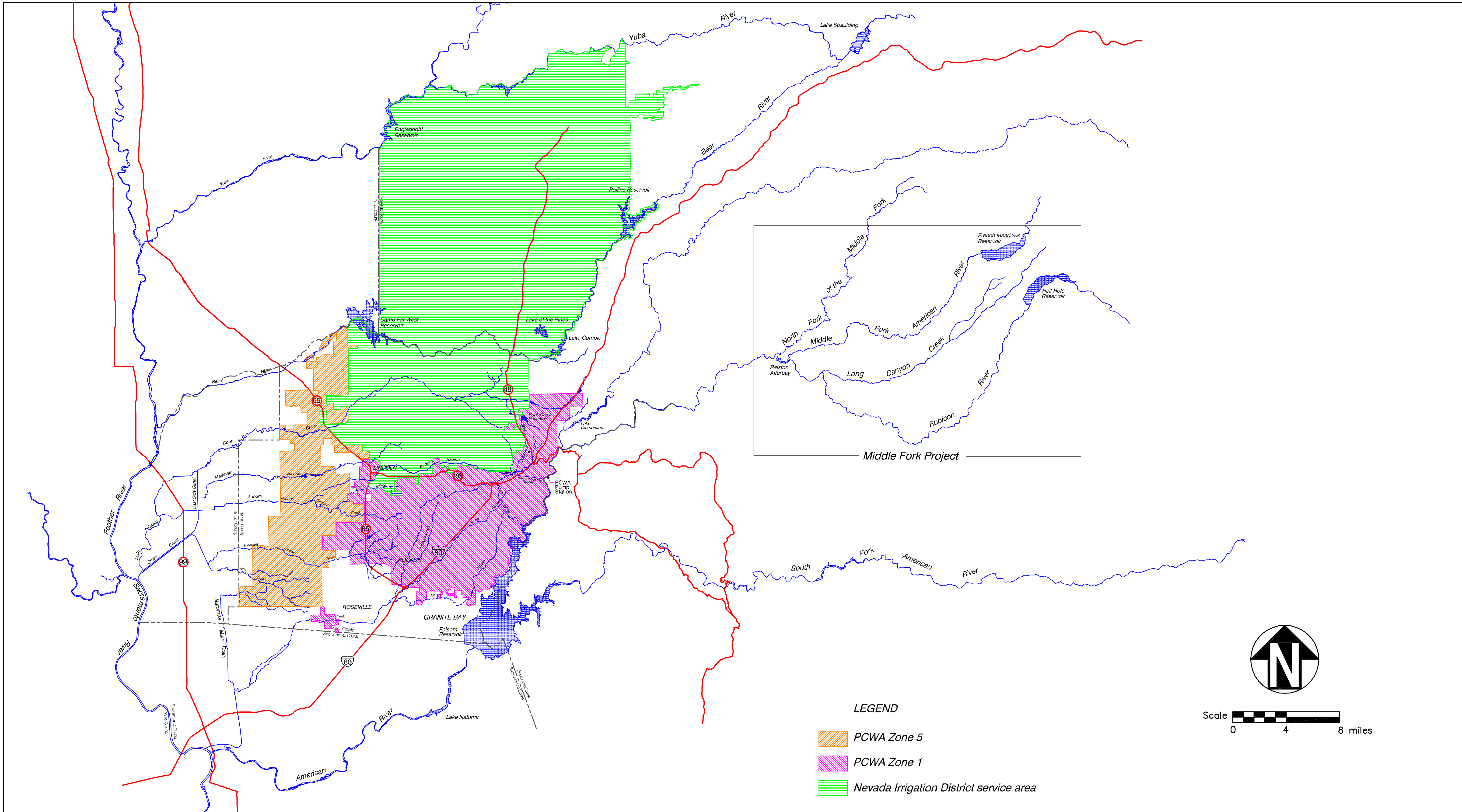


Figure 3.5-2 Regional View of Auburn Ravine Watershed

In addition to being able to supply water to Auburn Ravine from the American River, PCWA has the ability to pump approximately 50 cfs of water directly from the Auburn Ravine Tunnel to PG&E's South Canal via the Auburn Ravine Tunnel pump station (constructed in 1990). This pump station is located directly above the Auburn Ravine Tunnel and lifts water approximately 200 feet from the tunnel to PG&E's South Canal. Once within the South Canal, this water flows by gravity toward the Foothill WTP. The Auburn Ravine Tunnel pump station has been used infrequently in the past, due to the high cost of double-pumping the American River water.

Water pumped from the American River historically has been delivered into Auburn Ravine. When American River water has been needed, PCWA orders a cutback in its PG&E deliveries to Auburn Ravine and reassigns the water to delivery at other, higher elevation locations. By exchanging American River water for PG&E's Drum/Spaulding water in this fashion, PCWA has been able to save half the energy cost that would otherwise be incurred in double-pumping the American River water from the 500-foot elevation of the American River to the 700-foot elevation of the Auburn Ravine Tunnel, and then pumped again to the 900-foot elevation of the South Canal (**Figure 3.5-3**)

While the water exchange has been effective during the irrigation seasons of past years in reducing double-pumping costs, PCWA has still been required to double-pump water during the annual PG&E canal maintenance outage in late October and early November. During these outages, water is not available from PG&E, and PCWA must double-pump American River water to supply the Foothill WTP and treated water customers.

City of Auburn Wastewater Treatment Plant Discharges

The City of Auburn's Wastewater Treatment Plant (WWTP) lies along the Auburn Ravine approximately one-half mile below PG&E's Wise Powerhouse South Canal crossing and one-half mile above the outlet of PCWA's Auburn Ravine Tunnel. The City continuously releases approximately 3.9 cfs of treated effluent into Auburn Ravine year-round. The City of Auburn WWTP service area water supply source is imported from the Drum-Spaulding Project (Yuba/Bear River system) and delivered by PCWA. The treated wastewater effluent releases are a function of the WWTP inflow and are unrelated to other sources of water released into Auburn Ravine. Likewise, direct releases to Auburn Ravine from other source waters are independent of the City of Auburn's WWTP.

Auburn Ravine Watershed - Stormwater Runoff

The Auburn Ravine headwaters lie within the City of Auburn. Urban stormwater runoff occurs in response to rainfall and due to over-watering of landscaped areas.

Fish Resources and Aquatic Habitat Considerations

The current flow augmentation in Auburn Ravine is particularly beneficial for chinook salmon and steelhead. Higher spring and summer flows support greater habitat diversity, increased quantity and quality of habitats, and lower summer water temperatures than what would be found

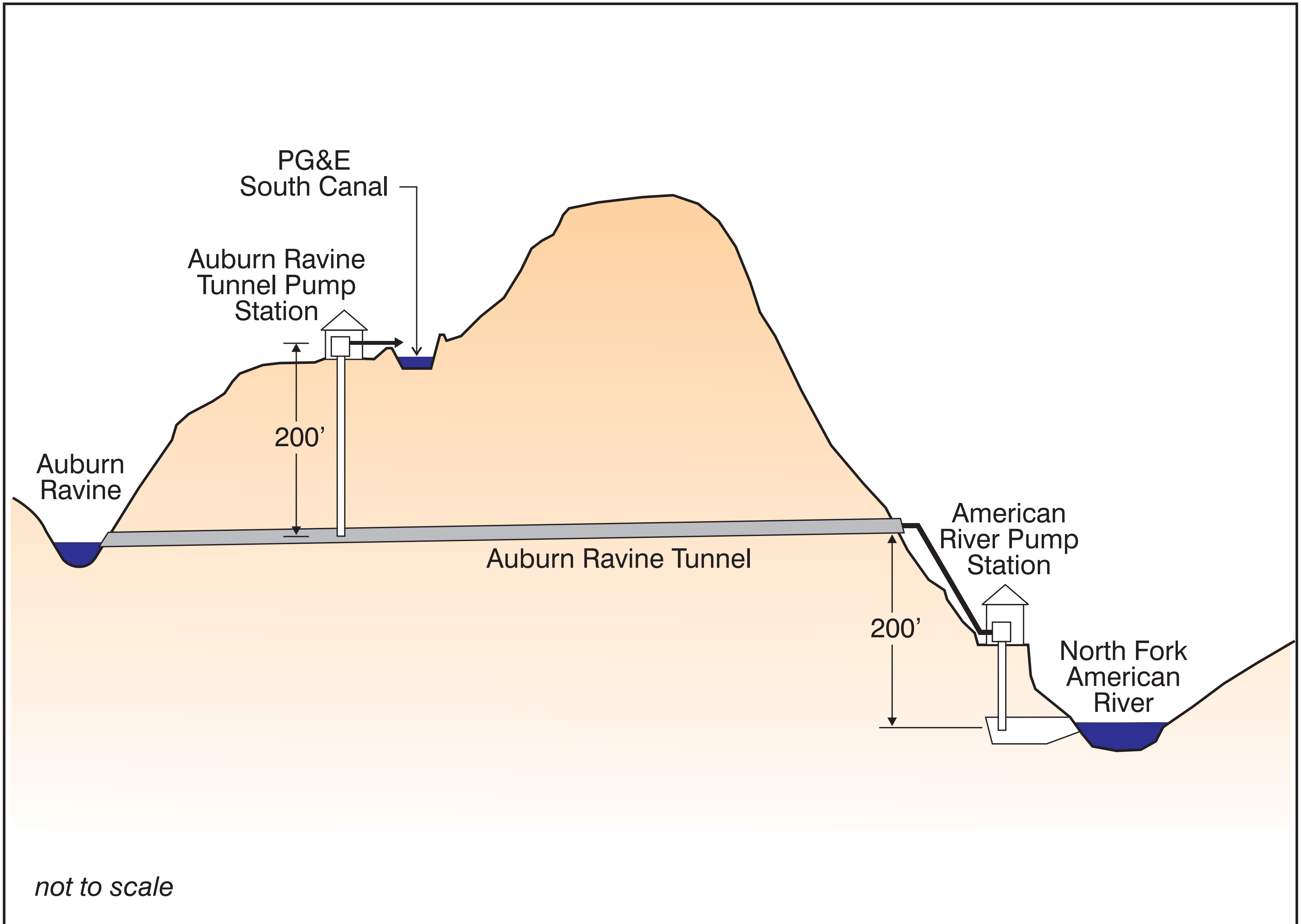


Figure 3.5-3 Hydraulic Profile of Water Deliveries from the American River Pump Station

PCWA-043

under natural conditions (City of Lincoln 1999). Current water management practices, therefore, greatly enhance potential anadromous salmonid production in Auburn Ravine (City of Lincoln 1999).

Although flow augmentation provides obvious beneficial effects for anadromous salmonids in Auburn Ravine, concern has been raised about an increase in salmonid straying into Auburn Ravine due to the existing deliveries of North Fork American River water into Auburn Ravine, as well as the project's contribution to the Lincoln Wastewater Treatment and Reclamation Facility (WWTRF) discharges. The issue of straying is of particular concern because steelhead are listed as threatened under the federal ESA, fall-run chinook salmon are listed as a candidate species under the federal ESA, and spring-run chinook salmon are listed as threatened under both the federal ESA and CESA. Presumably, the possibility of increased straying of anadromous salmonids into Auburn Ravine is a concern because of potential impacts, including competition and genetic introgression, on fish native to Auburn Ravine.

Fish surveys of Auburn Ravine conducted in 1997, 1998, and 1999 indicate a fish population assemblage typical of a Sierra Nevada foothill stream (City of Lincoln 1999). In general, these surveys found steelhead/rainbow trout, Sacramento pikeminnow, Sacramento sucker and hitch in upstream areas characterized by more complex structure and gravel substrates (City of Lincoln 1999). The fish assemblage in areas downstream of the Highway 65 Bridge included a number of non-native sunfish family members, mosquitofish, and carp. Habitat in the downstream locations is characterized by lower stream gradient and slower velocity, less complex structure, and sand substrate (City of Lincoln 1999). The federally listed splittail are not believed to use Auburn Ravine. Auburn Ravine does not provide conditions consistent with big-river, floodplain, and estuarine habitat normally used by splittail (Sommer et al. 1997). Although it is possible that some splittail could exist in Auburn Ravine, given the absence of splittail in fish surveys, and given the absence of appropriate habitat, splittail are not expected to occur in Auburn Ravine (City of Lincoln 1999).

Fall-run Chinook Salmon

Fall-run chinook salmon from the Feather River and Nimbus hatcheries historically have been stocked by CDFG in Auburn Ravine, Doty Ravine, and Coon Creek (Cramer and Demko 1997 *in* City of Lincoln 1999). Typically, about 100,000 fall-run chinook salmon fingerlings from Nimbus Fish Hatchery are released annually into Auburn Ravine. In March 1998, CDFG released 140,000 fall-run chinook salmon fingerlings into Auburn Ravine. No chinook salmon were collected or observed during the fish surveys conducted in 1997, 1998, or 1999. However, anecdotal information from long-time residents indicates that fall-run chinook salmon historically migrated as far upstream as Auburn to spawn. Lincoln area residents report that as many as several hundred fall-run chinook salmon spawned just upstream of Lincoln in the fall of 1985 (City of Lincoln 1999).

Spring-run Chinook Salmon

Occurrence of either adult or juvenile lifestages of spring-run chinook salmon have not been documented in Auburn Ravine. Spring-run chinook salmon are not believed to be native to

Auburn Ravine but, over the last 15 years, spring-run chinook salmon from the Feather River and Nimbus hatcheries have been stocked in Auburn Ravine by CDFG (Cramer and Demko 1997 *in* City of Lincoln 1999). In March 1998, CDFG released 77,400 spring-run chinook salmon fingerlings into Auburn Ravine and the same number in Doty Ravine, which combines with Auburn Ravine and Coon Creek prior to the combined waters flowing into the Cross Canal (Cramer and Demko 1997 *in* City of Lincoln 1999). Spring-run chinook salmon from the Feather River Hatchery are interbred with fall-run chinook salmon and do not represent a genetically uncontaminated stock (CDFG 1994 *in* City of Lincoln 1999).

Central Valley Steelhead

Currently, there is little detailed information regarding steelhead specific to Auburn Ravine. Steelhead/rainbow trout were not collected during the fish survey conducted in 1997, although juveniles were collected in upstream areas in the 1998 and 1999 surveys. It can be difficult to definitively determine whether juveniles are the anadromous steelhead or resident rainbow trout. The fish survey conducted in 1998 reported that some of the captured juveniles exhibited the iridescent silvery sides typical of smolting salmonids (City of Lincoln 1999). The juvenile steelhead/rainbow trout collected during the 1999 survey reportedly did not exhibit any obvious visual characteristics of emigration associated with the anadromous form (i.e., steelhead) (City of Lincoln 1999).

Steelhead have not been reported to have been planted in Auburn Ravine. Rainbow trout historically were planted in Auburn Ravine until 1965. Rainbow trout continues to be planted in water bodies connected to Auburn Ravine (e.g., the Bear River and associated reservoirs) (City of Lincoln 1999).

Anecdotal information suggests that adult steelhead, exhibiting the silver-side characteristics of recent migration from the ocean, have been captured and released by anglers in the Ophir area. Long-time residents report that steelhead/rainbow trout routinely spawned near Auburn.

Juvenile steelhead would be expected to rear in Auburn Ravine for a year or more prior to emigration to the ocean. Therefore, summer rearing habitats are an important factor in the survival of these juveniles, and the current water management practices in Auburn Ravine provide this habitat.

3.5.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.5.2.1 Methodology

Facilities-Related Analysis Approach

Facilities-related effects include those associated with construction, operation, and maintenance of the pump station facilities, and restoration of the previously dewatered channel, and are limited to the immediate project area setting. To determine if potential impacts to fish resources may occur as a result of construction of project facilities, the duration of construction, the potential turbidity, sedimentation, and siltation resulting from construction, and the composition of the fish communities present in the immediate project area (North Fork American River) were considered and evaluated.

Operation and maintenance considerations include potential impacts associated with project facilities and fish screen functions on the aquatic resources of the upper American River. To determine potential impacts to fish passage resulting from alternative facility operations, fish swimming velocities, and the length of the bypass tunnel were considered and evaluated. Finally, as part of the operation considerations, fish communities present in the project area, as well as their respective lifestages, were assessed to determine if any potential impacts would be associated with backwater created by the new diversion facilities. Additionally, the analysis evaluated potential impacts to adult salmonid emigration patterns resulting from operational changes in Auburn Ravine flows. To determine if salmonid genetic stock in Auburn Ravine would be expected to be impacted from alternative operations, a literature review regarding chemical detection limits and olfactory response mechanisms of salmonids was conducted. Auburn Ravine water composition and hatchery influences also were evaluated.

Diversion-Related Analysis Approach

Extensive hydrologic, water temperature, and early lifestage salmon mortality modeling was performed to provide a quantitative basis from which to assess potential diversion-related impacts to fish resources and aquatic habitats within the study area.

Modeling output provided monthly values for each year of the 70-year period of record modeled for river flows, reservoir storage and elevation, and for each year of the 69-year hydrologic simulation period modeled for river water temperatures. Water temperature modeling encompassed a 69-year period because the model is based upon a calendar year, whereas the hydrologic modeling is based upon a water year. River water temperature output was then used in Reclamation's chinook salmon mortality models to characterize water temperature-induced losses of early lifestages of chinook salmon under each simulated condition. Output from the salmon mortality models provided estimates of annual (rather than monthly mean) losses of emergent fry from egg potential (all eggs brought to the river by spawning adults), which is presented in terms of survival.

The specific hydrologic, water temperature, and salmon mortality modeling output used to assess potential impacts to fish resources and aquatic habitats are identified in Section 3.5.2.3, Impact Indicators and Significance Criteria, for each water body potentially affected.

Application of Modeling Output

The models used in this analysis (DWR's UARM, Reclamation's PROSIM, reservoir temperature models, American and Sacramento water temperature models, and the lower American and Sacramento river chinook salmon early-lifestage mortality models) are tools that have been developed for comparative planning purposes, not for predicting actual river conditions at specific locations at specific times. The 70-year and 69-year periods of record for PROSIM and temperature modeling, respectively, provide an index of the kinds of changes that would be expected to occur with implementation of a specified set of operational conditions.

Reservoir storage, river flows, water temperature, and salmon survival output for the period modeled should not be interpreted or used as definitive absolutes depicting actual river conditions that will occur in the future. Rather, output for the with-project and the cumulative condition can be compared to that for the without-project condition to determine:

- Whether reservoir storage or river flows and temperatures would be expected to change with implementation of the project alternative;

- The months in which potential reservoir storage and river flow and temperatures changes could occur;

- A relative index of the magnitude of change that could occur during specific months of particular water year types, and whether the relative magnitude anticipated would be expected to result in impacts to fish resources within the regional area; and

- The relative degree to which alterations in operations of Folsom Dam and Reservoir, as directed by the principles of coldwater pool management, could eliminate or minimize temperature increases.

The models used, although mathematically precise, should be viewed as having "reasonable detection limits." Establishing reasonable detection limits is useful to those using the modeling output for impact assessment purposes, and prevents making inferences: (1) beyond the capabilities of the models; and (2) beyond an ability to actually measure changes. Although data from the models are output to the nearest 100 AF, tenth of a foot in elevation, tenth of a cfs, tenth of a degree Fahrenheit, and tenth of a percent in salmon mortality, these values were rounded when interpreting differences for a given parameter between two modeling simulations. For example, two simulations having river flows at a given location within one percent of each other were considered to be essentially equivalent. Because the models provide reservoir storage data on a monthly time-step, measurable differences in reservoir storage were evaluated similarly. Similar rounding of modeled output was performed for other output parameters in order to assure the reasonableness of the impact assessments.

Commonly used field-temperature monitoring equipment (in situ temperature loggers, thermometers, electronic meters) have a total error of measurement of 0.2°F or more. Therefore, modeled differences in temperature of 0.2°F or less could not be consistently detected in the river by actual monitoring of water temperatures. In addition, as mentioned above, output from Reclamation's water temperature models provides a "relative index" of water temperatures under the various operational conditions modeled. Output values indicate whether the temperatures would be expected to increase, remain unchanged, or decrease, and provide insight regarding the relative magnitude of potential changes under one operational condition compared to another. Therefore, for the purposes of this impact assessment, modeled temperature changes that were within 0.3°F between modeled simulations were considered to represent no measurable change. Temperature differences of more than 0.3°F were assessed for their biological significance. This approach is very conservative (rigorous). For example, USFWS and Reclamation, in the Trinity River Mainstem Fishery Restoration Draft EIS/EIR (USFWS et al. 1999), used a change in long-term average water temperature of 0.5°F as a threshold of significance, and the Central Valley RWQCB generally uses a change of 1.0°F or more as a threshold of significance.

<u>Assessment Methodologies</u>

The impact assessment methodologies defined below are discussed in terms of comparing the modeled output for one condition to output from a second condition depicting the additional surface water diversions associated with the Proposed Project or Upstream Diversion Alternative. Hence, throughout this methodology section, reference will be made to comparing modeled output from the Action Alternatives to that under another condition without implementation of a project (i.e., either the existing condition or No Action/No Project Alternative). The same basic methodologies described below were used to assess cumulative impacts (i.e., 2025 with the project versus existing condition) and for evaluating the project's incremental contribution to the cumulative condition.

Upper American River Basin

To assess diversion-related impacts to fish resources and aquatic habitat in the upper American River associated with the Action Alternatives or the cumulative condition, a flow comparison was performed to determine the difference between monthly mean flows for all of the months of the 70-year period of record relative to the basis of comparison. Monthly mean flows were further examined to determine the difference between monthly mean flows for the high-flow season (i.e., December through June) and the low-flow season (i.e., July through October) of the 70-year period of record.

Ralston Afterbay

No substantial storage-, elevation-, or temperature impacts to the fish resources of Ralston Afterbay would be expected to occur because, as a regulating afterbay of the MFP, its monthly storage, elevation, and temperature regimes would be expected to remain relatively similar under the Action Alternatives compared to the existing condition. Any small changes in storage, elevation, or temperature that could occur would constitute a less-than-significant impact to Ralston Afterbay fish resources.

Folsom Reservoir

<u>Warmwater Fisheries</u>

Because Folsom Reservoir's warmwater fish species (black bass, sunfish, crappie, and catfish) use the warm upper layer of the reservoir and nearshore littoral habitats throughout most of the year, seasonal changes in reservoir storage, as it affects reservoir water surface elevation (feet msl), and the rates at which water surface elevation changes during specific periods of the year, can directly affect the reservoir's warmwater fish resources. Reduced water surface elevations can reduce the availability of nearshore littoral habitats used by warmwater fish for spawning and rearing, Therefore reducing spawning and rearing success and subsequent year-class strength. In addition, decreases in reservoir water surface elevation during the primary spawning period for nest-building, warmwater fish (March through July) may result in reduced initial year-class strength through warmwater fish nest "dewatering."

To assess potential elevation-related impacts to the warmwater fish of Folsom Reservoir, the following two-phased approach was used. First, a relationship between reservoir water surface elevation and acres of nearshore littoral habitat containing submerged structure (submerged macrophytes and/or inundated terrestrial vegetation) was developed. Using this relationship, the mean number of acres of littoral habitat was estimated for each month of the primary spawning and rearing period (March through September) under the Proposed Project and the cumulative condition relative to that modeled for the basis of comparison.

Second, the magnitude of change (feet) in reservoir water surface elevation occurring each month of the primary spawning period for nest-building fish (March through July) under the Proposed Project and the cumulative condition was determined and compared to that modeled for the basis of comparison. A recent study by CDFG, which examined the relationship between reservoir elevation fluctuation rates and nesting success for black bass, suggests that a reduction rate of 0.15, 0.18, and 0.39 meter per day (m/day) or greater would result in 100 percent nest mortality (or zero percent nest survival) for largemouth bass, smallmouth bass, and spotted bass, respectively (Lee et al. 1998). However, CDFG reservoir biologists suggest that, on the average, a nest survival rate of at least 20 percent is necessary to maintain the long-term population levels of high-fecundity, warmwater fish (D. Lee, pers. comm. 1998). Using nest survival curves developed by CDFG (Lee et al. 1998), reservoir fluctuation criteria were developed that would provide a minimum nest survival rate of approximately 20 percent for largemouth bass, the bass species found by CDFG to be most sensitive to reservoir elevation fluctuations.

A reduction rate of nine feet per month would represent an approximate water level decrease of 0.3 feet per day (ft/day) (0.09 m/day) during a nesting event, which would correlate to an approximate nest survival rate of 20 percent for largemouth bass (Lee et al. 1998). Therefore, a decrease in mean Folsom Reservoir water surface elevation of nine feet or more per month was selected as the threshold beyond which spawning success of nest-building, warmwater fish (black bass, sunfish, crappie, and catfish) could potentially result in long-term population declines. To evaluate impacts to warmwater fish, the number of times that reservoir reductions of nine feet or more per month could occur under the Proposed Project and the cumulative condition were compared to the number of occurrences that were modeled to occur under the basis of comparison.

Criteria for reservoir elevation increases (nest flooding events) are not recommended by CDFG. Because of overall fishery benefits, greater reservoir elevations that would be associated with rising water levels would offset negative impacts due to nest flooding (Lee et al. 1998). Therefore, the likelihood of spawning-related impacts from nest flooding is not addressed for reservoir fisheries.

Coldwater Fisheries

During the period when Folsom Reservoir is thermally stratified (April through November), coldwater fish within the reservoir reside primarily within the reservoir's metalimnion and hypolimnion where water temperatures remain suitable. Reduced reservoir storage (TAF) during this period could reduce the reservoir's coldwater pool volume, thereby reducing the quantity of habitat available to coldwater fish species during these months. Reservoir coldwater pool size generally decreases as reservoir storage decreases, although not always in direct proportion because of the influence of reservoir basin morphometry. Therefore, to assess potential storage-related impacts to coldwater fish habitat availability in Folsom Reservoir, end-of-month storage modeled for each year of the 70-year period of record under the Proposed Project and the cumulative condition was compared to end-of-month storage under the basis of comparison for each month of the April through November period. Substantial reductions in reservoir storage were considered to result in substantial reductions in coldwater pool volume and, therefore, habitat availability for coldwater fish. Impacts to the coldwater fisheries were further assessed by determining whether seasonal changes in reservoir storage, and associated changes in water-surface elevation, would be expected to indirectly affect coldwater fish species by adversely affecting the productivity of their primary prey species (threadfin shad (*Dorosoma petenense*) and wakasagi (*Hypomesis hipponensis*)).

Lake Natoma

No storage- or elevation-related impacts to fishery resources of Lake Natoma are expected to occur because as a regulating afterbay of Folsom Reservoir, its monthly storage and elevation would be affected little, if at all, by the Proposed Project or cumulative condition, relative to the basis of comparison. Consequently, no quantitative assessment of potential storage- or elevation-related impacts to fishery resources in this water body is warranted.

Because the increased diversion under the Proposed Project and the cumulative condition could alter the temperature of water released from Folsom Dam, and because Lake Natoma's water temperature at any given time is largely dictated by the temperature of water released from Folsom Dam, these additional diversions could change seasonal water temperatures within Lake Natoma. The small changes in lake temperatures that could occur would not be expected to adversely affect the lake's warmwater fisheries. Conversely, increases in lake temperatures could adversely affect coldwater species such as rainbow trout stocked by CDFG. To assess the potential impacts of altered lake temperatures to fishery resources within the lake, monthly mean temperatures of water released from Nimbus Dam were determined for the Proposed Project and the cumulative condition, and compared to monthly mean temperatures modeled under the basis of comparison for each month of the year. Temperatures of water released from Nimbus Dam were used as an “index” to represent the relative changes in Lake Natoma water temperatures that could occur under the Proposed Project, relative to the basis of comparison.

Nimbus Hatchery

Because the additional diversions could alter Lake Natoma water temperatures during some months, and because Nimbus Hatchery diverts its water supply directly from Lake Natoma throughout the year, the Proposed Project or cumulative condition could change hatchery water temperatures during some months of the year. Nimbus Hatchery production remains relatively unaffected when hatchery temperatures remain below 60°F. However, increased disease and mortality of hatchery-reared fish often occurs when temperatures exceed 60°F. Losses from these factors become a particular problem when hatchery water temperatures exceed 65°F for extended periods. Water temperatures exceeding 68°F for even short periods (days) are particularly detrimental to hatchery fish held at high densities, and could require the hatchery to release and/or transfer most or even all of its fish to prevent unacceptably high mortality (B. Barngrover, pers. comm. 1997).

To assess potential temperature-related impacts to Nimbus Hatchery operations, monthly mean temperatures of water released from Nimbus Dam under the Proposed Project and the cumulative condition were modeled and compared to those modeled under the basis of comparison for each month of the year. The number of years of the 69 years modeled that monthly mean Nimbus Dam release temperatures would exceed the index values of 60°F, 65°F, and 68°F under the Proposed Project and the cumulative condition were determined and compared to the frequency of exceedance of these temperature index values under the basis of comparison. In addition, for each month of the year, the mean temperature of water released from Nimbus Dam for the years exceeding each of these temperature index values was determined.

Lower American River

The additional diversions by PCWA could affect lower American River flows and water temperatures during portions of the year. The lower American River is the water body within the study area with the greatest potential to experience impacts to fisheries associated with implementation of the Proposed Project and the cumulative condition due to anticipated changes in Reclamation's operation of Folsom Reservoir. In addition, a number of fish species of primary management concern utilize the lower American River during one or more of their lifestages. For these reasons, species-specific impact assessments were warranted for this water body and were conducted for the following five species of primary management concern:

- Fall-run Chinook Salmon
- Steelhead
- Splittail
- American Shad
- Striped Bass

These species are of primary management concern due either to the importance of their commercial and/or recreational fisheries (i.e., chinook salmon, steelhead, American shad, and striped bass) and/or because they are a species currently listed under the federal ESA and/or CESA (i.e., steelhead, chinook salmon, and splittail). Because the species selected for species-specific assessments include those sensitive to changes in both river flow and water temperature throughout the year, an evaluation of impacts to these species is believed to reasonably encompass the range of potential impacts to lower American River fish resources that could occur under the Proposed Project or the cumulative condition relative to the basis of comparison.

Potential impacts resulting from changes in river flows and water temperatures were evaluated for each of the five species of primary management concern. Because these species are known to use the lower American River during discrete time periods associated with specific lifestages, potential impacts were evaluated using species-specific assessment parameters, where appropriate. The impact assessment methodologies used to assess potential flow- and water temperature-related impacts to the five indicator species are described below.

Fall-run Chinook Salmon

Watt Avenue represents the river location above which approximately 98 percent of fall-run chinook salmon spawning occurs. To assess flow-related impacts to fall-run chinook salmon spawning, incubation and initial rearing, monthly mean flows at Watt Avenue and below Nimbus Dam under the alternatives were compared to monthly mean flows under the existing condition for each month of the October through February period. In addition, monthly mean flows at Watt Avenue and below Nimbus Dam under the cumulative condition (i.e., 2025 with the American River Pump Station Project) versus both the existing condition and future No Action/No Project Alternative conditions were evaluated to assess flow-related impacts to fall-run chinook salmon spawning incubation and initial rearing. If a cumulative impact (versus the existing condition) was found to be significant, then the Action Alternatives' incremental contribution to the cumulative condition was assessed.

Changes in flows during the period March through June also were assessed at Watt Avenue to further address potential impacts to fry and juvenile lifestages rearing during these months. Flows at the mouth were compared between modeling simulations to assess flow-related impacts to adult immigration and juvenile emigration. The frequency with which specified flow levels were met was determined under the alternatives, and was compared to that under the existing condition.

Water temperature-related impacts to lower American River fall-run chinook salmon were evaluated through three distinct assessments focusing on distinct lifestages and periods, including: (1) adult immigration (September through November); (2) spawning/incubation and initial rearing (October through February); and (3) juvenile rearing and emigration (March through June) using the multi-step analysis described below.

Adult Immigration (September Through November)

Temperature-related impacts to adult immigration were based on water temperature at the mouth of the lower American River and at Freeport on the Sacramento River. The 69-year average water temperatures for each month of the September through November period that would occur at the American River mouth and at Freeport under the Proposed Project and the cumulative condition were compared to those under the basis of comparison. In addition, monthly mean water temperatures at the American River mouth and at Freeport were compared for each month of the adult immigration period over the 69-year period of record. Therefore, a total of 483 months for each month were included in the analysis.

Spawning/Incubation and Initial Rearing (October Through February)

First, the long-term average water temperatures for each month of the October through February period that would occur below Nimbus Dam or at Watt Avenue under the Proposed Project or cumulative condition were compared to the long-term average water temperatures for each of these months, at these same locations, under the basis of comparison. Because water temperatures generally warm with increasing distance downstream during October, and because 98 percent of all spawning occurs upstream of Watt Avenue, the most conservative assessment of thermal impacts to chinook salmon spawning and incubation during October is based on Watt Avenue temperatures. Therefore, all temperature assessments for the month of October are based on temperatures at Watt Avenue. Conversely, because water temperatures generally cool with increasing distance downstream during the period November through January, and because water temperatures generally change little between Nimbus Dam and Watt Avenue during February, temperature impact assessments for spawning and incubation during the months November through February are based on water temperatures below Nimbus Dam, thereby providing the most conservative assessment.

Second, the number of years (of the 69 years modeled) that monthly mean water temperatures would exceed 56°F below Nimbus Dam or at Watt Avenue was determined for each month of the October through February period and compared to those modeled under the basis of comparison.

Third, for each month of the October through February period, the mean water temperature below Nimbus Dam or at Watt Avenue for the years (of the 69 years modeled) exceeding the 56°F index value was determined under the Proposed Project or the cumulative condition and compared to those under the basis of comparison.

Finally, Reclamation's Lower American River Fall-Run Chinook Salmon Mortality Model was used to assess potential temperature-related impacts to the early lifestage of chinook salmon. Annual early lifestage survival (the complement of mortality) estimated for the Proposed Project and the cumulative condition were compared to that estimated for the basis of comparison for each year of the 69-year period of record. Model output represents the percentage of potential emergent fry produced, based on all eggs brought to the river by spawning adults, that would survive under the temperature regime that would occur under each model simulation. The model calculates temperature-induced mortality (the percentage of potential emergent fry lost as a result of temperature-induced mortality of pre-spawned eggs, fertilized eggs incubating in the gravel, and pre-emergent fry). Losses for each of these three early lifestages are then tallied by the model and output as a percent loss (mortality) from egg potential (all eggs brought to the river by immigrating adults) for each year modeled. The complement (i.e., survival = 100 - mortality) of these calculated percent losses is discussed for impact assessment purposes.

Juvenile Rearing and Emigration (February Through June)

The same methodology was used to evaluate potential temperature-related impacts to fall-run chinook salmon juvenile rearing and emigration with the following modifications:

- The period of assessment was February through June;

- The number of years (of the 69 years modeled) that monthly mean water temperatures would exceed the index value of 65°F were determined at Watt Avenue and the lower American River mouth;

- Mean water temperatures for the years (of the 69 years modeled) that were shown to exceed the 60°F and 65°F index values were determined at Watt Avenue; and

- Reclamation's Salmon Mortality Model was not used, because it does not assess mortality beyond the emergent fry lifestage.

The temperature index values for immigration/emigration and spawning/incubation are different because adult and juvenile fall-run chinook salmon are believed to tolerate water temperatures up to 65°F without substantial adverse impacts, whereas incubating eggs and pre-emergent fry incur substantial reductions in survival when water temperatures exceed 60°F. Because the majority of fall-run chinook salmon and steelhead rearing is believed to occur above Watt Avenue (River Mile (RM) 9.5), and because water temperatures generally increase between Nimbus Dam and Watt Avenue during the February through June period, use of Watt Avenue water temperatures for assessing temperature-related impacts to juvenile chinook salmon during this period provides the most conservative assessment.

In addition to the assessments described above, temperature-related impacts to juvenile emigration through the lower portion of the river were assessed based on temperatures at the mouth using the temperature index value described above.

Steelhead

Because environmental conditions required by steelhead are not significantly different from those required by fall-run chinook salmon, flow- and temperature-related impact determinations for steelhead for the period October through June were based on the same modeling output used to assess impacts to fall-run chinook salmon during this period. However, because steelhead rear within the lower American River year-round, additional flow and temperature impact assessments were made for the months of the year not addressed by the fall-run chinook salmon assessments (i.e., July through September).

Flow-related impacts to steelhead during the July through September period were assessed via the same methods used to assess flow-related impacts to fall-run chinook salmon during the October through June period.

Temperature-related impacts to steelhead juvenile rearing during the July through September period were assessed via the same methods used to assess temperature-related impacts to fall-run chinook salmon juvenile rearing and emigration during the March through June period. In addition, the number of months exceeding 65°F for each model simulation, as well as the average temperature for the months exceeding this index value, also was determined. Because no steelhead mortality model has been developed for the lower American River, no steelhead mortality modeling could be performed as a part of the assessment for this species.

Splittail

Splittail may spawn in the lower American River in extremely low numbers, with the majority of splittail spawning that could occur taking place in the lower sections of the river (i.e., downstream of RM 12). Consequently, altered river flows from the alternatives could impact the availability of potential splittail spawning habitat within the lower American River by reducing the amount of riparian vegetation that would be inundated during the splittail spawning season (February through May).

The lower American River from RM 5 to the mouth is largely influenced by the water surface elevation of the Sacramento River. Sacramento River stage often controls the water surface elevation here, and the extent to which splittail spawning habitat, particularly inundated riparian vegetation, along this lower reach of the river channel would be available. Conversely, river stage in the portion of the river between RM 8 and RM 12, which is characterized by abundant backwater habitat, is controlled primarily by lower American River flows. The frequency and duration of riparian vegetation flooding in this area and, therefore, the quality and quantity of potential splittail spawning habitat has the potential to be impacted by reduced flows.

To assess flow-related impacts to potential splittail spawning habitat availability during each month of the February through May period, for each year of the 70-year period of record, the amount of riparian habitat inundated in acres (dependent variable) was regressed against flow in cfs (independent variable). Using river flows at Watt Avenue (RM 9.5), the number of acres of flooded riparian habitat between RM 8 and RM 9 was determined under the Proposed Project and the cumulative condition and for the basis of comparison, and these values were compared for assessment purposes. Field measurements conducted for the interim reoperation of Folsom Dam and Reservoir indicated that the total amount of riparian vegetation inundated within RM 8 to RM 9 ranged from 2.4 acres at a river flow of 4,540 cfs to 35.8 acres at a river flow of 22,570 cfs (SAFCA 1999).

The simple linear regression analysis performed identified a positive, statistically significant ($r^2=0.99$; $P<0.001$) relationship between flow and the total acreage of riparian vegetation inundated within RM 8 to RM 9. This relationship is defined by the equation:

$$\text{Habitat} = (0.001874 \times Q) - 6.4585$$

Where: Habitat = the total amount of riparian vegetation inundated within the study area (acres); and
Q = flow within the study area (cfs)

The x-intercept of the linear regression line occurs at 3,456 cfs, which indicates that zero acres of riparian habitat are inundated within the study area at river flows of approximately 3,456 cfs or less. For river flows between 3,456 cfs and 22,571 cfs, the total acreage of riparian vegetation inundated within the study area increased by approximately 1.9 acres for each 1,000 cfs increase in flow. As previously discussed, field observations determined that the first 2.4 acres of riparian vegetation inundated primarily occurred within a narrow strip along the riverbank. This inundation zone was noted as being very shallow (i.e., generally less than two feet deep) and, therefore, unlikely to provide suitable potential habitat for splittail. Based on this observation, more than 2.4 acres of inundated vegetation must be present within the study area before potentially suitable splittail spawning habitat would be available.

Splittail reportedly spawn at water temperatures from 48°F to 68°F (Wang 1986). To evaluate potential temperature-related impacts to splittail, the number of years (of the 69 years modeled) that monthly mean water temperatures at Watt Avenue and the mouth would be within this preferred range during the period February through May was determined under the Proposed Project and the cumulative condition, and compared to that under the basis of comparison. For the purposes of assessing temperature-related impacts to splittail in the American River, water temperatures at Watt Avenue and the mouth effectively represent the range of water temperatures that splittail would encounter when using the lower portion of the river for spawning and initial rearing.

American Shad

The flow-related impact assessments conducted for fall-run chinook salmon and steelhead described above provided for an evaluation of the relative change in monthly mean flows in the lower American River under the Proposed Project and the cumulative condition for all months of the year. Consequently, findings from these assessments also were used, in part, to assess potential flow-related impacts to American shad.

Because the majority of American shad spawning migrations into the lower American River are believed to occur during May and June, changes in river flows during these months warrant further assessment for this species. The relative number of adult American shad entering the lower American River during May and June is believed to be largely influenced by flows at the mouth. Snider and Gerstung (1986) recommended flow levels of 3,000 to 4,000 cfs during May and June as sufficient “attraction flows” to sustain the American shad fishery in the lower American River. Impacts to American shad attraction flows were assessed by determining the number of years (of the 70-year period of record) during which May and June flows at the mouth would be less than 3,000 cfs under the Proposed Project and the cumulative condition, compared to that determined for the basis of comparison.

To evaluate potential water temperature-related impacts to American shad spawning, monthly mean water temperatures under the Proposed Project and the cumulative condition were determined and compared to those under the existing condition for the months of May and June. A conservative approach for assessing potential water temperature impacts was to assume that American shad may spawn throughout the river and, therefore, to evaluate water temperature conditions below Nimbus Dam and the mouth. Specifically, the number of years (of the 69 years modeled) that mean May and June water temperatures below Nimbus Dam and the mouth would be within the reported preferred range for American shad spawning (60°F to 70°F) was determined under the Proposed Project and the cumulative condition and compared to that under the basis of comparison.

<u>Striped Bass</u>

Although no study to date has definitively determined whether striped bass spawn in the lower American River, it is believed that little, if any, striped bass spawning occurs there (DeHaven 1978, *in* Snider and Gerstung 1986). Nevertheless, the lower American River is used by juvenile striped bass for rearing and supports a striped bass sport fishery during May and June.

The flow-related impact assessments conducted for fall-run chinook salmon and steelhead address all months of the year. Hence, potential flow-related impacts to striped bass, as they pertain to juvenile rearing habitat availability, were assessed using the same data produced to assess flow-related impacts to fall-run chinook salmon and steelhead.

In addition to juvenile rearing considerations, the number of adult striped bass entering the lower American River during the summer is believed to vary with flow levels and food production. Snider and Gerstung (1986) suggested that flows of 1,500 cfs at the mouth during May and June would be sufficient to maintain the striped bass sport fishery in the lower American River. Hence, potential flow-related impacts to the striped bass sport fishery were assessed by determining the number of years (of the 70-year period of record) that flows at the mouth would be less than 1,500 cfs in May and June under the Proposed Project and the cumulative condition, compared to the number of years this would occur during these months under the basis of comparison.

Optimal water temperatures for juvenile striped bass rearing are reported to range from approximately 61°F to 73°F (USFWS 1988). Therefore, to evaluate potential water temperature-related impacts to striped bass juvenile rearing, the number of years (of the 69 years modeled) that monthly mean water temperatures below Nimbus Dam and at the mouth during May and June would be within the preferred range of 61°F to 73°F for juvenile rearing was determined and compared to those modeled under the basis of comparison.

Shasta and Trinity Reservoirs

Potential elevation- and storage-related impacts to the warmwater and coldwater fisheries of Shasta and Trinity reservoirs were assessed using the same methods described above for Folsom Reservoir.

Keswick Reservoir

No storage- or elevation-related impacts to the fishery resources of Keswick Reservoir are expected to occur because, as a regulating afterbay of Shasta Reservoir, its monthly storage and elevation will be affected little, if at all, by the Proposed Project, alternatives or the cumulative condition. Consequently, no quantitative assessment of potential storage- or elevation-related impacts to fishery resources in this water body is warranted. Similarly, the Proposed Project, alternatives or the cumulative condition would not be expected to substantially alter the water temperatures within Keswick Reservoir. Consequently, a quantitative assessment of potential water temperature-related impacts to fishery resources within this reservoir was not warranted.

Sacramento River

Additional American River diversions could potentially alter seasonal Sacramento River flows, which could change the relative habitat availability for Sacramento River fish. To assess such flow-related impacts to upper Sacramento River fish, monthly mean flows released from Keswick Dam under the Action Alternatives and the cumulative condition were compared to releases from Keswick Dam under the basis of comparison for each month of the year. Potential flow-related impacts to lower Sacramento River fish were assessed in the same manner, except that this assessment used modeled flows at Freeport (RM 46).

Additional diversions could potentially alter Sacramento River water temperatures seasonally during some years. Changes in Sacramento River water temperatures that could occur as a result of implementation of the Proposed Project, alternatives or the cumulative condition would not be expected to be sufficiently large to adversely affect fish species present in the upper Sacramento River, with the possible exceptions of chinook salmon and steelhead. Elevated water temperatures could reduce spawning and rearing success of these anadromous salmonids because of their low thermal tolerance. For this reason, an assessment of changes to upper Sacramento River water temperatures focused on these fish species. Moreover, because: (1) thermal requirements of chinook salmon and steelhead are generally similar; (2) the NMFS Biological Opinion for Winter-run Chinook Salmon (NMFS 1993 as revised in 1995) has established quantitative temperature criteria for the upper Sacramento River to protect winter-run chinook salmon; and (3) Reclamation has developed a Sacramento River Chinook Salmon Mortality Model applicable to all four runs of chinook salmon, this assessment focused quantitatively on chinook salmon. Impact findings for the four runs of chinook salmon provide a technical basis from which to infer whether steelhead would be impacted by seasonal changes in water temperatures.

A three-phased water temperature assessment was performed to evaluate potential temperature-induced impacts to the anadromous salmonid resources of the Sacramento River. First, monthly mean water temperatures at Keswick Dam (RM 301), the upstream extent of anadromous fish immigration, under the Action Alternatives and the cumulative condition were compared to monthly mean temperatures at this river location under the basis of comparison for each month of the year.

Second, the number of years of the 69-year period modeled that water temperatures at Keswick Dam and Bend Bridge would exceed the temperature criteria identified by NMFS in its Biological Opinion for Winter-run Chinook Salmon (NMFS 1993 as revised in 1995) was determined for the Action Alternatives and cumulative condition and compared to the number of years that these criteria would be exceeded under the basis of comparison. NMFS criteria used for this component of the assessment are as follows:

- Daily average water temperature not in excess of 56°F at Bend Bridge from April 15 through September 30; and

- Daily average water temperature not in excess of 60°F at Bend Bridge from October 1 through October 31.

Although the NMFS (1993) temperature criteria are stated as daily averages, the available hydrologic and water temperature models allow only for monthly mean temperature analyses and output. Consequently, this assessment was based on monthly mean water temperature data output from Reclamation's existing models.

Finally, Reclamation's Sacramento River Chinook Salmon Mortality Model was used to estimate annual, early lifestage losses (from egg potential) for fall-run, late-fall-run, winter-run, and spring-run chinook salmon populations. Temperature input to the Sacramento River Chinook Salmon Mortality Model consists of monthly mean temperatures at nine locations between Shasta Dam and Vina Bridge. Mortality estimates for each of the four runs were modeled under the Proposed Project and the cumulative condition, which were then compared to modeled mortality estimated for each run under the basis of comparison. Potential impacts to the four chinook salmon runs in the Sacramento River were evaluated using the same criteria established for the Lower American River Chinook Salmon Mortality Model (see discussion under Lower American River, Fall-Run Chinook Salmon).

To assess potential water temperature-related impacts to fish in the lower Sacramento River, the first phase of this assessment was conducted for the Freeport location.

Sacramento-San Joaquin River Delta

Increased surface water diversion could alter the quantity of freshwater flowing into and through the Delta. The abundance and distribution of several fish species of management concern that rely heavily upon the Delta for one or more of their lifestages, including delta smelt (federally threatened), splittail (federally threatened), longfin smelt (state species of special concern), and striped bass (recreationally important), can be affected by total Delta outflow, the location of X2 (two parts per thousand (ppt) isohaline in the Delta), and the export/inflow ratio.

To evaluate potential impacts to Delta fish resources, changes in monthly mean Delta outflow for the 70-year period of record under the Action Alternatives and the cumulative condition were determined for each month of the year and were compared to monthly mean Delta outflow under the basis of comparison. The frequency and magnitude of differences in Delta outflow were evaluated relative to life history requirements for Delta fish. In addition, changes in monthly mean X2 position were determined for all months of each year, with an emphasis on the February through June period.

Impacts to delta smelt, splittail, striped bass, and other Delta fishery resources were considered adverse if hydrology under the Action Alternatives or the cumulative condition showed a substantial decrease in monthly mean Delta outflow, relative to hydrology under the basis of comparison, during one or more months of the February through June period; if a substantial shift in the long-term monthly mean X2 position occurred (i.e., more than one kilometer (km)); or if Delta export/inflow ratios were increased to where allowable export limits would be exceeded. USFWS and Reclamation have in past documents (i.e., Draft Trinity River Mainstem Fishery Restoration EIS/EIR) applied a 10 percent modeled exceedance in changes in X2 position during the February through June period to determine potentially significant impacts to fish populations in the Delta. Therefore, the significance criteria utilized in this document (i.e., 1 km or more shift in X2 position) to determine potentially significant impacts to Delta fish populations is very conservative (rigorous) relative to the significance criteria utilized by the resource agencies in previous documents.

Oroville Reservoir and Feather River

Additional American River diversions could potentially alter seasonal lower Feather River flow due to changes in releases from the Oroville Reservoir to the lower Feather River to meet its share of Delta requirements under the Coordinated Operating Agreement (COA). The COA is an agreement between the SWP and the CVP on how they will share the responsibility to meet operational requirements in the Delta. Since the COA takes local reservoir operations into account, any change in either project's operations may have an impact on the other. To assess such flow related impacts to lower Feather River fish, monthly mean flows released from Oroville Reservoir under the cumulative condition were compared to releases under the basis of comparison for each month of the year.

Any changes in Oroville Reservoir operations could alter water temperatures seasonally in the Feather River downstream of the reservoir. To assess such water temperature impacts mean monthly water temperature data from Reclamation's existing Oroville and lower Feather River temperature models were used. The assessment was performed by comparing the modeled monthly mean water temperatures in the Lower Feather River at Oroville Dam, under the cumulative condition to monthly mean water temperatures at this location under the basis of comparison for each month of the year.

3.5.2.2 Applicable Laws, Ordinances, Regulations, and Standards

Management of non-anadromous fish and other aquatic species is the responsibility of the USFWS, whereas management of anadromous fish is the responsibility of NMFS. CDFG is a state "trustee agency" for aquatic species under CEQA. Sensitive aquatic resources are regulated by the federal ESA and CESA. The following discussion addresses fisheries management plans and other regulatory initiatives relative to aquatic resources in the study area.

Central Valley Project Improvement Act

The CVPIA (Title 34 of Public Law (P.L.) 102-575) amends the authorization of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes of the CVP having equal priority with irrigation and domestic uses of CVP water. It also elevates fish and wildlife enhancement to a level having equal purpose with power generation.

The CVPIA identifies several measures to meet these new purposes. Significant among these is the broad goal of restoring natural populations of anadromous fish (chinook salmon, steelhead, green and white sturgeon, American shad, and striped bass) in Central Valley rivers and streams to double their recent average levels. The Anadromous Fish Restoration Program (AFRP) directs the Secretary of the Interior to:

> *"... develop within three years of enactment and implement a program which makes all reasonable efforts to ensure that, by the year 2002, natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less than twice the average levels attained during the period of 1967-1991 ..."*

The USFWS has assumed the lead role in the AFRP. Under USFWS direction, technical teams have assisted in the establishment of components of the AFRP. A key element of the program is instream flow recommendations, including objectives for the lower American River, upper Sacramento River, and the Delta.

The Secretary of the Interior also is directed under Section 3406(b)(2) of the CVPIA to dedicate and manage 800,000 AFA of CVP yield for the primary purpose of implementing the fish, wildlife, and habitat restoration and measures authorized by that title. Management of the 800,000 AFA for fishery and habitat restoration is still under consideration; however, Reclamation has voluntarily implemented AFRP flow-related actions both for the Delta and upstream reservoirs. Moreover, both Reclamation and the USFWS have required the implementation of the AFRP actions in any modeling studies associated with federal actions or otherwise affecting the CVP. While it is recognized that recent litigation regarding the accounting of 3406(b)(2) water has resulted in uncertainty in how to characterize 3406(b)(2) actions, Interior has yet to suggest any specific approach (for planning and impact assessment purposes) other than AFRP actions. Inclusion of AFRP flow-related actions both for the Delta and upstream reservoirs best represents implementation of management of 3406(b)(2) water.

Ecosystem Restoration Program Plan of the CALFED Bay-Delta Program

The mission of the CALFED Bay-Delta Program is to develop a long-term comprehensive plan that will restore ecosystem health and improve water management for beneficial uses of the Bay-Delta system. The program addresses problems in four resource areas: ecosystem quality, water quality, system integrity, and water supply reliability. Programs to address problems in the four resource areas will be designed and integrated to fulfill the CALFED mission.

The goal for ecosystem quality is to improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species. The CALFED Ecosystem Restoration Program Plan (ERPP) addresses this goal. The foundation of the ERPP is restoration of ecological processes that are associated with streamflow, stream channels, watersheds, and floodplains. These processes create and maintain habitats essential to the life history of species dependent on the Delta. In addition, the ERPP aims to reduce the effects of stressors that inhibit ecological processes, habitats, and species.

Key restoration actions for Sacramento River fisheries being proposed by this program include the following:

- Enhancing river flows;
- Restoring the natural river meander process;

- Enhancing riparian and riverine habitats;
- Maintaining suitable water temperatures for salmonids;
- Reducing fish losses at points of water diversion;
- Improving anadromous fish passage at existing barriers;
- Maintaining and improving water quality;
- Improving hatchery and stocking programs; and
- Improving management of inland harvest of salmonids.

Such restoration actions, when implemented over the next few decades, are expected to improve Sacramento River fisheries, including salmonid fisheries, over the existing condition. The ERPP establishes similar restoration goals for other major water courses throughout the Central Valley.

Restoring Central Valley Streams: A Plan for Action

In 1993, CDFG published *Restoring Central Valley Streams: A Plan for Action*, which was developed to address the protection of anadromous fish habitat in Central Valley streams (CDFG 1993). This plan identified the following five priorities for the lower American River, and establishes them as recommendations:

- Maintain specified instream flow releases below Nimbus Dam throughout the year;

- Establish minimum fall carryover storage at Folsom Reservoir to maintain suitable year-round stream temperatures;

- Control rapid-flow fluctuations to protect eggs and fry of anadromous fish;

- Develop a coordinated multi-agency management plan; and

- Develop and implement a continuing program for the purpose of restoring and replenishing, as needed, spawning gravel lost from the construction and operation of the CVP dams, bank protection projects, and other actions that have reduced the availability of spawning gravel and rearing habitat in the lower American River.

Steelhead Restoration Plan for the American River

In 1991, CDFG published the *Steelhead Restoration Plan for the American River*. The plan has two main objectives (CDFG 1991):

- Restoring and maintaining naturally produced steelhead as an integral component of the American River ecosystem; and

- Restoring the population to a level that will sustain a quality steelhead fishery and provide for other non-consumptive uses.

The plan focuses on restoring habitat conditions within the American River, and on supplementing the existing fisheries population with artificially reared fish. The plan also recommends that the overall CVP operations be adjusted to allow for the elimination of drastic flow fluctuations in the American River; states water temperature objectives during spawning, incubation, emergence, juvenile rearing lifestages; and suggests maintenance of a minimum coldwater pool in Folsom Reservoir throughout the summer.

National Marine Fisheries Service Biological Opinion for Winter-run Chinook Salmon

In 1993, NMFS assessed the potential impacts of Reclamation's operation of the CVP on the federally listed winter-run chinook salmon. Based on this assessment, NMFS issued a biological opinion concluding that operation of the CVP would likely jeopardize the continued existence of winter-run chinook salmon. Reasonable and prudent alternatives to CVP operations were developed to avoid jeopardy, including specific flow, temperature, reservoir storage, and diversion requirements in the Sacramento River and in the Delta. NMFS reinitiated consultation on CVP operations when the "Principles for Agreement" that formed the basis for the Bay-Delta Plan was originally signed, and they subsequently issued a revised biological opinion in 1995. Reclamation currently operates the CVP in accordance with the Biological Opinion for Winter-run Chinook Salmon (NMFS 1993, as revised in 1995).

U.S. Fish and Wildlife Service Biological Opinion for Delta Smelt

In 1995, Reclamation consulted with the USFWS on impacts to the federally listed delta smelt potentially resulting from CVP operations. The USFWS concluded that operation of the CVP would not jeopardize the continued existence of delta smelt. This conclusion was based on the benefits to delta smelt expected from operating the CVP in accordance with the Biological Opinion for Winter-run Chinook Salmon (NMFS, 1993 as revised in 1995) and the Bay-Delta Plan.

U.S. Fish and Wildlife Service Biological Opinion for Splittail

In 1995, Reclamation consulted with the USFWS on impacts to then-proposed threatened Sacramento splittail potentially resulting from CVP operations. The USFWS concluded in a conference opinion that operation of the CVP would not jeopardize the continued existence of Sacramento splittail. This conclusion was based on the benefits to Sacramento splittail expected from operating the CVP in accordance with the Biological Opinion for Winter-run Chinook Salmon and the Bay-Delta Plan. It is important to note that the USFWS officially listed the Sacramento splittail as a threatened species on March 10, 1999. Nevertheless, as stated by the USFWS biological opinion (page 1), "[*s*]*hould the Sacramento splittail listing action be finalized as proposed, the [USFWS] intends to adopt the conference opinion as the biological opinion for combined project effects*" (USFWS 1995).

Federal Energy Regulatory Commission License for the Middle Fork Project

Article 37 of the FERC license issued to PCWA for the MFP, as modified in 1981, specifies that flows in the North Fork and Middle Fork American rivers below Ralston Afterbay must be a minimum of 75 cfs year-round to support fisheries of the American River. This 75 cfs minimum flow requirement extends downstream of the confluence of the Middle Fork American River and the North Fork of the Middle Fork American River, and continues downstream for the North Fork American River to Folsom Reservoir. CDFG agreed with the modified fish flow releases and the flows are a part of PCWA's SWRCB permits.

Federal Energy Regulatory Commission License for Oroville Reservoir

An application for renewal for the power facilities at Oroville Reservoir is being prepared for submission to the FERC in 2006. During this process, the temperature and fishery resources of Oroville Reservoir and the lower Feather River will undergo detailed analysis to determine the appropriate flow and temperature requirements that will be part of the new license to maintain or enhance the fisheries of Oroville Reservoir and the lower Feather River.

3.5.2.3 Impact Indicators and Significance Criteria

Tables 3.5-3 and **3.5-4** list the impact indicators and significance criteria developed for use in assessing the significance of potential impacts upon fish resources and aquatic habitat that may result from facilities- and diversion-related activities.

Table 3.5-3
Fish Resources and Aquatic Habitat Facilities-Related Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ Streamflows through the project area.	❑ Decrease in habitat quantity, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect long-term population levels of species of management concern.
❑ Amount of turbidity, sedimentation, siltation, or contaminants/pollutants.	❑ Decrease in habitat quality, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect population levels of species of management concern.
❑ Area of backwater effect created by the water intake/diversion structure.	❑ Decrease in habitat quality and quantity, relative to the basis of comparison, of sufficient magnitude to adversely affect long-term population levels of fish species of management concern.
❑ Velocity of the water passing through the project area.	❑ Impediment to fish passage through the project site, relative to the basis of comparison, of sufficient magnitude to adversely affect migration of adult and sub-adult species of management concern.
❑ Source and amount of water, and fish community present in Auburn Ravine.	❑ Significant increase in straying of anadromous salmonids known to be genetically distinct from Auburn Ravine stocks.

Table 3.5-4
Fish Resources and Aquatic Habitat Diversion-Related Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
Upper American River Basin	
❑ Monthly mean flows from Ralston Afterbay downstream to Folsom Reservoir.	❑ Decrease in river flows, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect long-term population levels of species of management concern.
Folsom Reservoir	
Warmwater Fisheries	
❑ Mean number of acres of littoral habitat for each month of the primary spawning and rearing period (i.e., March through September).	❑ Decrease in the long-term average quantity (acres) of littoral habitat, relative to the basis comparison, of sufficient magnitude and frequency to adversely affect long-term population levels of warmwater fish, for any month of this period over the 70-year period of record.
❑ End-of-month reservoir water surface elevation (feet/msl) occurring each month of the primary spawning and rearing period for nest-building warmwater fish (i.e., March through September).	❑ Decrease in reservoir water surface elevation of more than nine feet per month, relative to the basis of comparison, of sufficient frequency to adversely affect long-term population of warmwater fish, for any month of this period over the 70-year period of record.
Coldwater Fisheries	
❑ End-of-month storage (TAF) for each month of the April through November period.	❑ Decrease in reservoir storage, relative to the basis of comparison, which also would reduce the coldwater pool, of sufficient magnitude to adversely affect long-term population levels of coldwater fish, for any month of this period over the 70-year period of record.
Nimbus Hatchery	
❑ Monthly mean water temperatures (°F) of water released from Nimbus Dam for each month of the year.	❑ Increase in water temperature, relative to the basis of comparison, of sufficient magnitude and frequency which would result in reduced hatchery production (using index temperatures of 60°F, 65°F, and 68°F) during any month of this period over the 69-year period of record.
Lower American River	
Fall-Run Chinook Salmon	
❑ Monthly mean flow (cfs) at the mouth for each month of the adult immigration period (i.e., September through December).	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect upstream passage or olfactory response, for any month of this period over the 70-year period of record.
❑ Monthly mean water temperature (°F) at the mouth of the American River and at Freeport on the Sacramento River for each month of the adult immigration period (i.e., September through December).	❑ Increase in water temperature, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect adult immigration, for any month of this period over the 69-year period of record.

Table 3.5-4 (Continued) Fish Resources and Aquatic Habitat Diversion-Related Impact Indicators and Significance Criteria	
Impact Indicators	**Significance Criteria**
Lower American River (Continued)	
Fall-Run Chinook Salmon (Continued)	
❑ Monthly mean flows (cfs) below Nimbus Dam and at Watt Avenue for each month of the spawning and incubation and initial rearing period (i.e., October through February).	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect long-term initial year-class strength, for any month of this period over the 70-year period of record.
❑ Monthly mean water temperatures (°F) below Nimbus Dam and at Watt Avenue for each month of the spawning and incubation and initial rearing period (i.e., October through February).	❑ Increase in water temperature, relative to the basis of comparison, of sufficient magnitude and frequency to result in substantial egg and alevin loss (e.g., resulting temperatures >56°F), for any month of this period over the 69-year period of record.
❑ Monthly mean flow (cfs) at Watt Avenue and the mouth for each month of the juvenile rearing and emigration period (i.e., February through June).	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect juvenile rearing and emigration, for any month of this period over the 70-year period of record.
❑ Monthly mean water temperature (°F) at Watt Avenue, the lower American River mouth, and at Freeport for each month of the juvenile rearing and emigration period (i.e., February through June).	❑ Increase in water temperature, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect juvenile rearing and emigration (e.g., resulting temperatures >65°F) for any month of this period over the 69-year period of record.
❑ Average annual early lifestage survival.	❑ Decrease in annual early lifestage survival, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect long-term initial year-class strength over the 70-year period of record.
Steelhead	
❑ Monthly mean flow (cfs) at the mouth for each month of the adult immigration period (i.e., December through March).	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect upstream passage or olfactory responses for any month of this period over the 70-year period of record.
❑ Monthly mean water temperature (°F) at the mouth of the American River and at Freeport on the Sacramento River for each month of the adult immigration period (i.e., December through March).	❑ Increase in water temperature, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect adult immigration for any month of this period over the 69-year period of record.
❑ Monthly mean water temperature (°F) below Nimbus Dam and at Watt Avenue for each month of the spawning and incubation period (i.e., December through March), as well as juvenile rearing (i.e., year-round).	❑ Increase in water temperature, relative to the basis of comparison, of sufficient magnitude and frequency to result in substantial egg and alevin loss (e.g., resulting temperatures >56°F) or substantial adverse affects to juvenile rearing (e.g., resulting temperatures >65°F) for any month of this period over the 69-year period of record.
❑ Monthly mean flow (cfs) at Watt Avenue for the spawning and incubation period (i.e., December through March), as well as juvenile rearing (i.e., July through September).	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect initial year-class strength and juvenile rearing for any month of this period over the 70-year period of record.

Table 3.5-4 (Continued) Fish Resources and Aquatic Habitat Diversion-Related Impact Indicators and Significance Criteria	
Impact Indicators	**Significance Criteria**
Lower American River (Continued)	
Steelhead (Continued)	
❑ Monthly mean flow (cfs) at Watt Avenue and the mouth for each month of the juvenile emigration period (i.e., February through June).	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency, to adversely affect juvenile emigration for any month of this period over the 70-year period of record.
❑ Monthly water mean temperature (°F) at Watt Avenue and the mouth for each month of the juvenile emigration period (February through June).	❑ Increase in water temperature, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect juvenile emigration (e.g., resulting temperatures >65°F) for any month of this period over the 69-year period of record.
Splittail	
❑ Monthly mean acreage of flooded riparian habitat at Watt Avenue during each month of the February through May spawning period.	❑ Decrease in long-term average quantity of inundated riparian habitat, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect potential splittail habitat availability for each month of this period over the 70-year period of record.
❑ Monthly mean water temperatures (°F) at Watt Avenue and the mouth during each month of the February through May spawning period.	❑ Substantial increase in the frequency, relative to the basis of comparison, in which water temperatures exceed the reported upper temperature range for splittail spawning (i.e., 68°F) for any month of this period over the 70-year period of record.
American Shad	
❑ Monthly mean flows (cfs) at the mouth during each month of the May through June spawning period.	❑ Substantial decrease in the frequency, relative to the basis of comparison, in which flows at the mouth are above the CDFG recommended “attraction flow” of 3,000 cfs for American shad spawning migrations during each month of the identified period, over the 69-year period of record.
❑ Monthly mean water temperatures (°F) below Nimbus Dam and the mouth of the lower American River during the May through June spawning period.	❑ Substantial increase in frequency, relative to the basis of comparison, in which water temperatures exceed the reported upper temperature range for American shad spawning (i.e., 70°F) for any month of the identified period over the 70-year period of record.
Striped Bass	
❑ Monthly mean flows (cfs) at the mouth during the May through June striped bass rearing period.	❑ Decrease of flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect striped bass juvenile rearing for May and June over the 70-year period of record.
❑ Monthly mean flows (cfs) at the mouth during the May through June striped bass sport fishery.	❑ Substantial decrease in the frequency, relative to the basis of comparison, in which flows at the mouth are above the CDFG recommended “attraction flow” of 1,500 cfs for the striped bass sport fishery for each month of the identified period over the 70-year period of record.
❑ Monthly mean water temperatures (°F) below Nimbus Dam and at the mouth during the May through June rearing period.	❑ Substantial increase in frequency, relative to the basis of comparison, in which water temperatures exceed the reported upper temperature range for striped bass rearing (i.e., 73°F) for any month of the identified period over the 69-year period of record.

Table 3.5-4 (Continued)
Fish Resources and Aquatic Habitat Diversion-Related Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
Shasta and Trinity Reservoirs	
Warmwater Fisheries	
❑ Mean number of acres of littoral habitat for each month of the primary spawning and rearing period (i.e., March through September).	❑ Decrease in the long-term average quantity (acres) of littoral habitat, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect long-term population levels of warmwater fish for any month of this period over the 70-year period of record.`
❑ End-of-month reservoir water surface elevation (feet/msl) occurring each month of the primary spawning and rearing period for nest-building warmwater fish (i.e., March through September).	❑ Decrease in reservoir water surface elevation more than nine feet per month, relative to the basis of comparison, of sufficient frequency to adversely affect long-term population levels of warmwater fish for any month of this period over the 70-year period of record.
Coldwater Fisheries	
❑ End-of-month storage (TAF) for each month of the April through November period.	❑ Decrease in reservoir storage, relative to the basis of comparison, which also would reduce the coldwater pool, of sufficient magnitude to adversely affect long-term population levels of coldwater fish for any month of this period over the 70-year of record.
Sacramento River	
❑ Monthly mean flows (cfs) released from Keswick Dam for each month of the year.	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to decrease the relative habitat availability for upper Sacramento River fish for any month of this period over the 70-year period of record.
❑ Monthly mean flows (cfs) at Freeport for each month of the year.	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to decrease the relative habitat availability for lower Sacramento River fish for any month of this period over the 70-year period of record.
❑ Monthly mean water temperatures (°F) at Keswick Dam and Bend Bridge for each month of the year.	❑ Increase in water temperature, relative to the basis of comparison, of substantial magnitude and frequency to adversely affect spawning and rearing of anadromous salmonids for any month of the year for the 69-year period of record.
❑ Number of years that water temperatures at Keswick Dam and Bend Bridge would exceed the temperature criteria identified by NMFS in its Biological Opinion for Winter-run Chinook Salmon (NMFS 1993).	❑ Increase in the number of years that water temperatures exceed those stipulated in the NMFS Biological Opinion (i.e., 56°F and 60°F), relative to the basis of comparison, which would adversely affect winter-run chinook salmon over the 69-year period of record.
❑ Average annual early lifestage survival for fall-, late-fall-, winter-, and spring-run chinook salmon.	❑ Decrease in annual early lifestage survival for any run chinook salmon (i.e., fall-, late fall-, winter-, and spring-run chinook salmon), relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect the long-term initial year-class strength over the 70-year period of record.

Table 3.5-4 (Continued) Fish Resources and Aquatic Habitat Diversion-Related Impact Indicators and Significance Criteria	
Impact Indicators	**Significance Criteria**
Sacramento River (Continued)	
❑ Monthly mean water temperatures (°F) at Freeport for each month of the year.	❑ Increase in temperature, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect spawning and rearing of anadromous salmonids for any month of the year for the 69-year period of record.
Delta	
❑ Monthly mean Delta outflow (cfs) for all months of the year.	❑ Decrease in Delta outflow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect Delta fish resources over the 70-year period of record.
❑ Monthly mean location of X2 and Delta export/inflow ratios for all months of the year, with an emphasis on the February through June period.	❑ Change in position of X2 and Delta export/inflow ratio, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect spawning and rearing habitat and downstream transport flows over the 70-year period of record.
Oroville Reservoir	
Warmwater Fisheries	
❑ End-of-month reservoir water surface elevation (feet/msl) occurring each month of the primary spawning and rearing period for nest-building warmwater fish (i.e., March through September).	❑ Decrease in reservoir water surface elevation more than nine feet per month, relative to the basis of comparison, of sufficient frequency to adversely affect long-term population levels of warmwater fish for any month of this period over the 70-year period of record.
Coldwater Fisheries	
❑ End-of-month storage (TAF) for each month of the April through November period.	❑ Decrease in reservoir storage, relative to the basis of comparison, which also would reduce the coldwater pool, of sufficient magnitude to adversely affect long-term population levels of coldwater fish for any month of this period over the 70-year of record.
Feather River	
❑ Monthly mean flows (cfs) released from Oroville for each month of the year.	❑ Decrease in flows, relative to the basis of comparison, of sufficient magnitude and frequency to decrease the relative habitat availability for Feather River fish for any month of the year over the 70-year period of record.
❑ Monthly mean water temperatures (°F) below Oroville for each month of the year.	❑ Increase in water temperature, relative to the basis of comparison, of substantial magnitude and frequency to adversely affect spawning and rearing of anadromous salmonids for any month of the year for the 69-year period of record.

3.5.2.4 Impact Analysis

This section presents the analysis of potential facilities- and diversion-related fish resources and aquatic habitat impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

Facilities-Related Impacts

No Action/No Project Alternative

Impact 3.5-1: Construction effects on aquatic resources of the North Fork American River.

No substantial changes from existing in-river construction activities would occur under the No Action/No Project Alternative. Although the duration of seasonal pumping would increase, no additional dredging activities would be expected to occur at the pump intake. Reclamation would continue to perform these activities in compliance with regulatory permit terms and conditions to protect water quality (Section 3.7, Water Quality). Therefore, disturbance of floor sediments and increases in turbidity are not expected to occur beyond existing levels. Based on these findings, no water quality-related impacts to aquatic life in the project area would result from construction under the No Action/No Project Alternative.

Impact 3.5-2: Fish impingement and entrainment at the point of diversion.

The No Action/No Project Alternative would include use of fish screening techniques approved by CDFG and would be included in the Streambed Alteration Agreement terms and conditions for the seasonal pump station. These provisions would be re-evaluated every five years. Implementation of these measures would protect juvenile and adult rainbow trout from entrainment and impingement at the intake. Compliance with the CDFG permit terms and conditions would reduce impacts to less than significant.

Impact 3.5-3: Alteration of habitat through creation of backwater on the North Fork American River upstream of the intake structure.

No substantial changes from the existing in-river construction activities would occur under the No Action/No Project Alternative. Because gradient control structures would not be constructed, water levels within the North Fork American River would not rise, and therefore upstream aquatic habitat would remain unchanged. Therefore, no impacts due to habitat alteration would result from the No Action/No Project Alternative.

Impact 3.5-4: Fish passage through the project area.

Under the No Action/No Project Alternative, fish migration into the project area from downstream of the project site is not likely to occur due to high-flow velocities through the one-half mile long bypass tunnel. Flows in the upstream portion of the tunnel range from about five feet per second (fps) at 100 cfs to 10 fps at 1,000 cfs (R. McLaughlin, pers. comm. 1998). Therefore, use of the project site by rainbow and brown trout, identified as the fish species of management concern in the project area, would continue to be limited to the downstream migration of adult and sub-adult fish through the project area (via the bypass tunnel) to Folsom Reservoir, and/or downstream passive transport of fish during high-flow events. Because no new or additional facilities or impediments would be constructed, as part of continued use of the seasonal pumps, fish passage impacts under the No Action/No Project Alternative would be less than significant.

Impact 3.5-5: Effects on salmonid stocks in Auburn Ravine.

Numerous issues have been raised regarding the potential for increased straying of American River steelhead and fall-run chinook salmon into Auburn Ravine if the selected alternative were to result in a change in water composition or flow volume. Such modifications of Auburn Ravine conditions raises the issue that the No Action/No Project Alternative could reassign the environmental cues which migrating American River salmonids home toward, thereby drawing American River fish into Auburn Ravine. It also has been suggested that Auburn Ravine salmonids may confuse the American River for their natal spawning grounds, due to the existence of American River water in their natal stream. In addition, the possibility of falsely attracting salmonids from the American River into Auburn Ravine due to the increased discharge of the Lincoln WWTRF during sensitive migratory months, has been identified as a concern. Attraction of American River fish into Auburn Ravine is of concern because the American River run consists primarily of hatchery stocks.

PCWA's proposed operations would not change the quantity or seasonal distribution of North Fork American River water delivered to Auburn Ravine compared to existing conditions. Any future changes in these water deliveries would first require completion of additional environmental studies. Water diverted from the North Fork American River would be conveyed to the PCWA water supply distribution system using a process called double-pumping. After being pumped from the North Fork American River, water would flow within the Auburn Ravine Tunnel, and from the Auburn Ravine Tunnel would be pumped again into PG&E's South Canal by the Auburn Ravine Tunnel Pump Station (Figure 3.5-3**)**. The water would then flow within the South Canal where it would be delivered to the Foothill WTP (Figures 3.5-1 and 3.5-2). The American River water currently delivered to Auburn Ravine would remain within the limits of recent historical monthly maximum delivery rates.

The double-pumping commitment by PCWA is a more costly method of water conveyance but ensures that the potential impacts resulting from an increase in volume or a change in the seasonal distribution of flow in Auburn Ravine would be avoided. Still, American River water would be delivered to Auburn Ravine as historically conveyed, as well as via the Lincoln WWTRF. A thorough review of the mechanisms that salmonids utilize when homing to natal streams indicates that it is unlikely that the No Action/No Project Alternative would produce a genetic disruption of Auburn Ravine salmonid stocks primarily due to the acute olfactory homing mechanisms in the salmonid family; the environmental homing cues and the fate of these cues within the study area; the sequential imprinting process; the probable lack of persistent, native Auburn Ravine stocks within the Central Valley Evolutionarily Significant Unit (ESU); and the mitigation programs of other water projects affecting Auburn Ravine. These topics are discussed below.

Salmonids have an acute homing mechanism which leads to an uncanny fidelity in returning to natal streams. The homing of migrating salmon likely derives from the processing of olfactory cues found in stream waters. The olfactory homing hypothesis is based on three assumptions (Hasler and Wisby 1951). First, streams differ in chemical characteristics that are stable over time. Second, salmonids can distinguish the chemical differences between streams. Third, salmonids learn the chemical characteristics of their natal stream (called imprinting) prior to or during their seaward journey, remember these cues without reinforcement while in the ocean, and respond to them upon returning to freshwater to spawn.

Numerous years of research seem to validate the olfactory hypothesis assumptions. For instance, research indicates that salmonids have the ability to actively differentiate between different stream waters, even when the streams are proximate, using only their olfactory sense (Hasler and Wisby 1951; Shoji et al. 2000). Studies illustrate that the olfactory cue in which salmonids home toward is likely organic in nature. In fact, investigations cite distinct combinations of amino acids as the odor cue utilized in discriminating between stream waters (Shoji et al. 2000). The distinct cues of each stream may be a result of differences in watershed vegetation and soil. Other research indicates that salmonid adults can sense the unique chemical compounds released by conspecifics (juvenile salmonids rearing in the natal stream during the adult migration period) and respond to the signature of each specific population (Stabell 1992; Courtenay et al. 2001). Regardless of the exact compound utilized in the homing response, an overwhelming majority of the available research finds that the cue is organic.

The organic nature of the homing cue has an enormous implication for the analysis of potential impacts of the project alternatives, including the No Action/No Project Alternative. The American River water delivered for irrigation and municipal use is likely to encounter extreme and odor-altering environments before entering Auburn Ravine. The water utilized for irrigation may encounter new sources of organic material such as the vegetation and soil of the agricultural fields and conveyance canals, and the ambient organic signature in the American River water would be subject to decomposition by soil microbes. Similarly, the American River water delivered for municipal use and discharged into Auburn Ravine as storm runoff may be subject to lawn vegetation and soil. American River water municipally delivered within the service area of the Lincoln WWTRF and discharged as treated effluent into Auburn Ravine would be treated and likely heavily altered by the secondary wastewater treatment process utilized by the plant, which is designed to remove organic material (City of Lincoln 1999). Similarly, the municipally delivered water which is distributed to the service areas of Placer County Department of Public Works SMD No. 3 and the two City of Roseville WWTPs would undergo treatment as well, a process which is likely to drastically alter the homing cues before the treated effluent is discharged into Dry Creek and Pleasant Grove Creek. Therefore, the homing cues found in the American River water utilized within the PCWA watersheds are likely to be dramatically altered before entering Auburn Ravine, Dry Creek, and Pleasant Grove Creek suggesting that the water reaching these streams would retain low potential for attracting American River fish.

The timing of olfactory imprinting also is a key component to understanding the mechanisms that drive salmonid homing behavior. The majority of the research in this field suggests imprinting of stream odors is most sensitive during a developmental process called the parr-smolt transformation (PST) (Dittman et al, 1996), in which a juvenile salmonid prepares for life in the ocean. However some imprinting must occur before this time, as wild salmon home to their hatching area, not to the area of their PST. Many of the changes that occur in the PST process are related to elevations in thyroid hormones, and it is postulated that these hormones drive the imprinting process (Dittman and Quinn 1996). Research reveals that elevations in various thyroid hormones may occur at numerous lifestages including hatching and emergence (Tilson et al 1994). Thyroid hormone levels also are particularly sensitive to environmental cues such as exposure to novel water chemistry (Dickhoff et al. 1992), and changes in lunar phase (Grau et al. 1991), water temperature (Lin et al. 1985), photoperiod (Hoar 1976), water flow rates (Youngson and Simpson 1984), and juvenile swimming rates (Nishioka et al. 1985). Migration may actually stimulate an increase in thyroid gland production as well (McCormick and Bjoernsson 1994). Hence, it appears that the imprinting process associated with developmental-, environmental-, and migratory-induced surges in hormone levels may serve to provide a sequence of cached odors which adult salmonids use to find their natal streams (Dickhoff et al. 1992).

The sequential imprinting process found in salmonids has implications in the analysis of the No Action/No Project Alternative. The sequential process indicates that as wild-spawned salmon and steelhead in Auburn Ravine emerge, rear, and migrate, they may become imprinted with numerous odors during their downstream journey. To illustrate, a juvenile steelhead migrating from Auburn Ravine toward the ocean may become imprinted at various points along its journey determined by developmental processes and changes in environmental conditions. These imprinting points may include Auburn Ravine itself, the tributary confluence with the Sacramento River and its confluence with the American River, as flow, water temperature, and water composition likely change at these points. Upon returning from the ocean, the adult steelhead may reverse the olfactory memory constructed during the ocean-bound migration. The wild-spawned salmonid will not necessarily seek its natal waters automatically, but instead locate a series of points sequentially until the natal stream, presumably the last point in the sequence, is found. It is unlikely that an immigrating Auburn Ravine adult would stray into the American River because the immigrating adult will continue to be drawn upstream in the much larger Sacramento River by olfactory cues associated with the next sequential points north of the point at which the American River empties into the Sacramento River. Thereafter, the immigrating adult will continue to follow the Sacramento River northward until the adult reaches a point at which olfactory cues indicate that the adult should follow waters flowing into the Sacramento River from the canals into which Auburn Ravine drains, each of which has its own unique olfactory cues. Thus, the sequential migration of Auburn Ravine salmonids will guide the return to their natal spawning grounds.

Similarly, it is unlikely that an American River fish will stray into Auburn Ravine as a result of the No Action/No Project Alternative. While the American River salmonids reared in a hatchery may have fewer opportunities to imprint due to the relatively constant environmental conditions within the hatchery environment (Dittman et al. 1996), American River fish should become imprinted with the smell of the American River as their natal spawning ground during developmental changes. As these fish reach the American River during upstream migration as adults, they will be bombarded with the smell of their natal stream. In some cases, this smell is the only imprinted smell available to them during their juvenile lives. Hence, it is unlikely that salmonids from the American River will disregard the inherent drive to enter this natal stream, simply because a minute amount of diluted American River water may exist in the Sacramento River at their confluence. In addition, the water transferred from the North Fork American River to Auburn Ravine, having been subjected to myriad organic influences associated with the Auburn Ravine watershed, is likely to smell drastically different than the substantial lower American River flows that enter into the Sacramento River at the confluence. Therefore, the No

Action/No Project Alternative would not be expected to increase the straying rates of American River or Auburn Ravine salmonids.

Although a majority of the transferred American River water would end up in Auburn Ravine only after contact with new odor causing agents or extensive treatment, some raw American River water still would be delivered into Auburn Ravine via the Auburn Ravine Tunnel in the historical amount. The majority of the American River raw water diversions associated with implementation of the No Action/No Project Alternative occur in June, July and August, with a maximum diversion in July. This pattern and volume of water diversion releases to Auburn Ravine is consistent with the existing condition, and would not result in a change in the total volume or seasonal distribution of North Fork American River water to Auburn Ravine.

Although it is not the only stage associated with imprinting, the PST likely represents the most sensitive imprinting period (Dittman et al. 1996). The initiation of the PST is related to the emigration process of salmonids from natal drainages. Fall-run chinook salmon in the Central Valley emigrate from January through June, peaking in April, while steelhead emigrate from December through possibly June (SWRI 2001). Hence, the periods of peak emigration of juvenile salmonids do not correlate with periods associated with peak raw water deliveries. Therefore, continuation of historical levels of raw water deliveries is not expected to significantly affect the imprinting of juvenile salmonids in Auburn Ravine.

Similarly, immigrating adult salmonids in Auburn Ravine are not expected to be exposed to the olfactory cues or increased flows associated with the seasonal delivery of raw North Fork American River water. Adult migrations of chinook salmon begin in September and may extend through January, while adult steelhead typically immigrate November through April, peaking in January (SWRI 2001). Because relatively small discharges of American River water from the Auburn Ravine Tunnel occur during these times, the continuation of historical levels of raw water deliveries would not be expected to affect immigrating adult salmonids. The timing of critical periods of salmonid life history and the timing of water deliveries to Auburn Ravine are temporally inconsistent.

It is not likely that Auburn Ravine historically harbored a persistent native population of salmonids. Low elevation streams like Auburn Ravine may have been essentially dry in summer and fall, at least in the foothill regions. Because of their intermittent nature, these streams were not conducive to significant or consistent fall-run chinook salmon or steelhead populations (McEwan 2001). The population of salmonids currently residing in Auburn Ravine likely represents a conglomeration of strays from Central Valley drainages, and the genetic characteristics of the Auburn Ravine salmonids are likely not distinct. Furthermore, hatchery stocking records indicate that Auburn Ravine already has been influenced by chinook salmon of American River origin (SWRI 2001). Additionally, NMFS considers Auburn Ravine steelhead to be within the Central Valley ESU, and does not recognize them as genetically distinct from other populations within the ESU.

Considering the overwhelming weight of evidence concerning homing and straying in the salmonid family, it is unlikely that the No Action/No Project Alternative would cause potentially significant impacts to the salmonids of Auburn Ravine.

While the mitigated diversion plan for the American River pump station project alternatives no longer requires a change in the volume or seasonal distribution of American River water diversions into Auburn Ravine, the Lincoln WWTRF discharges would increase the amount of flow in Auburn Ravine, which some believe could potentially induce a "false attraction" of salmonids.

The relationship between the American River Pump Station alternatives and the City of Lincoln WWTRF is described under the Proposed Project impact analysis (Impact 3.5-11). The Proposed Project impact analysis also considers the relationship between the American River Pump Station and the Placer County Public Works SMD No. 3 and two City of Roseville WWTPs, which discharge into Dry Creek and Pleasant Grove Creek. The impact analysis (Impact 3.5-11) concludes that these relationships represent a less than significant potential impact of the Proposed Project. The No Action/No project Alternative would supply less water to these facilities than the Proposed Project. Therefore, the No Action/No Project Alternative deliveries of North Fork American River water to the Lincoln WWTRF, Placer County Pubic Works SMD No. 3, and the City of Roseville WWTPs represent a less than significant impact.

Proposed Project

Impact 3.5-6: Construction effects on aquatic resources of the North Fork American River.

Under the Proposed Project, construction activities associated with the new pump station and proposed intake pipeline would disturb river floor sediment and potentially increase riverbank erosion. In addition, under the Proposed Project, a series of gradient control structures and a permanent fish screen structure would be constructed. The Proposed Project also would close the Auburn Dam construction bypass tunnel and restore flows to the dewatered channel. It has been determined that a cofferdam would not be required as part of this construction. Therefore, cofferdam construction mitigation measures recommended in the Draft EIS/EIR (September 2001) are no longer proposed.

The magnitude of potential impacts to aquatic organisms would be dependent on the timing and extent of sediment loading, and river flows during and immediately following construction. However, minimal effects are expected to occur because: (1) much of the construction for this alternative would be performed in the dewatered river channel prior to river restoration; (2) sediment control measures, including regulatory agency permit terms and conditions, would be incorporated into a construction management plan (Section 3.7, Water Quality); and (3) any potential effects would be temporary in nature. Therefore, construction-related riverbed and bank disturbance would result in a less-than-significant impact upon fish and aquatic habitat.

Development of the vehicle turnaround and three-space handicapped accessible parking area across from the bypass tunnel outlet would occur as part of the channel restoration activities, and would occur prior to rewatering the riverbed. Due to the distance from the river, there would be no direct contribution of soil or rock materials to the river. All materials to be removed from the channel would be deposited in designated excavation material disposal locations and stabilized prior to restoring the river channel. The parking area proposed for the former Auburn Dam batch plant also is a sufficient distance from the river so that no direct contribution of construction materials to the water would be anticipated.

Implementation of construction BMPs for erosion control and grading activities would minimize the potential for direct release of materials to the river during road widening and trail improvement activities that would take place between the upper flat parking area and Oregon Bar at the river (Figure 2-7). Few improvements would be made from the point of the proposed vehicle turnaround area near Oregon Bar and the river itself. These improvements generally would include development of improved drainage courses for surface water runoff and would be performed manually to minimize the extent of vegetation and ground disturbance. Therefore, development of the public river access sites would result in a less-than-significant impact to fish communities present in the study area. Overall, construction effects on aquatic resources of the North Fork American River would be considered less than significant.

Impact 3.5-7: Use of river access parking area.

Use of the river access parking area potentially would involve up to 53 cars at one time, on a peak summer day. These vehicles could contribute oil or other contaminants to local surface water runoff. The parking areas would be designed to reduce the potential for direct contribution of vehicle-related materials to the river. Additionally, the river access improvements would include installation of sanitary facilities including portable restrooms and trash containers to minimize potential water quality impacts from increased human activity in the project area. Based on the limited use of the area and inclusion of drainage and sanitary improvements, increased use of the area is anticipated to have a less-than-significant effect on fish communities in the study area.

Moreover, the Proposed Project includes restoring the previously dewatered channel, resulting in increased habitat availability for fish resources in the project vicinity. The restored channel would be designed to self-regulate the transport of sediment moving into and out of the system, maintain the stability of bed and banks within the natural variability of erosion expected for the site, and promote development of diverse substrate and bar morphology similar to a natural river system. These design features would emphasize physical non-uniformity that provides diverse water depths and velocities and substrate complexity, promoting a diverse physical and aquatic environment that would eventually naturally support diverse riverine and riparian ecosystems. Therefore, overall, river restoration activities would result in improved fisheries communities and aquatic habitat in the project area.

Impact 3.5-8: Fish impingement and entrainment at the point of diversion.

The seasonal facility fish screen method is not in compliance with current CDFG screening criteria, and fish species present at the point of diversion are susceptible to entrainment. Although the Proposed Project would increase PCWA's rate and volume of diversion (from the existing diversion of 8,500 AFA over four months to 35,500 AFA over 12 months), loss of fish through impingement and entrainment would be expected to be reduced, due to the installation of a fish screen to be designed in consultation with CDFG fish screen experts. Therefore, the

Proposed Project would be expected to have a beneficial effect on larval and juvenile fish through reduction of entrainment at the point of diversion.

Reclamation and CDFG would evaluate the performance of the newly-constructed fish screen. PCWA would ensure the fish screen and pumping plant are operated and maintained properly for acceptable fish screen performance. This will include documentation of fish screen performance in an operations and maintenance log book, provision of quarterly reports to CDFG for the first two years of operation, and upon request thereafter, and coordination with CDFG staff for inspection and performance measurement purposes.

Impact 3.5-9: Alteration of fish habitat through creation of backwater upstream of the diversion and by restoration of the dewatered channel.

Under the Proposed Project, a series of gradient control structures would be constructed at the point of diversion to direct river flow to create flow velocities and river depth conducive to the proposed diversion. With the gradient structures at the point of diversion, water within the North Fork American River would be locally impounded, causing water levels to rise. The river stage at the point of diversion would increase up to approximately two feet, with changes in water depths decreasing with distance upstream. Preliminary design information indicates that the backwater effect would extend upstream approximately to Tamaroo Bar.

Creation of the gradient control structures would change the upstream aquatic habitat from a lotic (e.g., stream-like) environment to a slightly more lentic (e.g., lake-like) environment. However, the backwater effect would generally not eliminate riffle habitat, because the river in this vicinity generally consists of pools and runs. Reduced flow rates also could lead to sedimentation of the deeper pools and runs. These overall habitat conditions would tend to favor fish species such as centrarchids (e.g., green sunfish, and largemouth and smallmouth bass) more so than rainbow and brown trout, the fish species of primary management concern in the project area. In addition, the process of sedimentation potentially could alter macroinvertebrate species composition. These changes in aquatic habitat could represent a slight adverse impact to rainbow and brown trout populations.

However, a healthy aquatic community would continue to persist following creation of the backwater. Because rainbow and brown trout populations within the area are established through downstream migration from upstream spawning grounds rather than from spawning within the immediate area, recruitment of adult and sub-adult fish into the population would continue. The backwater would not be expected to significantly reduce the long-term population trends of rainbow and brown trout at the project site, compared to existing population levels. In addition, although macroinvertebrate community composition could be altered, macroinvertebrate populations would still be present. Furthermore, the backwater created by the Proposed Project would not be expected to adversely impact native fish species such as pikeminnow, Sacramento sucker, and hitch.

In addition to altered aquatic habitat, the created backwater also could potentially increase the availability of predator holding areas through reduced current velocities. However, because minimal, if any, salmonid spawning or early-lifestage rearing occurs within the project area, because fry and/or juvenile salmonids do not emigrate in mass through the project area, and because predation on adult and sub-adult salmonids is limited by their larger size, increased availability of predator holding areas due to reduced current velocities would not significantly impact long-term salmonid population trends within the project area.

Finally, although current velocities would be reduced, the backwater would not be expected to significantly increase average water temperatures on the North Fork American River. Water temperatures at the project site are generally at or near their equilibrium temperature. In addition, because of the relatively rapid turnover rate of water within the backwater, average temperatures would generally not be expected to change measurably from the existing condition. As a result, the overall change in aquatic habitat would not significantly reduce the long-term population trends of rainbow and brown trout, a healthy aquatic environment would remain within the backwater, the backwater would not increase rates of predation, and the backwater would not substantially increase temperatures.

Finally, the Proposed Project includes restoring a previously dewatered channel, resulting in increased habitat availability for fish resources in the project vicinity. Therefore, habitat alteration in the project vicinity due to implementation of the Proposed Project represents a beneficial effect on fish resources and aquatic habitat.

Impact 3.5-10: Impact of structures on fish passage through the project area.

Under the Proposed Project, fish passage from upstream to downstream and habitat availability would be greatly improved through river restoration. Minimum instream requirements would continue to be met past the point of diversion, and additional flow would be released from upstream reservoirs to meet future demands resulting in flows through the project area that would be equal to or higher than existing flows. Fish also would be able to pass the gradient control structures to reach downstream sites. Overall, the Proposed Project would result in a beneficial impact for fish passage through the project area.

Impact 3.5-11: Effects on salmonid stocks in Auburn Ravine.

Implementation of the Proposed Project would result in greater pumping capacities and greater delivery of water into the Auburn Ravine Tunnel from the American River Pump Station than under the No Action/No Project Alternative. However, deliveries in excess of the historical delivery rate into Auburn Ravine would be double-pumped into the South Canal for delivery to the Foothill WTP, thereby avoiding potential flow-related changes and related impacts in Auburn Ravine. In addition, the Proposed Project would not result in a change in the source water composition in Auburn Ravine. Therefore, the Proposed Project and No Action/No Project Alternative are very similar in their potential impacts to the aquatic resources of Auburn Ravine. Please refer to the No Action/No Project Alternative impact analysis (Impact 3.5-5) for further detail regarding these issues.

While the potential impacts described in the No Action/No Project Alternative are very similar to the potential impacts of the Proposed Project, the Proposed Project does differ in its relationship to the City of Lincoln WWTRF, Placer County Public Works SMD No. 3, and two City of

Roseville WWTPs. Because the Proposed Project has a greater diversion capacity than the No Action/No Project Alternative, a greater amount of water potentially would be supplied to these facilities under the Proposed Project.

While the mitigated diversion plan for the American River Pump Station Project no longer requires a change in the volume or seasonal distribution of American River water diversions into Auburn Ravine, the Lincoln WWTRF treated effluent discharges would increase the amount of flow in Auburn Ravine, which some believe could potentially induce a “false attraction” of salmonids. The potential for the “false attraction” of salmonids was considered by the City of Lincoln in its Draft EIR for the WWTRF (City of Lincoln 1999). The City of Lincoln (1999) concluded that the existing flows in Auburn Ravine during the steelhead spawning season would likely be adequate for migration both upstream and downstream of the WWTRF outfalls. However, the City of Lincoln (1999) determined that the supplementation to existing flows in Auburn Ravine by WWTRF effluent during the fall-run chinook salmon spawning months (October and November) could potentially create a “false attraction” of fall-run chinook salmon. The Lincoln Draft EIR deemed the potential for fall-run chinook salmon “false attraction” potentially significant. As a result of the potentially significant impact created by the City of Lincoln WWTRF, the City of Lincoln committed to monitoring adult fall-run chinook salmon migrations in Auburn Ravine.

The City of Lincoln (1999) Draft EIR indicated that the WWTRF will have a maximum discharge into Auburn Ravine of 12 mgd, or 18.6 cfs. The Proposed Project would supply only a fraction of the WWTRF inflows. At maximum buildout, the Proposed Project would contribute an average of 2.0 cfs during the months of October and November, the months of concern regarding “false attraction.” Therefore, the Proposed Project would approximate only 11 percent of the total WWTRF discharge. Without any contribution from the Proposed Project, the Lincoln WWTRF discharge would still exceed 16 cfs during October and November, which may constitute a potentially significant impact. The additional contribution of North Fork American River source water provided by the Proposed Project during October and November would not significantly exacerbate any “false attraction” that may be created by the Lincoln WWTRF discharge into Auburn Ravine. Therefore, the potential for "false attraction" of adult salmonids into Auburn Ravine, more particularly to the Lincoln WWTRF outfall, represents a less-than-significant impact of the Proposed Project.

In addition, the Proposed Project would supply municipally delivered treated water to the service areas of three other WWTPs including Placer County Public Works SMD No. 3, and two City of Roseville WWTPs. During October and November, the Proposed Project-related collective discharge from these three plants would average approximately 2.8 cfs, while the collective planned capacities of the three WWTPs total 65 cfs. Hence, the Proposed Project-related discharge represents less than five percent of the collective planned capacities of these three WWTPs. It also should be noted that American River water deliveries to this area would increase independent of the Proposed Project as a result of increased deliveries by Roseville and San Juan Water District (SJWD), both of which supply only American River water. Overall, the distribution of water from the Proposed Project to the service areas of the Placer County Department of Public Works SMD No. 3 and the two City of Roseville facilities represents a less-than-significant impact.

Overall, a less-than-significant impact is expected to occur as a result of the Proposed Project.

Upstream Diversion Alternative

With the exception of the restoration of the river channel, the Upstream Diversion Alternative facilities-related effects would generally be the same as described for the Proposed Project (see Impacts 3.5-6 to 3.5-11).

Impact 3.5-12: Construction and maintenance effects on aquatic resources of the North Fork American River.

Under the Upstream Diversion Alternative, construction and operation activities would disturb floor sediments and potentially increase erosion. The magnitude of potential impacts to aquatic organisms would be dependent on the timing and extent of sediment loading, and river flows during and immediately following construction.

During annual maintenance activities involving sediment removal from behind the diversion structure, impacts from the Upstream Diversion Alternative on aquatic resources would be similar to the Proposed Project. For a further discussion of this impact, refer to Impact 3.5-6. As described for the Proposed Project, environmental protection measures would be implemented to protect fish from water quality effects. Overall, construction impacts on fish resources would be less than significant.

Impact 3.5-13: Fish impingement and entrainment at the point of diversion.

As described for the Proposed Project, the year-round pump station under the Upstream Diversion Alternative would include a fish screen to be designed in consultation with CDFG fish screen experts, thereby minimizing the potential for impingement and entrainment of fish at the point of diversion. Therefore, the Upstream Diversion Alternative would be expected to have a beneficial effect on larval and juvenile fish through reduction of entrainment at the point of diversion. For a further discussion of this impact, refer to Impact 3.5-8.

Impact 3.5-14: Alteration of fish habitat through the creation of a backwater upstream of the diversion.

Under the Upstream Diversion Alternative, backwater would be formed upstream of the diversion structure. The river stage at the point of diversion would increase up to approximately two feet, with changes in stream depths decreasing with distance upstream (J. Kaufman, pers. comm. 1998). The backwater would extend upstream to Tamaroo Bar. The change in aquatic habitat from a lotic environment to a slightly more lentic environment could represent a slight adverse impact to rainbow and brown trout populations. However, the backwater would not be expected to significantly reduce long-term population trends of rainbow and brown trout in the project area. In addition, the backwater effect would not be expected to significantly contribute to increased predation on salmonids, or increases in water temperature. Therefore, because the overall change in aquatic habitat would not significantly reduce the long-term population trends of rainbow and brown trout, because the backwater would not increase rates of predation, and because the backwater would not significantly increase water temperatures, the backwater effect would have a less-than-significant impact on fish resources and aquatic habitats. See additional discussion under Impact 3.5-9.

This alternative would not provide the added benefit of increasing open-water habitat in the project area because the bypass tunnel would continue to divert river flows through the project area.

Impact 3.5-15: Impacts of structures on fish passage through the project area.

Under the Upstream Diversion Alternative, fish movement through the project site would not be substantially changed from the existing or No Action/No Project Alternative conditions. Fish would be able to pass over the diversion structure. Fish screens at the point of diversion would be designed in consultation with CDFG fish screen experts and meet applicable criteria to maintain adequate approach and sweeping velocities and minimize impacts. Blockage of upstream fish migration due to velocity conditions in the bypass tunnel would not change under the Upstream Diversion Alternative. The Upstream Diversion Alternative effects on fish passage through the project area would represent a less-than-significant impact relative to the existing condition and compared to the No Action/No Project Alternative.

Impact 3.5-16: Effects on salmonid stocks in Auburn Ravine.

Operation of the Upstream Diversion Alternative would be the same as the Proposed Project relative to Auburn Ravine. Please refer to impact discussions 3.5-5 and 3.5-11.

Overall, a less-than-significant impact would be expected to occur as a result of the Upstream Diversion Alternatives.

Facilities-Related Cumulative Impacts

All future planned activities within the river channel would be responsible for implementing water quality protection measures according to regulatory and planning agency requirements. No significant cumulative impact upon water quality affecting fish resources would be anticipated.

Diversion-Related Impacts

The diversion-related analysis refers to certain tables and graphs prepared to provide additional representation of the modeling results and comparison of simulated conditions. These tables and figures are included in Appendix H to the Draft EIS/EIR and are labeled by the appendix letter, resource section number, and ordered as it is referenced in the impact analysis (H-3.5-1, H-3.5-2, etc.).

The timing and quantity of the increased diversion would be the same under the Proposed Project and Upstream Diversion Alternative. Therefore, the diversion-related impacts are expected to be identical and so, are discussed below as Action Alternative impacts.

No Action/No Project Alternative

The increased pump station diversion under the No Action/No Project Alternative would be less than evaluated for the Action Alternatives (see below). Based on the evaluation of modeling performed for the Action Alternatives, it is expected that the No Action/No Project Alternative would not result in significant effects on fish habitat or aquatic resources, nor would it result in a significant or considerable contribution to the cumulative condition.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the Existing Condition

<u>Upper American River Fisheries Impacts</u>

Impact 3.5-17: Flow impacts to fish resources on the North and Middle Forks of the American River upstream of the project site.

Simulated average long-term flows in the North and Middle Forks of the American River upstream of the project area under the existing condition and Action Alternatives are presented in Table H-3.5-1 (Appendix H to the Draft EIS/EIR). Simulation results show that the monthly mean flows upstream of the project site under the Action Alternatives would result in essentially equivalent monthly mean flows as in the existing condition for 801 months of the 840 months included in the analysis.

During the high-flow months (December to June), the change in streamflow due to the Action Alternatives would be negligible. During the low-flow period (July to November), project operations would result in both increases and decreases in monthly mean flow upstream of the project site. Reductions in flow during the low-flow period are of more concern than reductions in flow during the high-flow period, because fish resources during low flow may already be under stressed conditions. Reduction in monthly mean flows would occur between April and August and would range from no change in June to a decrease of 0.8 percent in July. All other months of the year would either experience no change or have an increase in flows of up to 0.7 percent. Over the long-term, implementation of the Action Alternatives relative to the existing condition would result in an increase in the upper American River flows upstream of the project site.

Figures H-3.5-1 through H-3.5-3 (Appendix H to the Draft EIS/EIR) show the exceedance curves for the flows on the North Fork American River upstream of the project site under the Action Alternatives relative to the existing condition. October through March flows would be essentially equivalent under the Action Alternatives relative to the existing condition. In April and May, the Action Alternatives would result in small reductions in flow when the flows would be within the 3,500 to 4,500 cfs range. The June and July exceedance curves are essentially equivalent between the Action Alternatives and existing conditions, with negligible reductions resulting from the Action Alternatives in July, for flows within the 500 to 1,100 cfs range. During June and July, the Action Alternatives would result in slightly higher flows than under the existing condition, for flows below 500 cfs. In the month of August, Action Alternative conditions would reduce upper American River flows within the 400 to 900 cfs range. For flows below 400 cfs, flows would increase under the Action Alternatives relative to the existing condition. Anticipated reductions in flow on the North Fork American River would not be expected to adversely impact fisheries because relatively small or no reduction in monthly mean flows would occur, and the majority of trout that occur in the North Fork American River below the confluence with the Middle Fork American River are believed to be transitory. Changes in the upper American River would represent a less-than-significant impact to fish resources upstream of the project site.

Impact 3.5-18: Water temperature impacts to fish resources of the North and Middle Forks of the American River upstream of the project site.

Under the Action Alternatives, decreases in flow during the low-flow condition would not be expected to result in increases in water temperature of the upper American River. Temperature changes that would result from the Action Alternatives relative to the existing condition upstream of the project area would generally not be measurable. Therefore, potential water temperature changes resulting from the Action Alternatives under low- and high-flow conditions represent a less-than-significant impact on the long-term population of rainbow or brown trout upstream of the project site.

Impact 3.5-19: Flow impacts to fish resources of the North and Middle Forks of the American River downstream of the project site.

Table H-3.5-2 presents simulated monthly mean flows in the upper American River downstream of the project site under the Action Alternatives relative to the existing condition. The Action Alternatives would exhibit lower monthly mean flows in all months of the year (except January), with decreases ranging from less than one percent in the high-flow winter months to 6.4 percent in July. Differences in monthly mean flows in the high-flow period (i.e., December to June) (Figure H-3.5-4) would range from 0.5 percent to 4.5 percent. The low-flow months (i.e., July to November) (Figures H-3.5-4 and H-3.5-6) would be subjected to changes ranging from 1.3 to 6.4 percent, with lower reductions in the fall months and greater reductions in the summer months, when greater volumes of water would be diverted at the pump station.

October through March flows would be essentially equivalent under the Action Alternatives relative to the existing condition. In April and May, the Action Alternatives would result in small reductions in flow when flows would be within the 3,500 to 4,500 cfs flow range. Because of the greater diversion rates in the summer months, the exceedance curves representing the Action Alternatives and the existing condition, start separating in June and display a greater spread in July, August and September (Figure H-3.5-6). However, in low-flow conditions, implementation of the Action Alternatives would result in an increase in flows relative to the existing condition.

Anticipated reductions in streamflow would not be expected to adversely impact fisheries in the North and Middle forks of the American River below the project site because relatively small or no reduction in monthly mean flows would occur, and the majority of trout that occur in the North Fork American River below the confluence with the Middle Fork American River are believed to be transitory. Moreover, the Proposed Project includes restoring a previously dewatered channel, resulting in increased habitat availability for fish resources in the North Fork American River for about 0.75 mile downstream of the project site, and probably result in a net beneficial impact. Although the Upstream Diversion Alternative would not include restoration of the previously dewatered channel, given the relatively unstable habitat conditions downstream of the project, much of which consist of the bypass tunnel itself, reductions in flow would represent a less-than-significant impact.

Impact 3.5-20: Water temperature impacts to fish resources on the North Fork American River downstream of the project site.

Under the Action Alternatives, decreases in flow during the low-flow condition would not be expected to result in measurable increases in water temperature of the upper American River. Therefore, potential water temperature changes resulting from the Action Alternatives under low- and high-flow conditions represent a less-than-significant impact on the long-term populations of rainbow or brown trout downstream of the project site.

Folsom Reservoir Fisheries Impacts

Impact 3.5-21: Impacts to Folsom Reservoir warmwater fisheries.

Hydrologic conditions under the Action Alternatives would result in almost no difference in the long-term average end-of-month water surface elevation in Folsom Reservoir during the March through September period (when warmwater fish spawning and initial rearing occurs). End-of-month water surface elevation at Folsom Reservoir would be essentially equivalent to the existing condition for 454 months of the 490 months included in the analysis. As shown in Table H-3.5-3, the average end-of-month elevation is the same in March, April, May and July with only a one-foot difference (reduction) in June, August and September. For the entire 70-year period of record, the largest single difference in end-of-month elevation (out of 490 months) during the March through September season would be a six-foot decrease relative to the existing condition.

Changes in water surface elevation in Folsom Reservoir during the March through September period would result in corresponding changes in the availability of reservoir littoral habitat containing inundated terrestrial vegetation (willows and button brush). Such shallow, near shore waters containing physical structure are important to producing and maintaining strong year-classes of warmwater fish annually. However, as shown in Table H-3.5-4, the difference in the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Folsom Reservoir during the March through September period attributable to the Action Alternatives is estimated to be two percent or less. The small and infrequent reductions in the availability of littoral habitat would not be of sufficient magnitude to substantially reduce long-term, average initial year-class strength of the warmwater fish populations. Consequently, seasonal reductions in littoral habitat availability would constitute a less-than-significant impact to Folsom Reservoir's warmwater fisheries.

In addition, the Action Alternatives could alter the extent to which water surface elevations in Folsom Reservoir change during each month of the primary warmwater fish-spawning period

(March through July). As previously discussed, adverse impacts to spawning from nest-dewatering are assumed to have the potential to occur when reservoir elevation decreases by more than 9 feet within a given month. Modeling results, shown in Table H-3.5-5, indicate that the frequency with which potential nest-dewatering events could occur in Folsom Reservoir would not increase under the Action Alternatives, compared to the existing condition, during any month of the March through July spawning period. Because the frequency with which potential nest-dewatering events could occur in Folsom Reservoir under the Action Alternatives would not change during any month of the March through July warmwater fish-spawning period, impacts to warmwater fish nesting success would be considered less than significant. Overall, impacts to Folsom Reservoir warmwater fisheries would be considered less than significant.

Impact 3.5-22: Impacts to Folsom Reservoir's coldwater fisheries.

Folsom Reservoir end-of-month storage under the Action Alternatives would be essentially equivalent to the existing condition for 428 of the 560 months included in the analysis (i.e., April through November, when the reservoir stratifies). The Action Alternatives, relative to the existing condition, would result in small changes in Folsom Reservoir end-of-month storage during some years of the simulation for the April through November period. Long-term average end-of-month storage would be slightly reduced with implementation of the Action Alternatives relative to the existing condition (Table H-3.5-6). For any given month, the largest difference between long-term average end-of-month storage would be 4,000 AF, a less than one percent difference. Anticipated reductions in reservoir storage would not be expected to adversely affect the reservoir's coldwater fisheries because coldwater habitat would remain available within the reservoir during all months of all years, physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations, and anticipated seasonal reductions in storage would not be expected to adversely affect the primary prey species utilized by coldwater fish. Therefore, changes in Folsom Reservoir end-of-month storage under the Action Alternatives represent a less-than-significant impact on coldwater fish resources.

Impact 3.5-23: Impacts to Nimbus Fish Hatchery.

CVP operations of Folsom Dam and Reservoir associated with the Action Alternatives would have very little effect on water temperatures entering the Nimbus Fish Hatchery from Lake Natoma during the May through September period, relative to the existing condition. Table H-3.5-7 shows that, under the Action Alternatives, the long-term average temperature of water released from Nimbus Dam would not differ by more than a calculated 0.1°F, relative to the existing condition, during any month of the year. Viewed from a different perspective, Table H-3.5-8 shows insignificant differences in the frequency with which temperatures exceed index temperatures of 60°F, 65°F and 68°F. These small and infrequent differences in water temperature which could occur during the May through September period (when hatchery temperatures reach annual highs) would have little, if any, effect on hatchery operations and resultant fish production. Therefore, implementation of the Action Alternatives would result in a less-than-significant impact.

<u>Lower American River Fisheries Impacts</u>

Flow- and temperature-related impacts are discussed separately below by species and lifestage. Organizationally, flow- and temperature-related impacts to fall-run chinook salmon and steelhead are discussed together, followed by impact discussions for splittail, American shad, and striped bass.

Impact 3.5-24: Impacts to fall-run chinook salmon and steelhead in the lower American River.

Minimal potential differences in lower American River flows and water temperatures under the Action Alternatives, relative to the existing condition, would not be expected to adversely affect fall-run chinook salmon and steelhead immigration, spawning and incubation, or juvenile rearing and emigration.

Flow-Related Impacts to Fall-Run Chinook Salmon/Steelhead Adult Immigration (September Through March)

Even at current minimum flow requirements (i.e., 250 cfs under D-893), flow-related physical impediments to adult salmonid upstream passage are not known to occur. Therefore, flow-related impacts to chinook salmon adult immigration would primarily be determined by flows at the mouth of the American River during the September through December period, when lower American River chinook salmon adults immigrate through the Sacramento River in search of their natal stream to spawn. The same would be true for steelhead during the December through March period. Reduced flows at the mouth are of concern primarily because less flow could result in insufficient olfactory cues for immigrating adult salmonids, thereby making it more difficult for them to "home" to the lower American River. Insufficient flow could result in higher rates of straying to other Central Valley rivers. Table H-3.5-9 shows the long-term average flow at the mouth differs by no more than 1.1 percent for all the months of the year under the Action Alternatives compared to the existing condition. The small difference in flows that would be expected to occur at the mouth under the Action Alternatives would not be of concern regarding attraction of adults immigrating into the lower American River.

Temperature-Related Impacts to Fall-Run Chinook Salmon/Steelhead Adult Immigration (September Through March)

Reclamation’s Lower American River Temperature Model does not account for the influence of Sacramento River water intrusion on water temperatures at the mouth. Therefore, the remaining temperature assessments are based on temperatures modeled at the mouth of the lower American River and at Freeport on the Sacramento River. The long-term average water temperatures modeled for the Action Alternatives would be essentially equivalent to those under the existing condition at the American River mouth and at Freeport on the Sacramento River during all months of the September through March adult immigration period, as shown in Table H-3.5-10. Monthly mean water temperatures at the American River mouth would be essentially equivalent to the existing condition for 475 months of the 483 months included in the analysis. Monthly mean water temperatures at Freeport on the Sacramento River would be essentially equivalent to the existing condition for all of the 483 months included in the analysis. Therefore, changes in temperature under the Action Alternatives would represent a less-than-significant impact to fall-run chinook salmon/steelhead adult immigration.

Flow-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October Through February)

All flow-related impact assessments regarding fall-run chinook salmon spawning and incubation were based on flows below Nimbus Dam and at Watt Avenue, with a greater emphasis placed on flows below Nimbus Dam. Aerial redd surveys conducted by CDFG in recent years have shown that 98 percent of all spawning occurs upstream of Watt Avenue, and 88 percent of spawning occurs upstream of RM 17 (located just upstream of Ancil Hoffman Park). Hence, the majority of spawning occurs upstream of RM 17.

Monthly mean flows below Nimbus Dam and at Watt Avenue under the Action Alternatives would be essentially equivalent to the existing condition for 304 months of the 350 months included in the analysis. The long-term average flow below Nimbus Dam would be within one percent of the flow under the existing condition during all months of the October through February period, as shown in Table H-3.5-11. Changes in long-term average flows at Watt Avenue would be within one percent for each month of the October through February period, as shown in Table H-3.5-12.

Figures H-3.5-7 through H-3.5-11 show exceedance curves for the American River release from Nimbus Dam for the October through February period. These curves demonstrate that the Action Alternatives' flows would be similar to those under the existing condition. Differences in flows in the lower flow ranges are more crucial for salmon survival. During October, the Action Alternatives result in flows nearly identical to the existing condition flows. Minimal differences in flow occur during November, December, and February when both slight increases and decreases resulting from the Action Alternatives occur when flows under the existing condition are 2,000 cfs or less. In January, the Action Alternatives would result in a flow decrease of 100 to 200 cfs in about half of the years when the existing condition flow is less than 2,000 cfs.

These findings indicate that, during the October through January period (when the majority of fall-run chinook salmon spawning occurs), the Action Alternatives could slightly reduce (i.e., 100 to 200 cfs) flows below Nimbus Dam and Watt Avenue in a few years when flows under the existing condition would be below 2,000 cfs. Flow reductions below 2,000 cfs could reduce the amount of available chinook salmon spawning habitat, which could result in increased redd superimposition during years when adult returns are high enough for spawning habitat to be limiting. However, these reductions in flow would not be expected to be of substantial magnitude or occur with enough frequency to have a significant adverse effect on long-term initial year-class strength of lower American River fall-run chinook salmon.

Temperature-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October Through February)

Under the Action Alternatives, the long-term average water temperatures would be equivalent to those under the existing condition during October at Watt Avenue, and during the November through February period below Nimbus Dam, as shown in Table H-3.5-13. Watt Avenue is the location of concern in October because air temperatures tend to warm the river as it moves downstream. Conversely, water temperatures below Nimbus Dam are usually warmer than water temperatures at Watt Avenue in the winter season.

The October water temperatures at Watt Avenue would be essentially equivalent to the existing condition for 67 months of the 69 months included in the analysis. The October water temperature at Watt Avenue would increase by more than 0.3°F in only two years of the simulation, once by 0.6°F, and once by 0.4°F. The November through February monthly mean water temperatures below Nimbus Dam would be essentially equivalent to the existing condition for 273 of the 276 months included in the analysis. November water temperatures below Nimbus Dam would increase by more than 0.3°F in only two years of the 69 years modeled, and by an estimated 0.4°F in only one year during the month of December. Under the Action Alternatives, there would not be any additional occurrences of October water temperatures at Watt Avenue above 56°F, relative to the existing condition. Below Nimbus Dam, there would only be one additional occurrence during November in which water temperatures under the Action Alternatives would exceed 56°F, relative to the existing condition. December, January and February water temperatures below Nimbus Dam would be below 56°F in all 69 years modeled.

The long-term average annual early lifestage survival for fall-run chinook salmon in the American River would be 84.9 percent under the existing condition and 85 percent under the Action Alternatives. Table H-3.5-14 shows the annual survival estimates for the 69 years modeled. Substantial increases or decreases in survival would not occur in any individual year of the 69-year simulation.

Based on these modeling results, any small temperature changes in the lower American River resulting from the Action Alternatives during the October through February period would not adversely affect spawning and incubation success of fall-run chinook salmon.

Flow- and Temperature-Related Impacts to Steelhead Spawning and Incubation (December Through March)

Monthly mean flows below Nimbus Dam and at Watt Avenue associated with the Action Alternatives would be essentially equivalent to the existing condition for 235 months of the 280 months included in the analysis. Also, monthly mean water temperatures below Nimbus Dam and at Watt Avenue would be similar to the existing condition for 271 months of the 276 months included in the analysis. Moreover, under the Action Alternatives water temperatures below Nimbus Dam would remain below 56°F for all months of the 69 years modeled for the spawning and incubation period for steelhead. December, January, and February water temperatures at Watt Avenue under the Action Alternatives would be below 56°F in all 69 years modeled. Under the Action Alternatives, there would only be one additional occurrence during March in which water temperatures at Watt Avenue would be greater than 56°F, relative to the existing condition, for all the 69 years modeled. Therefore, no flow- or temperature-related impacts to steelhead spawning or incubation would be expected to occur resulting from the Action

Alternatives. For flow data supporting this impact determination, see Tables H-3.5-11, H-3.5-12 and Figures H-3.5-9 through H-3.5-15. For the water temperature data supporting this impact determination, see Tables H-3.5-15 and H-3.5-16. (These tables and figures are included in Appendix H to the Draft EIS/EIR).

Flow-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March Through June)

Because the majority of juvenile salmonid rearing is believed to occur upstream of Watt Avenue, and because depletions generally exceed tributary accretions to the river throughout the March through June period (generally resulting in lower flows at Watt Avenue than below Nimbus Dam), all flow-related impact assessments for fall-run chinook salmon and steelhead rearing are based on flows at Watt Avenue.

Small changes in monthly mean flows would be expected to occur at Watt Avenue under the Action Alternatives relative to the existing condition. The long-term average flow at Watt Avenue would be within two percent of the flow under the existing condition for any given month during the March through June period (Table H-3.5-15). Flow exceedance curves for March through June at Watt Avenue are shown in Figures H-3.5-15 through H-3.5-18. An approximate decrease of 150 cfs represents the largest decrease in flow during the March through June period when flows under the existing condition are 2,000 cfs or less. Decreases of 150 cfs would occur about four percent of the time during March, five percent of the time during May, and four percent of the time during June. These small differences in flow would not be expected to adversely affect long-term juvenile fall-run chinook salmon or steelhead rearing success.

Temperature-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March Through June)

Modeling of the Action Alternatives indicates that the long-term average water temperature at Watt Avenue would not change by more than 0.1°F during any month of the March through June period, compared to the existing condition, as shown in Table H-3.5-15. Monthly mean water temperatures at Watt Avenue would be essentially equivalent to the existing condition for 268 of the 276 months included in the analysis. Moreover, under the Action Alternatives, there would not be any additional occurrences during May and only one additional occurrence during June for all the 69 years modeled in which water temperatures would be above 65°F, relative to the existing condition. March and April water temperatures at Watt Avenue under the Action Alternatives would remain below 65°F for all the 69 years modeled. Consequently, although small temperature increases at Watt Avenue would occur during the March through June period, resultant water temperatures would not be expected to adversely affect the success of juvenile salmon rearing.

Flow-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Emigration (February Through June)

The primary period of fall-run chinook salmon juvenile emigration occurs from February to June, with the majority of juvenile steelhead emigration occurring during this same period.

Generally little, if any, emigration occurs during July and August. Flow-related impacts to salmonid immigration discussed above addressed flow changes in February and March. As previously concluded for adult immigration, potential changes in flows under the Action Alternatives during February through March would not adversely affect juvenile fall-run chinook salmon or steelhead rearing and, therefore, also would not adversely affect emigration. Hence, this discussion focuses primarily on the April through June period.

Small decreases in monthly mean flows would be expected to occur at the American River mouth associated with implementation of the Action Alternatives compared to the existing condition. Under the Action Alternatives, the simulated long-term average flow at the mouth would decrease slightly (about one percent) in May and June (Table H-3.5-9). Figures H-3.5-19, H-3.5-20, and H-3.5-21 show the difference in flows simulated under the Action Alternatives at the lower flow ranges.

Juvenile salmonid emigration surveys conducted by CDFG have shown no direct relationship between peak emigration of juvenile chinook salmon and peak spring flows (Snider et al. 1997). Moreover, emigrating fish are more likely to be adversely affected by events when flows are high, then ramp down quickly (resulting in isolation and stranding). Adverse changes in flow ramping rates would not be expected to occur under the Action Alternatives. Consequently, although small flow reductions at the mouth would occur in a few years during the April through June period, resultant flows would not be expected to adversely affect the success of juvenile salmonid emigration.

Temperature-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Emigration (February Through June)

With the possible exception of a small percentage of fish that may rear near the mouth of the lower American River, impacts due to elevated water temperatures at the mouth to fall-run chinook salmon and steelhead would be limited to the several days that it takes emigrants to pass through the lower portion of the river and into the Sacramento River en route to the Delta. Water temperatures near the mouth during the primary emigration period (February into June) are often largely affected by intrusion of Sacramento River water, which is not accounted for by Reclamation's Lower American River Temperature Model. Consequently, actual temperatures near the mouth would likely be somewhere between temperatures modeled for the mouth, and temperatures modeled for the Sacramento River at Freeport (RM 46), located 14 miles downstream of the lower American River's confluence. For this reason, the long-term average temperatures are discussed for both of these locations.

Monthly mean temperatures at the American River mouth under the Action Alternatives are essentially equivalent to or less than the existing condition for 332 months of the 345 months included in the analysis. Monthly mean temperatures at Freeport on the Sacramento River are essentially equivalent to or less than the existing condition for all of the months of the 345 months included in the analysis. The long-term average water temperature at the American River mouth and on the Sacramento River at Freeport during February through June under the Action Alternatives would be similar to temperatures under the existing condition, as shown in Table H-3.5-10. In the 69-year simulation, water temperature increased 0.4°F or more at the mouth in only three years during March, two years during April, two years during May and five years during June. At Freeport on the Sacramento River, long-term average temperature increases greater than 0.1°F in the months of February through June would not occur, relative to the existing condition. Moreover, under the Action Alternatives, there would not be any additional occurrences during April and May and one additional occurrence during June in which water temperatures at the mouth of the lower American River would be above 65°F, relative to the existing condition. At Freeport, under the Action Alternatives, there would not be any additional occurrences during May and June in which water temperatures would be above 65°F, relative to the existing condition. Under the Action Alternatives, April water temperatures at Freeport would remain below 65°F for all the 69 years modeled.

Based on the results discussed above, water temperatures under the Action Alternatives would not adversely affect emigration during the February through June period, relative to the existing condition.

Flow-Related Impacts to Steelhead Rearing (July Through September)

Small decreases in monthly mean flows would be expected to occur below Nimbus Dam under the Action Alternatives relative to the existing condition. The long-term average flow below Nimbus Dam would decrease by less than two percent compared to the existing condition for the July through September period (Table H-3.5-11). The difference in flow would be similar at Watt Avenue (Table H-3.5-12).

Figures H-3.5-22 through H-3.5-24 provide flow exceedance curves for American River release from Nimbus Dam during July, August and September. These curves demonstrate that flows would be slightly different under the Action Alternatives compared to the existing condition. The exceedance curves show flows under the Action Alternatives to be both less than and greater than the flows under the existing condition when flows are 1,500 cfs or less.

Based on these findings, flow reductions under the Action Alternatives are not expected to reduce juvenile steelhead rearing habitat. Further, steelhead populations in the lower American River are believed to be limited by instream temperature conditions during the July through September period, rather than by flows. Therefore, small and infrequent reductions in flow would not be expected to adversely affect long-term rearing success of juvenile steelhead.

Temperature-Related Impacts to Steelhead Rearing (July Through September)

The long-term average water temperatures below Nimbus Dam, Watt Avenue, and the mouth would be the same during July, August and September under the Action Alternatives and the existing condition (Tables H-3.5-7, H-3.5-15, and H-3.5-16, respectively). Monthly mean water temperatures below Nimbus Dam would be essentially equivalent to the existing condition for 194 months of the 207 months included in the analysis. Monthly mean water temperatures at Watt Avenue would be essentially equivalent to the existing condition for 198 months of the 207 months included in the analysis. Moreover, under both the Action Alternatives and the existing condition, there would be the same number of occurrences in which water temperatures would be above 65°F during the July through September period at Watt Avenue. Monthly mean water temperatures at the mouth of the American River under the Action Alternatives would be essentially equivalent to the existing condition for 200 months of the 207 months included in the analysis. Therefore, small and infrequent increases in water temperature would not be expected to adversely affect long-term rearing success of juvenile steelhead.

Impact 3.5-25: Impacts to splittail in the lower American River.

Monthly mean flows at Watt Avenue under the Action Alternatives would be essentially equivalent to or greater than the existing condition for 216 months of the 280 months included in the analysis. The long-term average flow at Watt Avenue during the period February through May would range between 0.5 percent to two percent less than under the existing condition, as shown in Table H-3.5-12.

Using flows at Watt Avenue, the acreage of usable riparian vegetation inundated between RM 8 and RM 9 was used as an index of the relative amount of inundated riparian vegetation that would occur in the lower portion of the river for a given flow rate. The amount of riparian habitat inundated in this portion of the river under the Action Alternatives would remain unchanged in 70 years (100 percent of the time) during February, 68 years (97 percent of the time) during March, 63 years (90 percent of the time) during April, and 62 years (89 percent of the time) during May. Therefore, substantial change in the frequency of habitat reductions would not be expected to occur during March, April, or May of any year. In some years, riparian vegetation would not be inundated under the Action Alternatives or the existing condition.

During the February through May splittail spawning period, the long-term average usable inundated riparian habitat between RM 8 and RM 9 under the Action Alternatives would not decrease relative to the existing condition. In addition, flow changes under the Action Alternatives would have little, if any, effect on the availability of in-channel spawning habitat availability, or the amount of potential spawning habitat available from the mouth up to RM 5, the reach of the river influenced by Sacramento River stage. Ultimately, these reductions in flow would not be expected to be of substantial magnitude and/or to occur with enough frequency to have a significant adverse effect on the long-term population trends of lower American River splittail.

Monthly mean temperatures at Watt Avenue under the Action Alternative are essentially equivalent to or less than the existing condition for 270 months of the 276 months included in the analysis. Over the 69-year period of simulation, February through May water temperatures at Watt Avenue under the Action Alternatives would be above 68°F, the upper limit of the reported preferred range for splittail spawning, in only one month of one year, relative to the existing condition. Therefore, temperature-related impacts to splittail spawning would be considered less than significant because no substantial change in the frequency of water temperature exceeding the reported preferred range for splittail spawning would occur.

Impact 3.5-26: Impacts to American shad in the lower American River.

Table H-3.5-9 shows the average flow at the American River mouth would be about one percent less during May and June under the Action Alternatives relative to the existing condition. Flow reductions in May and June under the Action Alternatives could potentially reduce the number of adult shad attracted into the river during a few years. However, American shad spawn opportunistically where suitable conditions are found, so that production of American shad within the Sacramento River system would not be affected. Any flow-related impacts to American shad are considered to be less than significant. In addition, analysis was performed to determine the probability that lower American River flows at the mouth in May and June would be greater than 3,000 cfs, the flow level defined by CDFG as that which would be sufficient to maintain the sport fishery for American shad. The simulations showed no difference in the number of years that the flow at the mouth would be below 3,000 cfs in May and June.

Monthly mean water temperatures in May and June below Nimbus Dam and at the mouth would be within the reported preferred range for American shad spawning of 60°F to 70°F only one year less under the Action Alternatives as compared to the existing condition. Because the frequency with which suitable temperatures for American shad spawning would not substantially differ, temperature-related impacts to American shad also are considered to be less than significant. Overall, the impacts associated with implementation of the Action Alternatives would be less than significant.

Impact 3.5-27: Impacts to striped bass in the lower American River.

The flow-related impact assessment conducted for fall-run chinook salmon and steelhead addresses potential flow-related impacts to striped bass juvenile rearing, which occurs during the months of May and June. In addition, an analysis was performed to determine the probability that lower American River flows at the mouth would be below 1,500 cfs, the flow level defined by CDFG as that which would be sufficient to maintain the sport fishery for striped bass. Under the Action Alternatives, monthly mean flows in the lower American River would be below the 1,500 cfs attraction flow index at the mouth during one additional year (one percent more often) during the May through June period, relative to the existing condition. Because flows at the mouth that are believed to be sufficient to maintain the striped bass fishery would be met or exceeded in most years during both May and June, and because substantial changes in the strength of the striped bass fishery would not be expected to occur when May and/or June monthly mean flows fall below 1,500 cfs, flow-related impacts to the striped bass fishery that could potentially occur under the Action Alternatives would be less than significant.

The number of years that monthly mean water temperatures would be within the reported preferred range for striped bass juvenile rearing of 61°F to 73°F would increase by one year during both May and June below Nimbus Dam, and decrease by one year in both months at the mouth. Because the frequency of suitable temperatures for juvenile striped bass rearing in the lower American River would remain essentially unchanged, temperature-related impacts to juvenile striped bass rearing also are considered to be less than significant. Overall, potential impacts to striped bass would be less than significant.

Impact 3.5-28: Impacts to Shasta and Trinity reservoirs' warmwater fisheries.

Hydrologic conditions under the Action Alternatives would result in no change in the long-term average end-of-month water surface elevation in Shasta Reservoir during the March through

September period when warmwater fish spawning and initial rearing may be expected. End-of-month elevation at Shasta Reservoir would be essentially equivalent to or greater than the existing condition for 471 months of the 490 months included in the analysis. Reductions in average end-of-month elevation of one foot or more would occur four percent of the time during the March through September period.

Changes in water surface elevation in Shasta Reservoir during the March through September period would result in corresponding changes in the availability of reservoir littoral habitat. Differences in the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Shasta Reservoir under the Action Alternatives would be negligible, as shown in Table H-3.5-17. These small and infrequent reductions in the availability of littoral habitat, under the Action Alternatives, would not be of sufficient magnitude to substantially reduce long-term average initial year-class strength of warmwater fish populations. Consequently, seasonal reductions in littoral habitat availability would constitute a less-than-significant impact to Shasta Reservoir's warmwater fisheries.

In addition, implementation of the Action Alternatives could alter the rates by which water surface elevation in Shasta Reservoir change during each month of the primary warmwater fish-spawning period (March through July). However, Table H-3.5-18 shows that the frequency with which potential nest-dewatering events would occur in Shasta Reservoir during the spawning period would be minimal. Because the frequency with which potential nest-dewatering events could occur in Shasta Reservoir under the Action Alternatives would not change substantially during the warmwater fish-spawning period, impacts to warmwater fish-nesting success are considered to be less than significant. Overall, potential impacts to Shasta Reservoir's warmwater fisheries would be less than significant.

Hydrologic conditions under the Action Alternatives would not result in substantial changes in the long-term average end-of-month water surface elevation in Trinity Reservoir during the March through September period.

End-of-month elevation at Trinity Reservoir under the Action Alternatives would be essentially equivalent to or greater than the existing condition for 479 months of the 490 months included in the analysis. Reductions in the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Trinity Reservoir under the Action Alternatives would be negligible, with reductions in long-term average amount of littoral habitat of 0.1 percent or less during the March through September period. This would not be of sufficient magnitude to substantially reduce long-term average initial year-class strength of warmwater fish populations. Consequently, seasonal reductions in littoral habitat availability would constitute a less-than-significant impact to Trinity Reservoir's warmwater fisheries.

In addition, the frequency with which potential nest-dewatering events could occur in Trinity Reservoir would not change under the Action Alternatives, relative to that under the existing condition, during any month of the March through July spawning period (Table H-3.5-19). Overall, impacts to Trinity Reservoir's warmwater fish populations would be less than significant.

Impact 3.5-29: Impacts to Shasta and Trinity reservoirs' coldwater fisheries.

Hydrologic conditions under the Action Alternatives would not result in a change in long-term average Shasta Reservoir storage, relative to the existing condition, during any month of the April through November period, as shown in Table H-3.5-20. Shasta Reservoir end-of-month storage under the Action Alternatives would be essentially equivalent to the existing condition for 533 months of the 560 months included in the analysis. In individual years during the April through November period (when Shasta Reservoir thermally stratifies), reductions in Shasta Reservoir end-of-month storage of more than three percent occurred in seven individual months under the Action Alternatives relative to the existing condition. The largest individual storage reduction for any given month over the 70-year period of record for the April through November period would be 4.6 percent. Because changes to Shasta Reservoir storage would not be substantial or frequent, because physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations within the reservoir, and because anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base used by the reservoir's coldwater fish populations, seasonal reductions in storage that could occur under the Action Alternatives would have less-than-significant impacts to Shasta Reservoir’s coldwater fisheries.

Under the Action Alternatives , the long-term average monthly storage in Trinity Reservoir would be essentially unchanged during all months of the April through November period (when Trinity Reservoir thermally stratifies). Trinity Reservoir storage would be essentially equivalent to the existing condition for 537 of the 560 months included in the analysis. Reductions in Trinity Reservoir storage would be less than 1.4 percent for any individual month of the 70-year period of record. Because changes to Trinity Reservoir storage would not be substantial, physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations within the reservoir, and anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base utilized by the reservoir's coldwater fish populations, seasonal reductions in storage expected to occur under the Action Alternatives would have less-than-significant impacts to Trinity Reservoir's coldwater fisheries

Sacramento River Fisheries Impacts

Impact 3.5-30: Flow-related impacts in the upper Sacramento River.

The long-term average Sacramento River flow released from Keswick Dam under the Action Alternatives would be essentially equivalent to the existing condition during all months of the year, as shown in Table H-3.5-21. Monthly mean flows below Keswick Dam in the upper Sacramento River would be essentially equivalent to the existing condition in 804 of the 840 months included in the analysis.

The minimum flow objective for Keswick Dam releases stipulated in the NMFS Biological Opinion (1993, as revised in 1995) for the protection of winter-run chinook salmon rearing and downstream passage is 3,250 cfs between October 1 and March 31. Modeling output shows that monthly mean flows below Keswick Dam would not be reduced below 3,250 cfs in any month of the October through March period in any of the 70 years modeled under the Action Alternatives or the existing condition.

These findings indicate that flow changes below Keswick Dam that would occur under the Action Alternatives would result in less-than-significant impacts to upper Sacramento River fish resources.

Impact 3.5-31: Flow-related impacts in the lower Sacramento River.

Monthly mean flows at Freeport in the lower Sacramento River under the Action Alternatives would be essentially equivalent to the existing condition for 798 months of the 840 months included in the analysis. The long-term average flow at Freeport would be within 0.2 percent of the average under the existing condition during all months of the year, as shown in Table H-3.5-22. Flow reductions of more than five percent would occur in only one month (i.e., August) of one year under the Action Alternatives relative to the existing condition. Therefore, neither physical habitat availability for fish residing in the lower Sacramento River nor immigration of adult or emigration of juvenile anadromous fish would be substantially affected under the Action Alternatives relative to the existing condition. Consequently, any flow-related impacts to lower Sacramento River fisheries or migrating anadromous fish that could occur under the Action Alternatives are considered to be less than significant. Overall, this constitutes a less-than-significant impact.

Impact 3.5-32: Water temperature-related impacts in the upper Sacramento River.

The Action Alternatives would not result in changes to the long-term average temperature at Keswick Dam or Bend Bridge for any month of the year. In 818 of the 828 months simulated, monthly mean temperatures at Keswick Dam would be essentially equivalent to or less than, the existing condition. Monthly mean temperatures at Bend Bridge under the Action Alternatives would be essentially equivalent to the existing condition for 821 months of the 828 months included in the analysis. Also, relative to the existing condition, there would be only two additional months throughout the entire simulation where the temperature could exceed 56°F or 60°F at Keswick Dam or Bend Bridge under the Action Alternatives, as shown in Table H-3.5-23. Therefore, the Action Alternatives would not result in significant additional exceedances of the temperature criteria identified in the NMFS Biological Opinion for Winter-run Chinook Salmon. In addition, there would not be any substantial decreases in annual early lifestage survival of fall-run, late fall-run, winter-run, or spring-run chinook salmon in any individual year relative to the existing condition. Based on these findings, temperature-related impacts to upper Sacramento River fisheries under the Action Alternatives would be less than significant.

Impact 3.5-33: Water temperature-related impacts in the lower Sacramento River.

Monthly mean temperatures at Freeport under the Action Alternatives would be essentially equivalent to the existing condition for 827 of the 828 months included in the analysis. The long-term average water temperature at Freeport in the lower Sacramento River would not change more than 0.1°F during any month of the year, as shown in Table H-3.5-24. Also, the number of years in which water temperature at this location would exceed 56°F, 60°F, and 70°F would be similar to the existing condition during the period March through November, as shown in Table H-3.5-25. Further, in only one month of one year of the 69-year period of simulation would the water temperature at Freeport increase by more than 0.3°F relative to the existing condition. Overall, potential water temperature impacts to fish species within the lower Sacramento River would be considered less than significant.

Impact 3.5-34: Impacts to Delta fish populations.

Delta outflow is considered to have a substantial effect on a number of fish species relying on Delta habitats for one or more of their lifestages. Reductions in the long-term average Delta outflow of up to 0.3 percent for any given month could occur under the Action Alternatives relative to the existing condition, as shown in Table H-3.5-26. Delta outflow during the period of February through June is believed to be of greatest concern for potential effects to spawning and rearing habitat and downstream transport flows for delta smelt, longfin smelt, splittail, striped bass, salmonids, and other aquatic species in the Delta. Throughout the entire 70-year period of record included in the analysis, Delta outflow reductions of more than three percent occurred during only seven individual months (out of 840 months) under the Action Alternatives relative to the existing condition. However, during the critical February through June period, Delta outflow reductions of more than three percent did not occur.

Under the Action Alternatives, there would be no shift in the long-term average position of X2 relative to the existing condition. The maximum upstream shift for any individual month of any year (i.e., 840 months) in the position of X2 would be 0.7 km. In fact, during the February through June period considered important for providing appropriate spawning and rearing conditions and downstream transport flows for various fish species, the maximum upstream shift for any individual month of any year in the position of X2 would be 0.2 km.

The model simulations conducted for the Action Alternatives included conformance with X2 requirements set forth in the SWRCB Interim Water Quality Control Plan. Also, the Delta export-to-inflow ratios under the Action Alternatives would not exceed the maximum export ratio as set by the SWRCB Interim Water Quality Control Plan. Overall, impacts to Delta fish populations would be less than significant.

Impact 3.5-35: Impacts to Oroville Reservoir or Feather River fish populations.

The Action Alternatives would not result in substantial changes in storage, elevation, or temperature at Oroville Reservoir, or in substantial changes in flows or temperatures of the Feather River, relative to the existing condition. Any small changes that might occur in storage, elevation, flow, or temperature would constitute less-than-significant impacts on fish resources.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the No Action/No Project Alternative in the Future (2025)

<u>Upper American River Fisheries Impacts</u>

Impact 3.5-36: Flow-related impacts to fish resources of the North and Middle Forks of the American River upstream of the project site.

When compared to the No Action/No Project Alternative, average long-term monthly mean flows in the upper American River above the project site under the Action Alternatives would be essentially equivalent all months of the year (Table H-3.5-27). Changes in average long-term monthly mean flows would vary from a decrease of 0.6 percent to an increase of 0.6 percent. The greatest changes would occur in the summer months, when higher volumes of water would be diverted at the pump station.

Flows would be essentially equivalent during the October through April period under the Action Alternatives and the No Action/No Project Alternative. Figures H-3.5-25 through H-3.5-27 show exceedance curves for the upper American River above the project site. In May and June, the Action Alternatives would result in small reductions in flows when the flows would be within the 3,500 to 4,500 cfs range and 2,500 to 3,000 cfs range, respectively, under the No Action/No Project Alternative. Conversely, there would be an increase in flows under low-flow conditions. Under the Action Alternatives, July flows would be slightly decreased when flows are within the 500 to 800 cfs range, and increased when flows are lower than 500 cfs. Under the Action Alternatives, August and September would present the largest reduction in flows, with slight reductions, when flows are within the 400 to 900 cfs range under the No Action/No Project Alternative. By contrast, under the Action Alternatives, flows that are below approximately 400 cfs under the No Action/No Project Alternative would increase during August and September. Because relatively small changes in average long-term monthly mean flows would occur, and the majority of trout that occur in the North Fork American River below the confluence with the Middle Fork American River are believed to be transitory, any change in flows associated with the Action Alternatives would represent a less-than-significant impact.

Impact 3.5-37: Water temperature-related impacts to fish resources of the North and Middle Forks of the American River upstream of the project site.

Under the Action Alternatives, small changes in flow during the low-flow condition would not be expected to result in substantial increases in water temperature, relative to the No Action/No Project Alternative. Temperature changes that would result from the Action Alternatives upstream of the project area would generally be less than measurable. Therefore, water temperatures resulting from the Action Alternatives under low- and high-flow conditions would represent a less-than-significant impact on the long-term populations of rainbow or brown trout upstream of the project site compared to the No Action/No Project Alternative.

Impact 3.5-38: Flow-related impacts to fish resources on the North and Middle Forks of the American River downstream of the project site.

Table H-3.5-28 presents simulated average long-term monthly mean flows in the upper American River downstream of the project site under the No Action/No Project Alternative and the Action Alternatives. Under the Action Alternatives, the average long-term monthly mean flows in the American River downstream of the project site would be lower in all but one month of the year, with decreases ranging from less than one percent in the high-flow winter months to 5.8 percent in September. Differences in average long-term monthly mean flows in the high-flow period (i.e., December to June) would range from 0.2 percent to 2.6 percent. During the low-flow months (i.e., July to November), changes in flow would range from an increase of 0.6 percent in November to a decrease of 5.8 percent in September. The greatest changes would occur in the summer months, when higher volumes of water would be diverted at the pump station.

October through April flows would be essentially equivalent under the Action Alternatives and the No Action/No Project Alternative (Figures H-3.5-28 and H-3.5-29). In May and June, the Action Alternatives would result in small reductions in flows when flows would be within the 3,500 to 4,500 cfs range and within the 2,000 to 3,000 cfs range, respectively. Conversely, the Action Alternatives would result in an increase in flows, when flows under the No Action/No Project Alternative would be lower than 500 cfs. July, August, and September would present the largest decrease, in which all but the flows in the lowest range would be reduced under the Action Alternatives relative to the No Action/No Project Alternative. Because small changes in monthly mean flows would occur, anticipated reductions in streamflow would not be expected to adversely impact fish resources in the North and Middle Forks of the American River below the project site. Moreover, the Proposed Project includes restoring the previously dewatered channel and increasing fish habitat availability for about three-quarters of a mile downstream of the project site, and probably result in a net beneficial impact. Although the Upstream Diversion Alternative would not include restoration of the previously dewatered channel, given the relatively unsuitable habitat conditions downstream of the project site, much of which consist of the bypass tunnel itself, reductions in flow would represent a less-than-significant impact to fish resources in the upper American River downstream of the project site.

Impact 3.5-39: Water temperature-related impacts to fish resources on the North Fork American River downstream of the project site.

Relatively small flow changes associated with the Action Alternatives would not be expected to result in substantial increases in water temperature. Therefore, potential changes in water temperatures resulting from the Action Alternatives would represent a less-than-significant impact to populations of rainbow or brown trout downstream from the project site, compared to the No Action/No Project Alternative.

Folsom Reservoir Fisheries Impacts

Impact 3.5-40: Impacts to Folsom Reservoir warmwater fisheries.

Hydrologic conditions under the Action Alternatives compared to the No Action/No Project Alternative would not result in substantial differences in the long-term average end-of-month water surface elevation in Folsom Reservoir during the March through September period (when warmwater fish spawning and initial rearing occurs). As shown in Table H-3.5-29, the long-term average elevation is equivalent in all months except July, where there is a one-foot difference. In individual years during the 70-year period of record, the largest single difference in elevation during the March through September season is 13 feet. In 451 months out of the 490 months simulated during this period, the elevation of Folsom Reservoir would increase or remain essentially equivalent to elevations under the No Action/No Project Alternative.

As shown in Table H-3.5-30, the difference in long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Folsom Reservoir during the March through September period under the Action Alternatives ranges from 1.4 percent more habitat available during the month of March to 3.1 percent less habitat available during the month of September, relative to the No Action/No Project Alternative. These small changes in the availability of littoral habitat would not be of sufficient magnitude to substantially reduce long-term average initial year-class strength of the warmwater fish populations of management concern. Consequently, seasonal reductions in littoral habitat availability would represent a less-than-significant impact to Folsom Reservoir's warmwater fisheries.

Modeling results, shown in Table H-3.5-31, indicate that the frequency with which potential nest-dewatering events could occur in Folsom Reservoir would change only slightly (i.e., two more occurrences) when compared to the No Action/No Project Alternative, during any month of the March through July spawning period. Because the frequency with which potential nest-dewatering events could occur in Folsom Reservoir during the March through July warmwater fish spawning period would change only slightly, impacts to warmwater fish nesting success are considered to be less than significant under the Action Alternatives relative to the No Action/No Project Alternative. Overall, impacts to Folsom Reservoir warmwater fisheries are considered less than significant.

Impact 3.5-41: Impacts to Folsom Reservoir's coldwater fisheries.

The Action Alternatives would result in small changes in Folsom Reservoir end-of-month storage during some years of the simulation compared to the No Action/No Project Alternative. Long-term average end-of-month storage would be slightly reduced under the Action Alternatives relative to the No Action/No Project Alternative. For any given month, the largest difference between the long-term average end-of-month storage would be 4,000 AF, or less than one percent difference. In 663 out of 840 months included in the analysis, Folsom Reservoir end-of-month storage under the Action Alternatives was greater than or essentially equivalent to the No Action/No Project Alternative. Anticipated reductions in reservoir storage would not be expected to adversely affect the reservoir's coldwater fisheries because coldwater habitat would remain available within the reservoir during all months of all years and anticipated seasonal reductions in storage would not be expected to adversely affect the primary prey species utilized by coldwater fish. Therefore, changes in Folsom Reservoir under the Action Alternatives relative to the No Action/No Project Alternative would represent a less-than-significant impact on coldwater fish resources.

Impact 3.5-42: Impacts to Nimbus Fish Hatchery.

CVP operations of Folsom Dam and Reservoir under the Action Alternatives would have very little effect on temperatures of water entering the Nimbus Fish Hatchery from Lake Natoma during the May through September period, relative to the No Action/No Project Alternative. In 789 out of the 828 months simulated, monthly mean temperatures below Nimbus Dam were essentially the same or less under the Action Alternatives as compared to the No Action/No Project Alternative. Table H-3.5-33 shows that the long-term average temperature of water released from Nimbus Dam is essentially equivalent to the No Action/No Project Alternative, during any month of the year. Table H-3.5-34 shows insignificant differences in the frequency with which temperatures exceed index temperatures of 60°F, 65°F and 68°F. These small and infrequent differences in temperature which could occur during the May through September period (when hatchery temperatures reach annual highs) would have little, if any, effect on hatchery operations and resultant fish production. Therefore, changes under the Action Alternatives relative to the No Action/No Project Alternative would result in a less-than-significant impact.

Lower American River Fisheries Impacts

Flow- and temperature-related impacts are discussed separately below by species and lifestage. Organizationally, flow- and temperature-related impacts to fall-run chinook salmon and steelhead are discussed together, followed by impact discussions for splittail, American shad, and striped bass.

Impact 3.5-43: Impacts to fall-run chinook salmon and steelhead in the lower American River.

Minimal potential differences in lower American River flows and water temperatures under the Action Alternatives would not be expected to adversely affect fall-run chinook salmon and steelhead immigration, spawning and incubation, and juvenile rearing and emigration relative to the No Action/No Project Alternative.

Flow-Related Impacts to Fall-Run Chinook Salmon/Steelhead Adult Immigration (September Through March)

Table H-3.5-35 shows that the long-term average flow at the mouth of the American River differs by less than one percent under the Action Alternatives, compared to the No Action/No Project Alternative, during all months of the adult immigration period (September through March). In 419 out of 490 months simulated in this period, the flow at the mouth was greater or essentially equivalent under the Action Alternatives as compared to the No Action/No Project Alternative. The difference in flow rate that would be expected to occur at the mouth under the

Action Alternatives indicates that such differences would not be of concern regarding attraction of adults immigrating into the lower American River.

Temperature-Related Impacts to Fall-Run Chinook Salmon/Steelhead Adult Immigration (September Through March)

The long-term average water temperatures modeled for the Action Alternatives would not differ by more than 0.1°F from those under the No Action/No Project Alternative at the mouth and at Freeport on the Sacramento River during all months of the September through March adult immigration period, as shown in Table H-3.5-36. Moreover, under the Action Alternatives, water temperatures at the lower American River mouth would remain essentially equivalent to those under the No Action/No Project Alternative in 468 out of 483 months included in the analysis. Water temperatures at Freeport under the Action Alternatives would remain essentially equivalent to the No Action/No Project Alternative in all of the 483 months included in the analysis.

September through March water temperatures in the lower portion of the lower American River under the Action Alternatives would be almost identical to the No Action/No Project Alternative. Therefore, potential temperature-related impacts to fall-run chinook salmon/steelhead adult immigration would be less than significant.

Flow-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October Through February)

The long-term average flow below Nimbus Dam under the Action Alternatives would be within 1.5 percent of the flow under the No Action/No Project Alternative during all months of the October through February period, as shown in Table H-3.5-37. In 299 of the 350 months simulated during this period, the flow below Nimbus Dam was either essentially equivalent or greater than the No Action/No Project Alternative. In addition, changes in long-term average flows at Watt Avenue under the Action Alternatives would be within 1.5 percent of the flow under the No Action/No Project Alternative for each month of the October through February period, as shown in Table H-3.5-38.

Figures H-3.5-30 through H-3.5-34 show exceedance curves for the American River release from Nimbus Dam for the October through February period. These curves demonstrate that flows under the Action Alternatives would be similar to those under the No Action/No Project Alternative. Differences in flows in the lower flow ranges are more crucial for salmon survival.

These findings indicate that for flows below 2,000 cfs under the No Action/No Project Alternative, the Action Alternatives could slightly reduce flows below Nimbus Dam and at Watt Avenue in a few years during the October through January period (when the majority of fall-run chinook salmon spawning occurs). Reductions in flows below 2,000 cfs could reduce the amount of available chinook salmon spawning habitat, which could result in increased redd superimposition during years when adult returns are high enough for spawning habitat to be limiting. However, these reductions in flow would not be expected to be of substantial magnitude or occur with enough frequency to have a significant adverse effect on long-term initial year-class strength of lower American River fall-run chinook salmon, and therefore, represents a less-than-significant impact.

Temperature-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October Through February)

Under the Action Alternatives, the long-term average water temperatures would be equivalent or lower than those under the No Action/No Project Alternative during October at Watt Avenue, and during the November through February period below Nimbus Dam, as shown in Table H-3.5-39. In fact, in 338 out of the 345 months included in the analysis, the water temperatures at these locations were essentially equivalent to or lower under the Action Alternatives as compared to the No Action/No Project Alternative.

Among individual years, monthly mean water temperature during October at Watt Avenue would increase by more than 0.3°F in five years of the simulation (i.e., five years out of 69) relative to the No Action/No Project Alternative. November water temperatures below Nimbus Dam would increase by more than 0.3°F in only two years of the 69 years modeled. Under the Action Alternatives, there would not be any additional occurrences of October water temperatures at Watt Avenue above 56°F, relative to the No Action/No Project Alternative. Below Nimbus Dam, there would only be one additional occurrence during November in which water temperatures would exceed 56°F, relative to the No Action/No Project Alternative. Water temperatures below Nimbus Dam during December, January and February would be below 56°F in all 69 years modeled.

The long-term average annual early lifestage survival for fall-run chinook salmon in the American River would be 92.8 percent under the No Action/No Project Alternative and 92.9 percent under the Action Alternatives. Table H-3.5-40 shows the annual survival estimates for the 69 years modeled. Substantial increases or decreases in survival would not occur in any individual year of the 69-year simulation.

Based on these modeling results, small temperature changes in the lower American River resulting from the Action Alternatives during the October through February period represent a less-than-significant impact spawning and incubation success of fall-run chinook salmon, relative to the No Action/No Project Alternative.

Flow- and Temperature-Related Impacts to Steelhead Spawning and Incubation (December Through March)

Monthly mean flows below Nimbus Dam and at Watt Avenue under the Action Alternatives would be essentially equivalent to or greater than the No Action/No Project Alternative for 235 out of 280 months included in the analysis. Additionally, monthly mean temperatures below Nimbus Dam would be similar to or less than the No Action/No Project Alternative for 273 of the 276 months included in the analysis. Monthly mean water temperatures at Watt Avenue would be essentially equivalent for 272 of the 276 months included in the analysis. Moreover, under the Action Alternatives, water temperatures below Nimbus Dam would remain below 56°F for all months of the 69 years modeled for the spawning and incubation period for steelhead.

December, January, and February water temperatures at Watt Avenue under the Action Alternatives would be below 56°F in all 69 years modeled. Under the Action Alternatives, there would be one less occurrence in which water temperatures at Watt Avenue would be greater than 56°F, relative to the No Action/No Project Alternative, for all the 69 years modeled. Therefore, flow and temperature-related changes during the steelhead spawning and incubation period represent a less-than-significant impact. For flow data supporting this impact determination, see Table H-3.5-37, H-3.5-38 and Figures H-3.5-32 through H-3.5-39. For the temperature data supporting this impact determination, see Table H-3.5-39.

Flow-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March Through June)

Under the Action Alternatives, the long-term average flow at Watt Avenue would be within one percent of the flow under the No Action/No Project Alternative during the March through June period (Table H-3.5-38). In 231 out of 280 months simulated, the flow would be essentially equivalent or greater under the Action Alternatives relative to the No Action/No Project Alternative. Flow exceedance curves for March through June at Watt Avenue are shown in Figures H-3.5-39 through H-3.5-42. These small differences in flow would not be expected to adversely affect long-term juvenile fall-run chinook salmon or steelhead rearing success and, therefore, represent a less-than-significant impact.

Temperature-Related Impacts to Fall-run Chinook Salmon and Steelhead Juvenile Rearing (March Through June)

Modeling associated with the Action Alternatives indicates that the long-term average water temperature at Watt Avenue would not change by more than 0.1°F during any month of the March through June period, compared to the No Action/No Project Alternative, as shown in Table H-3.5-41. Data in Appendix I of the Draft EIS/EIR shows that water temperature at Watt Avenue would increase more than 0.3°F in one year of the 69-year simulation during the month of March, in five years during the month of April, in four years during the month of May, and in no years during the month of June relative to the No Action/No Project Alternative. These relatively infrequent increases in water temperature during March, April, and May result in monthly mean water temperatures at or below 65°F for each instance under the Action Alternatives. Moreover, water temperature decreases of more than 0.3°F occur in five years of the 69-year simulation period for the month of June under the Action Alternatives, relative to the No Action/No Project Alternative. Under the Action Alternatives, there would be one less occurrence during June in which water temperatures would be above 56°F, relative to the No Action/No Project Alternative. Therefore, temperature changes associated with the Action Alternatives relative to the No Action/No Project Alternative would represent a less-than-significant impact to fall-run chinook salmon and steelhead juvenile rearing.

Flow-Related Impacts to Fall-run Chinook Salmon and Steelhead Juvenile Emigration (February Through June)

As can be concluded from previous discussions of fall-run chinook salmon and steelhead adult immigration, potential changes in flows under the Action Alternatives during February and

March also would not adversely affect juvenile fall-run chinook salmon or steelhead emigration. Hence, this discussion focuses primarily on the April through June period.

Under the Action Alternatives relative to the No Action/No Project Alternative, the simulated long-term average flow at the mouth would decrease slightly, about 0.3 percent, in May and increase slightly in June (Table H-3.5-35). Figures H-3.5-43, H-3.5-44 and H3.5-45 show the difference in flows simulated at the lower flow ranges. In 121 out of the 140 months simulated for May and June, the flow at the mouth of the American River under the Action Alternatives would be greater or essentially equivalent to the No Action/No Project Alternative. Although small flow reductions at the mouth would occur in a few years during the April through June period, the Action Alternatives would not be expected to adversely affect the success of juvenile salmonid emigration, relative to the No Action/No Project Alternative and, therefore, represents a less-than-significant impact.

Temperature-Related Impacts to Fall-run Chinook Salmon and Steelhead Juvenile Emigration (February Through June)

The long-term average water temperature at the American River mouth and on the Sacramento River at Freeport during February through June under the Action Alternatives would be within 0.1°F of temperatures under the No Action/No Project Alternative, as shown in Table H-3.5-36. In the 69-year simulation, monthly mean water temperature at the mouth increased more than 0.3°F in one year during March, four years during April, four years during May, and one year during June. With the exception of one instance during April, these relatively infrequent increases in monthly mean water temperature during March, April, and May result in water temperatures at or below 65°F for each instance under the Action Alternatives. Under the Action Alternatives, there would only be one additional occurrence during June in which water temperatures at the lower American River mouth would be above 65°F, relative to the No Action/No Project Alternative. Moreover, water temperature decreases of more than 0.3°F occur in five years of the 69-year simulation period for the month of June under the Action Alternatives, relative to the No Action/No Project Alternative. At Freeport on the Sacramento River, there would be only one individual month when the temperature increased more than 0.3°F in the months of February through June relative to the No Action/No Project Alternative. Under the Action Alternatives, there would not be any additional occurrences during April and June, and one additional occurrence during May in which water temperatures at Freeport would be above 65°F, relative to the No Action/No Project Alternative.

Based on the results discussed above, potential water temperature changes resulting from the Action Alternatives relative to the No Action/No Project Alternative represent a less-than-significant impact to the February through June juvenile salmonid emigration period.

Flow-Related Impacts to Steelhead Rearing (July Through September)

Under the Action Alternatives, the long-term average flow below Nimbus Dam would decrease by less than two percent for any month of the July through September period (Table H-3.5-37) relative to the No Action/No Project Alternative. In 130 out of 210 months simulated, the flow would be essentially the same or greater under the Action Alternatives as compared to the No

Action/No Project Alternative. The difference in flow would be similar at Watt Avenue (Table H-3.5-38).

Figures H-3.5-46 through H-3.5-48 provide flow exceedance curves for American River release from Nimbus Dam during July, August and September. These curves demonstrate that flows would be slightly different under the Action Alternative compared to the No Action/No Project Alternative. The exceedance curves show flows under the Action Alternatives to be both less than and greater than the flows under the No Action/No Project Alternative when flows are 1,500 cfs or less.

Based on these findings, flow changes under the Action Alternatives compared to the No Action/No Project Alternative are not expected to reduce juvenile steelhead rearing habitat. Further, steelhead populations in the lower American River are believed to be limited by instream temperature conditions during the July through September period, as opposed to flows. Therefore, small and infrequent reductions in flow would not be expected to adversely affect long-term rearing success of juvenile steelhead and, therefore, represents a less-than-significant impact.

Temperature-Related Impacts to Steelhead Rearing (July Through September)

The long-term average water temperatures below Nimbus Dam, at Watt Avenue, and at the mouth would be the same during July, August and September under the Action Alternatives and the No Action/No Project Alternative (Tables H-3.5-33, H-3.5-41, and H-3.5–42, respectively). Water temperatures below Nimbus Dam are essentially equivalent to or less under the Action Alternatives as compared to the No Action/No Project Alternative in 190 out of the 207 months simulated in this three-month period.

There is little difference in water temperatures between the Action Alternatives and the No Action/No Project Alternative during the juvenile steelhead over-summering rearing months of July through September (Figures H-3.5-49, H-3.5-50, and H-3.5-51). The Action Alternatives would not result in additional occurrences during August, one additional occurrence during July and two occurrences less during September, in which water temperatures at Watt Avenue would be above 65°F, relative to the No Action/No Project Alternative. Therefore, potential changes in water temperature that may occur under the Action Alternatives represent a less-than-significant impact to juvenile steelhead over-summer rearing.

Impact 3.5-44: Impacts to splittail in the lower American River.

Under the Action Alternatives, the long-term average flow at Watt Avenue during the period February through May would be 0.3 percent to 0.9 percent less than under the No Action/No Project Alternative, as shown in Table H-3.5-38. However, in 237 out of 280 months simulated for this period, flows would be essentially equal to or greater than the No Action/No Project Alternative.

The long-term average usable splittail habitat at Watt Avenue would not change for any month of the February through May period under the Action Alternatives relative to the No Action/No Project Alternative.

The amount of inundated riparian habitat under the Action Alternatives would decrease relative to the No Action/No Project Alternative by more than two percent in six years, two years, three years, and three years during the months of February, March, April, and May, respectively. These potential habitat reductions, however, would be small. For the 14 months out of the 280 months included in the analysis in which usable splittail habitat would be reduced by more than two percent, the absolute reduction in habitat would be 0.1 acre. In addition, flow changes would have little, if any, effect on the availability of in-channel spawning habitat availability, or the amount of potential spawning habitat available from the mouth up to RM 5, the reach of the river influenced by Sacramento River stage. Ultimately, these reductions in flow would not be expected to be of substantial magnitude and/or to occur with enough frequency to have a significant adverse effect on the long-term population trends of lower American River splittail.

During the February through March period of the 69-year simulation, water temperatures at Watt Avenue do not rise above 67°F, the reported preferred range for splittail spawning, as a result of the Action Alternatives. The impacts would be less than significant because no substantial change in the frequency of water temperature exceeding the reported preferred range for splittail spawning would occur. Overall, potential flow and water temperature changes resulting from the Action Alternatives relative to the No Action/No Project Alternative represent a less-than-significant impact to splittail.

Impact 3.5-45: Impacts to American shad in the lower American River.

Table H-3.5-35 shows that the long-term average flow at the American River mouth would be 0.3 percent less in May and 0.1 percent more in June under the Action Alternatives relative to the No Action/No Project Alternative. In addition, further analysis was performed to determine the probability that flows at the mouth in May and June would be greater than 3,000 cfs, the flow level defined by CDFG as that which would be sufficient to maintain the sport fishery for American shad. The simulations showed no difference in the number of years that the flow at the mouth would be greater than 3,000 cfs in May and June.

Flow reductions in May and June under the Action Alternatives could potentially reduce the number of adult shad attracted into the river during a few years relative to the No Action/No Project Alternative. However, American shad spawn opportunistically where suitable conditions are found, so that production of American shad within the Sacramento River system would not be affected. Any flow-related impacts to American shad are considered to be less than significant.

The number of years that monthly mean water temperatures in May and June would be within the reported preferred range for American shad spawning of 60°F to 70°F would remain unchanged below Nimbus Dam, and change by one additional year at the mouth under the Action Alternatives compared to the No Action/No Project Alternative. Because the frequency with which suitable temperatures for American shad spawning would not differ substantially, temperature-related impacts to American shad also are considered to be less than significant. Overall, the impacts would be less than significant.

Impact 3.5-46: Impacts to striped bass in the lower American River.

Under the Action Alternatives, the number of years that monthly mean flows would be below the 1,500 cfs attraction flow index at the mouth in May and June would remain unchanged, relative to the No Action/No Project Alternative. Because flows at the mouth that are believed to be sufficient to maintain the striped bass fishery would be met or exceeded in most years during both May and June, and because substantial changes in the strength of the striped bass fishery would not be expected to occur in all years when May and/or June monthly mean flows fall below 1,500 cfs, flow-related impacts to the striped bass fishery that could potentially occur under the Action Alternatives compared to the No Action/No Project Alternative would be less than significant.

Monthly mean water temperatures would be within the reported preferred range for striped bass juvenile rearing of 61°F to 73°F two less years in both May and June below Nimbus Dam, and one additional year in May at the mouth under the Action Alternatives relative to the No Action/No Project Alternative over the 69-year period of record. Because the frequency of suitable temperatures for juvenile striped bass rearing in the lower American River would not change significantly, temperature-related impacts to juvenile striped bass rearing also are considered to be less than significant. Overall, potential impacts to striped bass would be less than significant.

<u>*Shasta and Trinity Reservoirs Fisheries Impacts*</u>

Impact 3.5-47: Impacts to Shasta and Trinity reservoirs' warmwater fisheries.

Hydrologic conditions under the Action Alternative relative to the No Action/No Project Alternative would not result in more than a one-foot decrease in the long-term average end-of-month water surface elevation in Shasta Reservoir during the March through September period, when warmwater fish spawning and initial rearing may be expected. In 435 of the 490 months simulated during this period, the end-of-month elevation of Shasta Reservoir was essentially unchanged or greater than the No Action/No Project Alternative. In 11 percent of the years during this period, the elevation of Shasta Reservoir would be more than one foot lower under the Action Alternatives compared to the No Action/No Project Alternative.

The difference in the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Shasta Reservoir under the Action Alternatives as compared to the No Action/No Project Alternative would be negligible, as shown in Table H-3.5-43. In 461 of the 490 months simulated during this period, the amount of littoral habitat would be essentially equivalent to or greater than the No Action/No Project Alternative. The small and infrequent reductions in the availability of littoral habitat would not be of sufficient magnitude to substantially reduce long-term average initial year-class strength of warmwater fish populations. Consequently, seasonal reductions in littoral habitat availability would constitute a less-than-significant impact to Shasta Reservoir's warmwater fisheries.

In addition, changes under the Action Alternatives as compared to the No Action/No Project Alternative could alter the rates by which end-of-month water surface elevation in Shasta Reservoir change during each month of the primary warmwater fish-spawning period (March through July). However, Table H-3.5-44 shows that the change in frequency with which potential nest-dewatering events would occur in Shasta Reservoir during the spawning period would be minimal. Because the frequency with which potential nest-dewatering events could occur in Shasta Reservoir under the Action Alternatives relative to the No Action/No Project Alternative would not change substantially during the warmwater fish-spawning period, impacts to warmwater fish-nesting success are considered to be less than significant. Overall, potential impacts to Shasta Reservoir's warmwater fisheries would be less than significant.

Hydrologic conditions under the Action Alternatives as compared to the No Action/No Project Alternative would not result in any change in the long-term average end-of-month water surface elevation in Trinity Reservoir during the March through September period. In 456 of the 490 months simulated during this period, the end-of-month elevation of Trinity Reservoir was essentially equal to or greater than the No Action/No Project Alternative.

Reductions in the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Trinity Reservoir under the Action Alternatives as compared to the No Action/No Project Alternative would be negligible, with the greatest reduction being 0.4 percent during the month of July for the March through September period. This would not be of sufficient magnitude to substantially reduce long-term average initial year-class strength of warmwater fish populations. Consequently, seasonal reductions in littoral habitat availability would constitute a less-than-significant impact to Trinity Reservoir's warmwater fisheries.

In addition, changes under the Action Alternatives as compared to the No Action/No Project Alternative could alter the rates by which water surface elevation in Trinity Reservoir change during each month of the primary warmwater fish-spawning period (March through July). However, the frequency with which potential nest-dewatering events could occur in Trinity Reservoir would not change under the Action Alternatives relative to the No Action/No Project Alternative, during any given month of the March through July spawning period. Overall, impacts to Trinity Reservoir's warmwater fish populations would be less than significant.

Impact 3.5-48: Impacts to Shasta and Trinity reservoirs' coldwater fisheries.

Hydrologic conditions under the Action Alternatives as compared to the No Action/No Project Alternative would not result in any significant change in long-term average Shasta Reservoir end-of-month storage during any given month of the April through November period (when Shasta Reservoir thermally stratifies), as shown in Table H-3.5-45. In 495 of the 560 months modeled during this period, Shasta Reservoir storage was essentially equivalent to or greater than the No Action/No Project Alternative. Shasta Reservoir storage would be decreased under the Action Alternatives relative to the No Action/No Project Alternative by more than 3 percent in 28 individual months, or about 5 percent of the time. Because changes to Shasta Reservoir storage would not be substantial or frequent and because anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base used by the reservoir's coldwater fish populations, seasonal reductions in storage expected to occur under the Action Alternatives relative to the No Action/No Project Alternative would have less-than-significant impacts to Shasta Reservoir's coldwater fisheries.

Under the Action Alternatives as compared to the No Action/No Project Alternative, the long-term average end-of-month storage in Trinity Reservoir would be unchanged or decrease by 0.1 percent during the April through November period. In only 43 of the 560 months simulated during this period, would the Trinity storage be reduced by more than one percent when compared to the No Action/No Project Alternative. For any individual month, the greatest reduction in storage for all the months simulated of the April through November period would be 7,000 AF during the month of July. Because changes to Trinity Reservoir storage would not be substantial and anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base utilized by the reservoir's coldwater fish populations, seasonal reductions in storage expected to occur under the Action Alternatives as compared to the No Action/No Project Alternative would have less-than-significant impacts to Trinity Reservoir's coldwater fisheries.

Sacramento River Fisheries Impacts

Impact 3.5-49: Flow-related impacts in the upper Sacramento River.

The long-term average Sacramento River flow released from Keswick Dam under the Action Alternatives would be essentially equivalent to that under the No Action/No Project Alternative during all months of the year, as shown in Table H-3.5-46. In only 37 out of the 840 months simulated, the release at Keswick Dam would decrease by more than one percent compared to the No Action/No Project Alternative.

The minimum flow objective for Keswick Dam releases stipulated in the NMFS Biological Opinion (1993, as revised in 1995) for the protection of winter-run chinook salmon rearing and downstream passage is 3,250 cfs between October 1 and March 31. Modeling output shows that monthly mean flows below Keswick Dam would not be below 3,250 cfs in any month of the October through March period in any of the 70 years modeled under the Action Alternatives or the No Action/No Project Alternative.

These findings indicate that flow changes below Keswick Dam that would occur under the Action Alternatives as compared to the No Action/No Project Alternative would result in a less-than-significant impact to upper Sacramento River fish resources.

Impact 3.5-50: Flow-related impacts in the lower Sacramento River.

The long-term average flows at Freeport under the Action Alternatives would be within 0.3 percent of the long-term average flows under the No Action/No Project Alternative during all individual months of the year, as shown in Table H-3.5-47. In 785 of the 840 months simulated, the flow at Freeport is essentially equivalent to or is greater than the No Action/No Project Alternative. In only four months, or less than 0.5 percent of the time, the flows under the Action Alternatives decreased relative to the No Action/No Project Alternative by more than five percent. Therefore, neither physical habitat availability for fish residing in the lower Sacramento

River nor immigration of adult or emigration of juvenile anadromous fish would be substantially affected by the Action Alternatives relative to the No Action/No Project Alternative. Consequently, flow-related impacts to lower Sacramento River fisheries or migrating anadromous fish that could occur under the Action Alternatives would be considered less than significant. Overall, this constitutes a less-than-significant impact.

Impact 3.5-51: Water temperature-related impacts in the upper Sacramento River.

The Action Alternatives would not result in more than a 0.1ºF change in the long-term average water temperature at Keswick Dam or Bend Bridge for any month of the year relative to the No Action/No Project Alternative. In 805 of the 828 months simulated, the monthly mean water temperature at Keswick Dam would be essentially equivalent to or lower than the No Action/No Project Alternative. Moreover, there would be fewer months when the temperatures exceed 56°F at Keswick Dam or 60°F at Bend Bridge relative to the No Action/No Project Alternative, as shown in Table H-3.5-48. Therefore, the Action Alternatives compared to the No Action/No Project Alternative would not result in significant additional exceedances of the temperature criteria identified in the NMFS Biological Opinion for Winter-run Chinook Salmon. In addition, there would not be any substantial decreases in annual early lifestage survival of fall-run, late fall-run, winter-run, or spring-run chinook salmon in any individual year relative to the No Action/No Project Alternative (Table H-3.5-40). Based on these findings, temperature-related impacts to upper Sacramento River fisheries would be less than significant.

Impact 3.5-52: Water temperature-related impacts in the lower Sacramento River.

The long-term average water temperature at Freeport in the lower Sacramento River would not change more than 0.1°F under the Action Alternatives compared to the No Action/No Project Alternative during any month of the year, as shown in Table H-3.5-49. The number of years that temperatures at this location would exceed 56°F, 60°F, and 70°F would be only slightly greater (i.e., one more occurrence for the 56ºF index, two more occurrences for the 60ºF index, and one more occurrence for the 70ºF index) than the No Action/No Project Alternative during the period of March through November, as shown in Table H-3.5-50. Monthly mean water temperatures at Freeport would be essentially equivalent to the No Action/No Project Alternative for 825 months of the 828 months included in the analysis. Overall, potential impacts to fish species within the lower Sacramento River would be considered less than significant.

Impact 3.5-53: Impacts to Delta fish populations.

Reductions in the long-term average Delta outflow of up to 0.3 percent for any given month would occur under the Action Alternatives relative to the No Action/No Project Alternative, as shown in Table H-3.5-51. Delta outflow during the period of February through June is believed to be of greatest concern for potential effects to spawning and rearing habitat and downstream transport flows for delta smelt, longfin smelt, splittail, striped bass, salmonids, and other aquatic species in the Delta. In 40 of the 840 months simulated, Delta outflow was reduced by more than one percent relative to the No Action/No Project Alternative. There were only eight months out of the 840 months included in the analysis, or less than one percent of the time, when the

Delta outflow would decrease by more than three percent under the Action Alternatives relative to the No Action/No Project Alternative.

Under the Action Alternatives, there would not be an upstream shift the long-term average position of X2 relative to the long-term average position under the No Action/No Project Alternative for 11 months of the year. The remaining month (November) would only experience a 0.1 km upstream shift in the long-term average position of X2. Furthermore, during the February through June period considered important for providing appropriate spawning and rearing conditions and downstream transport flows for various fish species, the maximum upstream shift in the position of X2 in any individual month of the 70-year period of record would be 1.1 km during the month of May.

The model simulations conducted for the Action Alternatives included conformance with export requirements set forth in the SWRCB Interim Water Quality Control Plan. Also, the Delta export-to-inflow ratios under the Action Alternatives relative to the No Action/No Project Alternative would not exceed the maximum export ratio as set by the SWRCB Interim Water Quality Control Plan. Overall, impacts to Delta fish populations would be less than significant.

Impact 3.5-54: Impacts to Oroville Reservoir or Feather River fish populations.

The Action Alternatives would not result in substantial changes in storage, elevation, or temperature at Oroville Reservoir, or in flow or water temperature in the Feather River, relative to the No Action/No Project Alternative. Any small changes that might occur would be considered less than significant impacts upon fish resources.

Cumulative Impacts

<u>Upper American River Fisheries Impacts</u>

Impact 3.5-55: Flow-related impacts to fish resources of the North and Middle Forks of the American River upstream of the project site.

Table H-3.5-52 presents simulated average long-term monthly mean flows in the American River upstream of the project site under existing and cumulative conditions. Cumulative conditions would exhibit lower monthly mean flows above the project site during the six months of highest diversion (i.e., April to September). Percentage decrease in these months would range from 0.2 percent in April to 3.7 percent in August. During the other months, flows would increase by up to 2.8 percent.

Figures H-3.5-52 to H-3.5-54 show exceedance curves for flows upstream of the project site. October through March flows would be essentially equivalent under the existing and cumulative conditions. In April and May, the cumulative condition would result in small reduction in flows, when flows would be within the 3,500 to 4,500 cfs range, and an increase in flows when flows would be above 1,000 cfs. June exceedance curves are nearly identical except for a slight decrease in flows, when flows under the existing condition would be within the 2,000 to 3,000 cfs range, and a slight increase in flows when flows under the existing condition would be lower than 500 cfs. The July exceedance curves show that there would be essentially no change when flows under the existing condition would be greater than 1,100 cfs, a slight decrease when flows under the existing condition would be between 400 and 1,100 cfs, and a slight increase in flows, when flows under the existing condition would be below 400 cfs. The cumulative condition would result in lower flows in August, when flows would be above 400 cfs under the existing condition, but result in higher flows when flows under the existing condition would be at levels below 400 cfs. Because small changes in monthly mean flows would occur, and the majority of trout that occur in the North Fork American River below the confluence with the Middle Fork American River are believed to be transitory, potential fisheries-related impacts associated with the cumulative condition would be less than significant, relative to the existing condition.

Impact 3.5-56: Water temperature-related impacts to fish resources of the North and Middle Forks of the American River upstream of the project site.

Under the cumulative condition, small changes in flow would not be expected to result in measurable increases in water temperature upstream of the project site. Therefore, potential water temperature changes associated with the cumulative condition under both low- and high-flow conditions would represent a less-than-significant impact to fishery resources upstream of the project site.

Impact 3.5-57: Flow-related impacts to fish resources of the North Fork American River downstream of the project site.

Table H-3.5-53 presents simulated average long-term monthly mean flows in the upper American River downstream of the project site under both the existing and the cumulative conditions. The cumulative condition would exhibit slightly lower monthly mean flows in all but two months of the year, with decreases ranging from less than one percent in the high-flow winter months to 10.2 percent in August. Differences in average long-term monthly mean flows in the high-flow period (December to June) would range from an increase of 0.1 percent to a decrease of 6.2 percent. The low-flow months (July to November) changes would range from an increase of 0.6 percent in the fall to a decrease of 10.2 percent in the peak diversion period.

Figures H-3.5-55 through H-3.5-57 show exceedance curves for upper American River flows below the project site. Flows in the October through March period would be essentially equivalent under the existing and the cumulative conditions. In April, the cumulative condition would result in small reductions in flows, when flows are within the 2,000 to 4,500 cfs range under the existing condition. Because of the higher diversion rates in the summer months, the exceedance curves representing the existing and cumulative conditions start separating in May and display a larger difference in July, August and September.

Because the Proposed Project would result in small changes in monthly mean flows; project operations would provide higher flows under low-flow conditions; and because restoration of the previously dewatered channel would increase fish habitat availability for about three-quarters of a mile at the project site, potential changes associated with the cumulative condition would represent a less-than-significant impact, and probably result in a net beneficial impact to upper American River fish resources at the project area. Although the Upstream Diversion Alternative would not include restoration of the previously dewatered channel, given the relatively unsuitable habitat conditions downstream of the project site, much of which consists of the bypass tunnel itself, reductions in flow would represent a less-than-significant impact.

Impact 3.5-58: Water temperature-related impacts to fish resources of the North Fork American River downstream of the project site.

Under the cumulative condition, the small changes in flow would not be expected to result in substantial increases in water temperature when compared to the existing condition. In addition, project operations would provide higher flows than the existing condition under low-flow situations. Therefore, water temperature changes associated with the cumulative condition represent a less-than-significant impact to fish resources of the North Fork American River downstream of the project site.

<u>Folsom Reservoir Fisheries Impacts</u>

Impact 3.5-59: Impacts to Folsom Reservoir warmwater fisheries.

Hydrologic conditions under the cumulative condition as compared to the existing condition would result in reduced long-term average end-of-month water surface elevation in Folsom Reservoir during the months of the March through September period (when warmwater fish spawning and initial rearing occurs) (Table H-3.5-54). The largest decrease in water surface elevation during the March through September season would be 8 feet for any individual year for the 70-year period included in the analysis.

As shown in Table H-3.5-55, the difference in the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Folsom Reservoir for any month during the March through September period attributable to the cumulative condition is estimated to range from five to 31 percent. These reductions in the availability of littoral habitat could result in increased predation on young-of-the-year warmwater fisheries, thereby reducing long-term initial year-class strength of the warmwater fish populations. Unless willows and other near-shore vegetation become established at lower reservoir elevations in the future in response to seasonal reductions in water levels, long-term year class production of warmwater fisheries could be reduced. Consequently, seasonal reductions in littoral habitat availability may represent a potentially significant impact to Folsom Reservoir's warmwater fisheries.

Modeling results, shown in Table H-3.5-56, indicate that the largest increase in the frequency with which potential nest-dewatering events could occur in Folsom Reservoir under the cumulative condition, compared to the existing condition, would occur during June, from 17 out of 70 years to 27 out of 70 years. Because the frequency with which potential nest-dewatering events could occur in Folsom Reservoir under the cumulative condition would change during the March through July warmwater fish-spawning period, impacts to warmwater fish nesting success may be significant. Overall, water surface elevation changes associated with the cumulative condition, relative to the existing condition, represent a potentially significant impact to the warmwater fisheries of Folsom Reservoir.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis indicates that the cumulative condition (future with the project), as compared to the future with the seasonal pumps at existing diversion level (i.e., 8,500 AF) (future base) condition, would result in almost no difference in the long-term average end-of-month water surface elevation in Folsom Reservoir during the March through September period. As shown in Table H-3.5-57, the average long-term water surface elevation is essentially equivalent in March, April, May, August and September, with only about a one-foot difference in June and July. The largest decrease in water surface elevation for any individual month (out of 490 months included in the analysis) during the March through September period would be 8 feet during the month of September.

Under the cumulative condition relative to the future base condition, seasonal reductions in littoral habitat availability would be expected to be small and infrequent and, therefore, not of sufficient magnitude to substantially reduce long-term, average initial year-class strength of the warmwater fish populations. For any individual year (out of the 70-year period included in the analysis), the difference in the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Folsom Reservoir during the March through September period attributable to the cumulative condition relative to the future base condition is estimated to be 4.4 percent or less (Table H-3.5-58).

In addition, the frequency with which potential nest-dewatering events could occur in Folsom Reservoir under the cumulative condition, relative to the future base condition, would not change significantly during the March through July warmwater fish-spawning period. For example, modeling results (Table H-3.5-59) indicate an equal number of occurrences for the month of July relative to the future base condition. Based on these and the above-discussed results, the implementation of the year-round pump station project would not significantly contribute to potentially significant cumulative impacts to Folsom Reservoir warmwater fisheries.

Impact 3.5-60: Impacts to Folsom Reservoir's coldwater fisheries.

The cumulative condition would result in slightly different Folsom Reservoir end-of-month storage during many years of the simulation. Table H-3.5-60 shows the difference in long-term average storage in Folsom Reservoir between the existing condition and the cumulative condition. For all months of the year, the largest decrease in long-term average end-of-month storage would be 60,000 AF (or approximately 11 percent) during the month of September. These relatively small anticipated reductions in reservoir storage would not be expected to adversely affect the reservoir's coldwater fisheries because coldwater habitat would remain available within the reservoir during all months of all years and anticipated seasonal reductions in storage would not be expected to adversely affect the primary prey species utilized by coldwater fish. Therefore, relatively small storage reductions associated with the cumulative condition represent a less-than-significant impact to coldwater fish resources of Folsom Reservoir.

Impact 3.5-61: Impacts to Nimbus Fish Hatchery.

Operations of Folsom Dam and Reservoir under the cumulative condition would have very little effect on temperatures of water entering Nimbus Fish Hatchery from Lake Natoma during the May through September period, relative to the existing condition. Table H-3.5-61 shows that under the cumulative condition, the long-term average temperature of water released from Nimbus Dam would not increase by more than 0.3°F, relative to the existing condition, during any month of the year. Table H-3.5-62 also shows small differences in the frequency with which temperatures exceed index temperatures of 60°F, 65°F and 68°F. These small and infrequent differences in temperature which could occur during the May through September period (when hatchery temperatures reach annual highs) would have little, if any, effect on hatchery operations and resultant fish production. Therefore, changes in the cumulative condition would represent a less-than-significant impact to Nimbus Hatchery operations and resultant fish production.

Lower American River Fisheries Impacts

Flow- and temperature-related impacts are discussed separately below by species and lifestage. Organizationally, flow- and temperature-related impacts to fall-run chinook salmon and steelhead are discussed together, followed by impact discussions for splittail, American shad, and striped bass.

Impact 3.5-62: Impacts to fall-run chinook salmon in the lower American River.

The cumulative condition would result in periods of reduced flows in the lower American River during the October through December fall-run chinook spawning period, relative to the existing condition. Further flow reductions occurring at already low-flow levels could result in increased redd superimposition and eventual lower-year-class strength. Flow reductions also would occur for the driest 20 percent of the years during May. These flow reductions may adversely affect long-term juvenile fall-run chinook salmon rearing habitat availability. In addition, water temperature increases would occur during March through June, potentially representing a significant impact to juvenile fall-run chinook salmon rearing. Consequently, the overall effect of the cumulative condition relative to the existing condition is considered to represent a potentially significant impact to fall-run chinook salmon in the lower American River.

Impact 3.5-63: Impacts to steelhead in the lower American River.

The cumulative condition would result in periods of reduced flows in the lower American River during the March through June juvenile steelhead rearing period, relative to the existing condition. Further flow reductions during July through September may adversely affect long-term summer rearing success of juvenile steelhead. In addition, temperature increases potentially represent a significant impact to juvenile steelhead rearing. Consequently, the overall effect of the cumulative condition relative to the existing condition represents a potentially significant impact to steelhead in the lower American River.

Flow-Related Impacts to Fall-Run/Steelhead Adult Immigration (September Through March).

Under the cumulative condition, reduction in the 70-year average proportion of Sacramento River flow immediately downstream of the mouth that would be composed of American River water during the September through March period (the combined primary period of upstream adult immigration for chinook salmon and steelhead) would range from about one percent (January) to less than 14 percent (September). Hence, although monthly mean lower American River flows at the mouth under the cumulative condition would decrease during each month of this period, relative to the existing condition, these reductions would not be expected to adversely affect immigrating adult fall-run chinook salmon or steelhead.

Temperature-Related Impacts to Fall-Run/Steelhead Adult Immigration (September Through March)

The long-term average water temperatures modeled for the cumulative condition would not increase by more than 0.2°F, relative to the existing condition, at the mouth or at Freeport on the Sacramento River, during all months of the September through March adult immigration period (as shown in Table H-3.5-63).

The largest long-term average water temperature increase under the cumulative condition for the September through March period is 0.2°F for the month of October. Moreover, under the cumulative condition, water temperatures at the lower American River mouth would remain essentially equivalent to those under existing conditions in 427 out of the 483 months included in the analysis. Water temperatures at Freeport under the cumulative condition would remain essentially equivalent to those under the existing condition in 444 months out of the 483 months included in the analysis. Therefore, September through March water temperatures in the lower portion of the lower American River would not be expected to adversely affect fall-run chinook salmon and steelhead adult immigration. Overall, changes in flow and temperature in the lower American River associated with the cumulative condition relative to the existing condition represent a less-than-significant impact to adult salmonid immigration in the lower American River.

Flow-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October Through February)

The long-term average flow below Nimbus Dam under the cumulative condition would be up to 13.6 percent (October) less than the flow under the existing condition during all months of the October through February fall-run chinook salmon spawning and incubation period, as shown in Table H-3.5-64. Similarly, changes in long-term average flows at Watt Avenue would be up to 14.3 percent less (i.e., October) during the October through February period, as shown in Table H-3.5-65.

Figures H-3.5-58 through H-3.5-62 show exceedance curves for the American River release from Nimbus Dam for the October through February period. These curves demonstrate that flows under the cumulative condition would be significantly different than those under the existing condition. Differences in flows in the lower flow ranges would be of particular concern. In

October, November and December, when the existing condition flow would be 2,500 cfs or less, the cumulative condition would result in flow reductions of up to 750 cfs nearly 50 percent of the time. Effects on flow in January and February would be small.

These reductions in flows would reduce the amount of available chinook salmon spawning habitat, which could result in increased redd superimposition during years when adult returns are high enough for spawning habitat to be limiting. These reductions in flow are of sufficient magnitude and occur with enough frequency to have a significant adverse effect on long-term initial year-class strength of lower American River fall-run chinook salmon, resulting in a significant impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

As shown in Table H-3.5-66, the long-term average flow below Nimbus Dam under the cumulative condition (with the project) would be within two percent of the flow under the future base condition (future with the project at existing diversion of 8,500 AF) during all months of the October through February period. In addition, as presented in Table H-3.5-67, changes in long-term average flows at Watt Avenue under the cumulative condition also would be within two percent for each month in the October through February period. The incremental contribution analysis indicates that monthly mean flows would be essentially equivalent or higher at both below Nimbus Dam and at Watt Avenue in 296 of the 350 months simulated.

Figures H-3.5-63 through H-3.5-67 show exceedance curves for the American River release from Nimbus Dam for the months of October through February. These figures demonstrate that although similar most of the time, flows under the cumulative condition would be, at times, lower than the flows associated with the future base condition, particularly when flows are 2,000 cfs or less. Anticipated decreases in flow when the future base flow would be at or below 2,000 cfs are of particular importance to salmon survival. During October and November, there would be seven years in which flows below Nimbus Dam under the cumulative condition would be lower than the corresponding flow under the future base conditions by more than 10 percent. During December, there would be five years in which flows below Nimbus Dam under the cumulative condition would be lower than the corresponding flow under the future base conditions by more than 10 percent. In January and February, decreases in flow of 10 percent or more when the flows would be at or below 2,000 cfs would occur in three and one year, respectively.

If a particular storage level is not met, the PROSIM model, by virtue of its mechanistic logic, has only one option available, which is to reduce fishery management flow releases. In other words, a fixed 250 cfs step difference change in magnitude is automatically calculated in the model regardless of the difference in storage. The result of this fixed step change is that a small reduction in simulated storage during the fall-run chinook salmon spawning period creates a condition that will result in increased storage at the end of the fall-run chinook salmon spawning period, under the cumulative condition. Therefore, the model does not have a choice to calculate a proportional change in the release consistent with the change in storage. However, by contrast to the model, in real-time operations, the operator has the ability to determine the actual flow management objective based on the end-of-September Folsom Reservoir storage, and the risk to storage associated with the determined fishery management objectives. In the eight years with modeled flows shown as reduced by 250 cfs during the months of October and November, the 250 cfs flow change equates to a flow management risk of approximately a few days to just over a month. During one year (i.e., 1969), there appears to be a 20,000 AF difference in storage at the beginning of the year which would equate over a month long of more than a 250 cfs difference. Nonetheless, because examination of the modeling data indicate that for seven of the eight years, the simulated reduction in flows are a result of a modeling anomaly related to step-functions and to decision logic of PROSIM's response to fishery management flow objectives (which are triggered by Folsom Reservoir storage, and not implementation of the Action Alternatives), the incremental contribution associated with the Action Alternatives to flow-related potentially significant cumulative impacts to fall-run chinook salmon spawning and incubation would not be significant. Therefore, flow reductions associated with the year-round pump station would not occur with sufficient magnitude or frequency to significantly adversely affect fall-run chinook salmon spawning and incubation, and therefore represent a less-than-significant contribution to the cumulative condition.

Temperature-Related Impacts to Fall-Run Chinook Salmon Spawning and Incubation (October Through February)

Under the cumulative condition, the long-term average water temperature would be 0.2°F greater than the existing condition during October at Watt Avenue. Long-term average water temperatures below Nimbus Dam under the cumulative condition would result in decreases of up to 0.4°F relative to the existing condition for the October through February period (Table H-3.5-68).

October monthly mean water temperatures at Watt Avenue would increase by more than 0.3°F under the cumulative condition relative to the existing condition in 23 of the 69 years simulated. Conversely, monthly mean water temperatures, under the cumulative condition relative to the existing condition, would decrease by more than 0.3°F in 17 of the 69 years simulated. November monthly mean water temperatures below Nimbus Dam would increase by more than 0.3°F in only two years of the 69 years modeled. In fact, the mean temperature for the 69-year period of record during the month of November would decrease by 0.3°F under the cumulative condition relative to the existing condition. Under the cumulative condition, there would not be any additional occurrences of October water temperatures at Watt Avenue above 56°F, relative to the existing condition. Below Nimbus Dam, there would be three occurrences less during November in which water temperatures under the cumulative condition would exceed 56°F, relative to the existing condition. December, January and February monthly mean water temperatures below Nimbus Dam would be below 56°F in all 69 years modeled.

The long-term average annual early lifestage survival for fall-run chinook salmon in the American River would be 84.9 percent under the existing condition and 85.3 percent under the cumulative condition, as shown in Table H-3.5-69. Substantial increases or decreases in survival would not occur in any individual year of the 69-year simulation.

Based on these modeling results, small temperature changes in the lower American River resulting from the cumulative condition during the October through February period represents a less-than-significant impact to spawning and incubation success of fall-run chinook salmon.

Flow- and Temperature-Related Impacts to Steelhead Spawning and Incubation (December Through March)

The largest percent decrease in long-term average flows would be 8.5 percent at Watt Avenue during the month of December, for the December through March steelhead spawning and incubation period. However, the resultant long-term December average flow remains relatively high (i.e., 3,300 cfs). The only long-term average water temperature increase for the December through March period would be 0.1°F for the month of March below Nimbus Dam, although the resultant temperature (i.e., 50.7°F) would still be well below the identified index of 56°F. Moreover, under the cumulative condition, water temperatures below Nimbus Dam would remain below 56°F for all months of the 69 years modeled for the spawning and incubation period for steelhead. December, January and February water temperatures at Watt Avenue under the cumulative condition would be below 56°F in all 69 years modeled. Under the cumulative condition, there would not be any additional occurrences in which water temperatures at Watt Avenue would be greater than 56°F, relative to the existing condition, for all the 69 years modeled. Therefore, flow- or temperature-related impacts to steelhead spawning or incubation would not be expected to result from the cumulative condition. For flow data supporting this impact determination, see Table H-3.5-64 and H-3.5-65 and Figures H-3.5-60, H-3.5-61, H-3.5-62, H-3.5-68 through H-3.5-72. For the temperature data supporting this impact determination, see Tables H-3.5-76 and H-3.5-80.

Flow-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March Through June)

Relatively small differences in flow would occur between the cumulative condition and the existing condition during the March through June juvenile fall-run chinook salmon and steelhead rearing period. Under the cumulative condition, the largest reduction in the long-term average flow at Watt Avenue would occur during May (i.e., 6.3 percent) for any given month of the March through June period (Table H-3.5-65). However, most reductions in flow during the month of May occurred during the driest 20 percent of the years, when flows are already at relatively low levels (i.e., less than 2,000 cfs). These differences in flow may adversely affect long-term juvenile fall-run chinook salmon or steelhead rearing habitat availability, and therefore represent a potentially significant impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis indicates that under the cumulative condition, the long-term average flow at Watt Avenue would be within two percent of the flow under the future base condition during the March through June period (Table H-3.5-67). Monthly mean flows would be essentially equivalent for 262 months of the 276 months included in the analysis.

Figures H-3.5-73 through H-3.5-76 show the exceedance curves for the lower American River flow at Watt Avenue for the months of March through June. For flows below 2,000 cfs during May, the cumulative condition would result in slight decreases compared to the future base condition. In April (Figure H-3.5-74), the cumulative condition provided an increase in flow when flows ranging between 1,500 cfs and 2,000 cfs, and for flows between 400 cfs and 800 cfs. However, slight flow decreases occur when flows range from 800 to 1,500 cfs. The long-term average flows during May would decrease by less than 1.5 percent under the cumulative condition relative to the future base condition. For the relatively small reductions in flow that do occur during May, most occurred at relatively high (greater than 2,000 cfs) flow levels. These small differences in flow would not be expected to adversely affect long-term juvenile fall-run chinook salmon or steelhead rearing success. Therefore, implementation of the year-round pump station would not significantly contribute to future potentially significant cumulative flow-related impacts to fall-run chinook salmon and steelhead juvenile rearing.

Temperature-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March Through June)

Under the cumulative condition, there would be two more occurrences during April, and the same number of occurrences during March, June and July, in which water temperatures at Watt Avenue would be above 65°F, relative to the existing condition. Under the cumulative condition, long-term average water temperature at Watt Avenue would not change by more than 0.3°F during any month of the March through June period, compared to the existing condition, as shown in Table H-3.5-70. Temperature data at Watt Avenue shows a water temperature increase greater than 0.3°F occurring in seven years during the month of March, in nine years during the month of April, in 19 years during the month of May and in 18 years during the month of June. However, temperature decreases greater than 0.3°F occur in five years during the month of March, nine years during the month of April, three years during the month of May, and in 10 years during the month of June. The largest temperature increase associated with the cumulative condition, relative to the existing condition, would be expected to occur during the month of May. Although the long-term average temperature during May increased by only 0.3°F, the cumulative condition would increase the frequency and magnitude of relatively warm temperatures (i.e., greater than or equal to 65°F). Therefore, these increases in water temperatures may represent a potentially significant impact to fall-run chinook salmon and steelhead juvenile rearing.

Action Alternatives' Incremental Contribution to the Cumulative Condition

Under the cumulative condition, the long-term average water temperature at Watt Avenue would not change by more than an estimated 0.1°F during any month of the March through June period, compared to the future base condition (Table H-3.5-71). Data in Appendix I of the Draft EIS/EIR shows that the water temperature at Watt Avenue under the cumulative condition would remain below 65°F in all years during March and April, relative to the existing condition. Monthly mean water temperatures are expected to exceed 65°F approximately 10 percent of the time during May and approximately 30 percent of the time during June under both the future base and the cumulative condition. Further, examination of the exceedance graphs for water temperatures during May and June comparing the future base and the cumulative condition indicates no substantial differences in water temperatures between the two conditions.

Therefore, implementation of the year-round pump station project would not significantly contribute to potentially significant cumulative temperature-related impacts to fall-run chinook salmon and steelhead juvenile rearing.

Flow-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Emigration (February Through June)

As can be concluded from previous discussions, potential changes in flows under the cumulative condition during February and March would not adversely affect juvenile fall-run chinook salmon or steelhead emigration. Hence, this discussion focuses primarily on the April through June period.

Under the cumulative condition, the simulated long-term average flow at the mouth of the lower American River would decrease about two percent in April, seven percent in May, and 3.4 percent in June (Table H-3.5-72). Figures H-3.5-77, H-3.5-78, and H-3.5-79 show the difference in flows simulated under the cumulative condition at the lower flow ranges. Flows at the confluence would frequently be reduced during all months with substantial reductions at the lower flow ranges occurring during May. However, flows under the cumulative condition would not be reduced to levels that could physically block emigration from the river. Although flow reductions at the mouth would occur in a few years during the April through June period and particularly during May, resultant flows represent a less-than-significant impact to juvenile salmonid emigration.

Temperature-Related Impacts to Fall-Run Chinook Salmon and Steelhead Juvenile Emigration (February Through June)

Examination of the exceedance curves indicates that water temperatures at the mouth of the lower American River and at Freeport under the cumulative condition would remain at or below 65°F during all years of the 69-year period of record during the months of February, March and April. Under the cumulative condition, there would not be any additional occurrences during May and June of water temperatures at the mouth of the lower American River exceeding 65°F, relative to the existing condition. At the mouth of the lower American River, water temperatures under the cumulative condition relative to the existing condition would be warmer during May but cooler 10 percent of the time during June. Under the cumulative condition, there only would be two additional occurrences during May, and the same number of occurrences during June, in which water temperatures at Freeport would exceed 65°F, relative to the existing condition. At Freeport, water temperatures are essentially equivalent during May and June for the cumulative and existing conditions. Overall, this would represent a less-than-significant impact to fall-run chinook salmon and steelhead juvenile emigration.

Flow-Related Impacts to Steelhead Rearing (July Through September)

Under the cumulative condition, the long-term average flow below Nimbus Dam would decrease, compared to the existing condition, by about seven percent in July, 10 percent in August and 15 percent in September (Table H-3.5-64). The long-term average flow at Watt Avenue would decrease compared to the existing condition by 7.9 percent in July, 10.9 percent in August, and 16.4 percent in September (Table H-3.5-65).

Figures H-3.5-80 through H-3.5-82 provide flow exceedance curves for American River flows at Watt Avenue during July, August and September. These curves demonstrate that flow reductions at Watt Avenue under the cumulative condition relative to the existing condition would occur about 70 percent of the time during July, about 85 percent of the time during August, and about 90 percent of the time during September. Furthermore, relatively large reductions in flow (i.e., 500 cfs) would occur when flows are already at low levels (i.e., 1,500 cfs or less).

Flow reductions under the cumulative condition may reduce juvenile steelhead summer rearing habitat. Nonetheless, reductions in flow associated with the cumulative condition may adversely affect long-term rearing success of juvenile steelhead, and therefore represent a potentially significant impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis indicates that, under the cumulative condition, the long-term average flow on the American River below Nimbus Dam would decrease by approximately two percent during July, 1.5 percent during August, and one percent during September (Table H-3.5-66). Long-term average flows at Watt Avenue would exhibit similar decreases to those below Nimbus Dam (Table H-3.5-67).

Figures H-3.5-83 through H-3.5-85 present the comparison of flow exceedance curves for the cumulative and future base condition flows at Watt Avenue during July, August, and September. Although small reductions in flows potentially would occur during July, these reductions would not be expected to be of such magnitude to adversely affect long-term summer rearing success of juvenile steelhead. Flows under the cumulative and future base condition are essentially equivalent during August and September.

Based on these findings, flow reductions under the cumulative condition, relative to the future base condition, would not be expected to significantly reduce juvenile steelhead rearing habitat. The potential small and infrequent reductions in flow would not be expected to adversely affect long-term rearing success of juvenile steelhead. Therefore, the implementation of the year-round pump would not significantly contribute to future potentially significant cumulative flow-related impacts to steelhead rearing.

Temperature-Related Impacts to Steelhead Rearing (July Through September)

Temperature modeling indicates that the long-term average water temperature at Watt Avenue would increase slightly each month during July, August and September under the cumulative condition, relative to the existing condition (Tables H-3.5-68). The cumulative condition would result in no additional occurrences during July, one less occurrence during August, and two less occurrences during September, in which water temperatures at Watt Avenue would be above 65°F, relative to the existing condition.

Figures H-3.5-86, H-3.5-87, and H-3.5-88 present the exceedance curves for water temperature at Watt Avenue under the existing condition and the cumulative condition during the months of July, August, and September, respectively. During July and August, water temperatures under the cumulative condition are higher than those under the existing condition when temperatures would already be relatively warm (i.e., 68°F). In fact, water temperatures could increase by as much as 3.0°F when temperatures under the existing condition are at 70°F or more. During September, water temperatures at Watt Avenue under the cumulative condition are generally equal to or lower than those under the existing condition. However, water temperature increases that would be expected to occur during July and August represent a potentially significant cumulative impact to juvenile steelhead summer rearing.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The long-term average monthly mean water temperatures at Watt Avenue under the cumulative condition would be essentially equivalent to those under the future base condition during July, August and September (Tables H-3.5-73).

Figures H-3.5-89, H-3.5-90, and H.3-5-91 show water temperature exceedance curves at Watt Avenue during July, August and September under the cumulative condition and future base condition. As shown, water temperatures are essentially identical for both conditions. Small and infrequent differences in water temperatures at Watt Avenue occurred between both conditions. The cumulative condition would result in only one additional occurrence in July, no additional occurrences in August and one less occurrence in September of water temperatures at Watt Avenue exceeding 65° F, relative to the future base condition. Therefore, implementation of a year-round pump station project would not significantly contribute to future potentially significant cumulative temperature-related impacts to steelhead rearing.

Impact 3.5-64: Impacts to splittail in the lower American River.

Under the cumulative condition, the long-term average flow at Watt Avenue during the period February through May would be 1.6 percent to 6.3 percent less than under the existing condition, as shown in Table H-3.5-65.

Using flows at Watt Avenue, the acreage of usable riparian vegetation inundated between RM 8 and RM 9 was calculated and employed as an index of the relative amount of inundated riparian vegetation that would occur in the lower portion of the river for a given flow rate. The amount of long-term riparian habitat inundated in this portion of the river under the cumulative condition would remain unchanged in 70 years (100 percent of the time) during February, 66 years (94 percent of the time) during March, 59 years (84 percent of the time) during April, and 51 years (73 percent of the time) during May. Therefore, habitat reductions may be expected to occur during most months of this period. In many years, riparian vegetation would not be inundated under either the cumulative or the existing condition.

The amount of riparian habitat between RM 8 and RM 9 under the cumulative relative to the existing condition would be reduced for each month of the February through May splittail spawning period, particularly during April (i.e., 11.1 percent) and May (i.e., 8.3 percent). Under the cumulative condition, reductions in inundated riparian habitat would occur virtually every month during the February through May period, during those years when habitat would be inundated under the existing condition. Relatively little splittail habitat is available under either the cumulative or existing condition. Given the uncertainty as to the magnitude and extent of splittail spawning habitat in the lower American River, and the actual amount of potential spawning habitat at specific flow rates throughout the river, the effects of flow reductions from the February through May period also are uncertain and, therefore, represent a potentially significant impact.

During the February through May period, water temperatures at Watt Avenue would increase above 68°F (the reported preferred range for splittail spawning) under the cumulative condition relative to the existing condition in only three years of the 69-year period of record (i.e., during the month of May). During February, March and April, water temperatures would not increase above 68°F under the cumulative condition for any year of the 69-year period of record. Therefore, significant temperature-related impacts would not be expected to occur to splittail under the cumulative condition.

Action Alternatives' Incremental Contribution to the Cumulative Condition

Under the cumulative condition, relative to the future base condition, average long-term usable inundated riparian habitat would not change for any month of the February through May splittail spawning period. Although small and infrequent decreases in the amount of usable inundated riparian habitat associated with the cumulative condition relative to the future base condition occur during this period, these differences would not be of sufficient magnitude or occur with enough frequency to represent a significant contribution to the identified potentially significant cumulative impact.

Impact 3.5-65: Impacts to American shad in the lower American River.

The average flow at the American River mouth under the cumulative condition relative to the existing condition would be seven and 3.4 percent less in May and June, respectively (Table H-3.5-72). In addition to this analysis, further analysis was performed to determine the probability that lower American River flows at the mouth in May and June would be greater than 3,000 cfs. The simulations showed there would be one less year under the cumulative condition relative to the existing condition when the flow at the mouth would be greater than 3,000 cfs in both May and June. In addition, American shad spawn opportunistically where suitable conditions are found. Therefore, production of American shad within the Sacramento River system would not be affected. Potential flow-related impacts to American shad are considered to be less than significant.

Under cumulative conditions, monthly mean water temperatures in May and June below Nimbus Dam and at the mouth would be within the reported preferred range for American shad spawning of 60°F to 70°F one less year for both months, relative to the existing condition. Because the frequency with which suitable temperatures for American shad spawning would not differ substantially, temperature-related impacts to American shad also would be considered to be less than significant. Overall, potential impacts to American shad under the cumulative condition would be less than significant.

Impact 3.5-66: Impacts to striped bass in the lower American River.

Differences in lower American River flows that could be expected to occur during May and June under the cumulative condition have been discussed previously under impact discussions for fall-run chinook salmon and steelhead. In addition, further analysis was performed to determine the probability that lower American River flows at the mouth would be below 1,500 cfs. Under the cumulative condition, monthly mean flows at the mouth of the lower American River would be below the 1,500 cfs attraction flow index during one additional year (one percent more often) for the May through June period, relative to the existing condition. Because flows at the mouth that are believed to be sufficient to maintain the striped bass fishery would be met or exceeded in most years during both May and June, and because substantial changes in the strength of the striped bass fishery would not be expected to occur when May and/or June monthly mean flows fall below 1,500 cfs, flow-related impacts to the striped bass fishery that could potentially occur under the cumulative condition would be less than significant.

Monthly mean water temperatures below Nimbus Dam would be within the reported preferred range for striped bass juvenile rearing of 61°F to 73°F by only one less year in May, but one additional year in June. At the mouth, the number of years within this preferred range would increase by two years in May and remain unchanged in June. Because the frequency of suitable temperatures for juvenile striped bass rearing in the lower American River would remain essentially unchanged, temperature-related impacts to juvenile striped bass rearing also are considered to be less than significant. Overall, potential impacts to striped bass would be less than significant.

<u>Shasta and Trinity Reservoir Fisheries Impacts</u>

Impact 3.5-67: Impacts to the warmwater fishery of Shasta and Trinity Reservoirs.

Hydrologic conditions under the cumulative condition would result in a decline in the long-term average end-of-month water surface elevation in Shasta Reservoir during the March through September period when warmwater fish spawning and initial rearing may be expected. In 57 percent of the years, the water surface elevation of Shasta Reservoir was simulated as lower by more than one foot under the cumulative condition compared to the existing condition during the March through September period.

The long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Shasta Reservoir under the cumulative condition would decrease by 6 to 23 percent over the March to September period, as shown in Table H-3.5-74. In addition, significant reductions in reservoir littoral habitat availability would occur frequently in some years during each of these months. Reductions in the availability of littoral habitat, under the cumulative condition, may be of sufficient magnitude to substantially reduce long-term average initial year-class strength of warmwater fish populations. Consequently, seasonal reductions in littoral habitat availability under the cumulative condition would constitute a potentially significant impact to Shasta Reservoir's warmwater fisheries.

In addition, the cumulative condition could alter the rates by which water surface elevation in Shasta Reservoir change during each month of the primary warmwater fish-spawning period (i.e., March through July). Table H-3.5-75 shows that the relative frequency with which potential nest-dewatering events would occur in Shasta Reservoir under the cumulative condition during the spawning period would not be substantial (i.e., 120 occurrences compared to 111 occurrences under the existing condition). Because the frequency with which potential nest-dewatering events would occur in Shasta Reservoir under the cumulative condition would not change substantially during the warmwater fish-spawning period, impacts to warmwater fish-nesting success are considered to be less than significant. However, overall, reduction in littoral habitat availability and potential impacts to Shasta Reservoir's warmwater fisheries associated with the cumulative condition represent a potentially significant impact.

Hydrologic conditions under the cumulative condition would not result in substantial changes in the long-term average end-of-month water surface elevation in Trinity Reservoir during the March through September period. Reductions in the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Trinity Reservoir under the cumulative condition are shown in Table H-3.5-76 and range from 0.1 to 10.2 percent during the March through September period. These reductions would not be of sufficient magnitude to substantially reduce long-term average initial year-class strength of warmwater fish populations. Consequently, seasonal reductions in littoral habitat availability would constitute a less-than-significant impact to Trinity Reservoir's warmwater fisheries.

In addition, changes associated with the cumulative condition could alter the rates by which water surface elevation in Trinity Reservoir change during each month of the primary warmwater fish-spawning period (March through July). Table H-3.5-77 provides modeling results indicating the frequency with which potential nest-dewatering events could occur in Trinity Reservoir under the cumulative and the existing condition, during the spawning period. The frequency with which potential nest-dewatering events would occur in Trinity Reservoir during the spawning period would be 84 occurrences under the cumulative condition compared to 87 under the existing condition. Therefore, potential nest-dewatering would be less under the cumulative condition than under the existing condition. Overall, impacts to Trinity Reservoir's warmwater fish populations would be less than significant.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The cumulative condition would not result in a substantial change relative to the future base condition in the long-term average end-of-month water surface elevation in Shasta Reservoir during the March through September period, when warmwater fish spawning and initial rearing may be expected. End-of-month elevation would be essentially equivalent to the future base condition in 463 months of the 490 months included in the analysis.

The difference in the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in Shasta Reservoir under the cumulative condition relative to the future base would be negligible, as shown in Table H-3.5-78. These small and infrequent reductions in the availability of littoral habitat would not be of sufficient magnitude to substantially reduce long-term average initial year-class strength of warmwater fish populations. Consequently, seasonal reductions in littoral habitat availability associated with implementation of the year-round pump station project would constitute a less-than-significant contribution to the potentially significant cumulative impact to Shasta Reservoir's warmwater fisheries.

Impact 3.5-68: Impacts to the coldwater fishery of Shasta and Trinity Reservoirs.

Hydrologic conditions under the cumulative condition would result in a decrease in long-term average Shasta Reservoir storage, relative to the existing condition, during the April through November period, as shown in Table H-3.5-79. During the April through November period, Shasta Reservoir storage would decrease by 10 percent or more 26 percent of the time. Because physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations within the reservoir, and because anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base used by the reservoir's coldwater fish populations, seasonal reductions in storage expected to occur under the cumulative condition would have less-than-significant impacts to Shasta Reservoir’s coldwater fisheries.

Under the cumulative condition, the long-term average monthly storage in Trinity Reservoir would be slightly less than the existing condition during the April through November period (when Trinity Reservoir thermally stratifies) (Table H-3.5-80). For any given month, the largest long-term average difference would be 5.2 percent during the month of June. Because changes to Trinity Reservoir storage would not be substantial, and anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base utilized by the reservoir's coldwater fish populations, seasonal reductions in storage expected to occur under the cumulative condition would have less-than-significant impacts to Trinity Reservoir's coldwater fisheries.

Sacramento River Fisheries Impacts

Impact 3.5-69: Flow-related impacts in the upper Sacramento River.

The long-term average Sacramento River flows released from Keswick Dam under the cumulative condition would be reduced relative to the existing condition by a range of 0.8 to 9.4

percent, as shown in Table H-3.5-81. This is primarily the result of implementation of the Trinity River Mainstem Fishery EIS/EIR Preferred Alternative (Revised Flow Evaluation Alternative).

The minimum flow objective for Keswick Dam releases stipulated in the NMFS Winter-run Chinook Salmon Biological Opinion (1993, as revised in 1995) for the protection of winter-run chinook salmon rearing and downstream passage is 3,250 cfs between October 1 and March 31. Modeling output shows that monthly mean flows below Keswick Dam would not be below 3,250 cfs in any month of the October through March period in any of the 70 years modeled under either the cumulative condition or the existing condition.

Because the long-term average flows released from Keswick Dam would not be substantially reduced, and because monthly mean flows would not be below 3,250 cfs during any month of the October through March period for any year of the years studied, the cumulative condition would result in less-than-significant flow-related impacts to upper Sacramento River fish resources.

Impact 3.5-70: Flow-related impacts in the lower Sacramento River.

The long-term average flow at Freeport under the cumulative condition would be within five percent of the long-term average under the existing condition during all months of the year, as shown in Table H-3.5-82. In 780 out of the 840 months simulated, the flow at Freeport under the cumulative condition would be greater or essentially equivalent to the future base condition. Neither physical habitat availability for fish residing in the lower Sacramento River nor immigration of adult or emigration of juvenile anadromous fish would be substantially affected relative to the existing condition. Consequently, flow-related impacts to lower Sacramento River fisheries or migrating anadromous fish that could occur under the cumulative condition are considered to be less than significant. Overall, this constitutes a less-than-significant impact.

Impact 3.5-71: Water temperature-related impacts in the upper Sacramento River.

The cumulative condition relative to the existing condition would result in changes to the long-term average temperature at Keswick Dam and Bend Bridge. There would be several additional months in the simulation when temperatures exceed 56°F or 60°F at Keswick Dam or Bend Bridge under the cumulative condition relative to the existing condition (Table H-3.5-83). For example, there would be 22 more occurrences where the 56°F index would be exceeded, and 8 more occurrences where the 60°F index would be exceeded at Keswick Dam relative to the existing condition. At Bend Bridge, there would be 31 more occurrences where the 56°F index would be exceeded and seven more occurrences where the 60°F index would be exceeded relative to the existing condition. Therefore, the cumulative condition would result in significant additional exceedances of the temperature criteria identified in the NMFS Biological Opinion for winter-run chinook salmon. Also, absolute long-term average early lifestage survival of fall-run chinook salmon would decrease more than 10 percent in 11 of the 70 years studied. For winter-run chinook salmon, absolute long-term average early lifestage survival would decrease more than 10 percent in four of the 70 years studied relative to the existing condition. No decreases of more than 10 percent are expected for late-fall-run chinook salmon and actual increases in survival are expected for spring-run chinook salmon relative to the existing condition. However, based on the increased number of exceedances of the temperature criteria identified in the NMFS Biological Opinion for winter-run chinook salmon, and decreases in absolute long-term early lifestage survival of fall-run chinook salmon and winter-run chinook salmon, temperature-related impacts to upper Sacramento River fisheries under the cumulative condition would represent a significant impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The cumulative condition would not result in more than a 0.1°F change in the long-term average water temperature at Keswick Dam or Bend Bridge for any month of the year, relative to the future base condition. Also, relative to the future base condition, the cumulative condition would result in only one additional month throughout the entire simulation where the water temperature exceeded 56°F or 60°F below Keswick Dam or at Bend Bridge under the cumulative condition, as shown in Table H-3.5-84. Monthly mean water temperatures at Keswick Dam and at Bend Bridge would be essentially equivalent under the future base and cumulative conditions. Therefore, the cumulative condition would not result in significant additional exceedances of the water temperature criteria identified in the NMFS Biological Opinion for winter-run chinook salmon, relative to the future base condition. In addition, there would not be substantial decreases in annual early lifestage survival of fall-run, late fall-run, winter-run, or spring-run chinook salmon in any individual year under the cumulative condition relative to the future base condition (Table H-3.5-79). Based on these findings, temperature-related impacts to upper Sacramento River fisheries associated with the implementation of the year-round pump station project would represent a less-than-significant contribution to the significant cumulative temperature-related impacts to upper Sacramento River fisheries.

Impact 3.5-72: Water temperature-related impacts in the lower Sacramento River.

The long-term average water temperature at Freeport in the lower Sacramento River would not change more than 0.3°F under the cumulative condition during any month of the year, as shown in Table H-3.5-85. The number of years that temperatures at this location would exceed 56°F, 60°F, and 70°F would be greater (i.e., 2 occurrences more often for the 56°F index, 11 occurrences more often for the 60°F index, and 9occurrences more often for the 70°F index) under the cumulative condition than the existing condition during the period March through November, as shown in Table H-3.5-86. Also, 17 percent of the time in the months of March through November, the monthly mean temperature at Freeport would increase more than 0.3°F under the cumulative condition relative to the existing condition. Overall, potential temperature-related impacts to fish species within the lower Sacramento River represent a potentially significant impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis indicates that the long-term average water temperature at Freeport in the lower Sacramento River would not change more than 0.1°F under the cumulative condition relative to the future base condition during any month of the year, as shown in Table H-3.5-87. The number of years that water temperatures at this location would exceed 56°F, 60°F, and 70°F would be slightly greater (i.e., one occurrence more often for the 56°F and 60°F indices and two more often for the 70°F index) under the cumulative condition, relative to the future base condition during the March through November period. Monthly mean water temperatures at Freeport in the lower Sacramento River would be essentially equivalent to the future base condition for 826 months of the 828 months included in the analysis. Therefore, implementation of the year-round pump station project would not significantly contribute to potentially significant cumulative water temperature-related impacts to fisheries of the lower Sacramento River.

<u>*Delta Fishery Impacts*</u>

Impact 3.5-73: Impacts to Delta fish populations.

The greatest reduction in the monthly long-term average Delta outflow under the cumulative condition was 8.3 percent (during the month of October) relative to the existing condition, as shown in Table H-3.5-88. Delta outflow during the period of February through June is believed to be of greatest concern for potential effects to spawning and rearing habitat and downstream transport flows for delta smelt, longfin smelt, splittail, striped bass, salmonids, and other aquatic species in the Delta. During 11 percent of the time (i.e., 38 months of the 350 months included in the analysis) for the February through June period, Delta outflow would decrease by 10 percent or more relative to the existing condition.

The long-term average position of X2 would move upstream less than one km relative to the existing condition for any given month. However, during the February through June period considered important for providing appropriate spawning and rearing conditions and downstream transport flows for various fish species, the upstream shift in the position of X2 under the cumulative condition relative to the existing condition would exceed one km 12 percent of the time (i.e., 39 more occurrences out of 350).

The model simulations conducted for the cumulative condition included conformance with X2 requirements set forth in the SWRCB Interim Water Quality Control Plan. Also, the Delta export-to-inflow ratios under the cumulative condition would not exceed the maximum export ratio as set by the SWRCB Interim Water Quality Control Plan. Even though the cumulative condition would not cause X2 or Delta outflow standards to be violated, the cumulative condition would result in decreased outflow and upstream shift in the position of X2, which could be considered a potentially significant impact to Delta fisheries. Overall, impacts to Delta fish populations would be potentially significant.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis indicates that reductions in the long-term average Delta outflow of up to 0.3 percent could occur under the cumulative condition relative to the future base condition, as shown in Table H-3.5-89. Throughout the entire 70-year period of record there would be only one individual month (i.e., May) when Delta outflow is reduced by more than three percent for the February through June period, relative to the future base condition.

In addition, under the cumulative condition, there would not be more than a 0.1 km shift in the long-term average position of X2 relative to the future base condition for any given month. Furthermore, during the February through June period, the maximum upstream shift in the position of X2 for the entire 70-year period of record would be 1.0 km. Based on these results, the year-round pump station project would not significantly contribute to potentially significant cumulative impacts to Delta fish populations.

Oroville Reservoir Fisheries Impacts

Impact 3.5-74: Impacts to Oroville Reservoir warmwater fisheries.

Hydrologic conditions under the cumulative condition as compared to the existing condition would result in reduced long-term average end-of-month water surface elevation in Oroville Reservoir during the months of the March through September period (when warmwater fish spawning and initial rearing occurs) (Appendix D of the Draft EIS/EIR). The largest decrease in water surface elevation during the March through September season would be 75 feet for any individual year for the entire 70-year period included in the analysis.

Modeling results indicate that the largest increase in the frequency with which potential nest-dewatering events could occur in Oroville Reservoir under the cumulative condition, compared to the existing condition, would occur during July, from 56 out of 70 years to 61 out of 70 years. Because the frequency with which potential nest-dewatering events could occur in Oroville Reservoir under the cumulative condition would change during the March through July warmwater fish-spawning period, impacts to warmwater fish nesting success may be potentially significant. Overall, water surface elevation changes associated with the cumulative condition, relative to the existing condition, represent a potentially significant impact to the warmwater fisheries of Oroville Reservoir.

Action Alternatives' Incremental Contribution to the Cumulative Condition

No substantial changes in reservoir elevation would be anticipated under the cumulative condition relative to the future base. The increase in future SWP demands is the primary factor leading to cumulative effects. The Action Alternatives contribution to the cumulative condition would not be considerable.

Impact 3.5-75: Impacts to Oroville Reservoir's coldwater fisheries.

The cumulative condition would result in slightly different Oroville Reservoir end-of-month storage during many years of the simulation. For all months of the year, the largest decrease in long-term average end-of-month storage would be 201,000 AF (or approximately 8.3 percent) during the month of September for all months of the year. These anticipated reductions in reservoir storage would not be expected to adversely affect the reservoir's coldwater fisheries because coldwater habitat would remain available within the reservoir during all months of all years and anticipated seasonal reductions in storage would not be expected to adversely affect the primary prey species utilized by coldwater fish. Therefore, storage reductions associated with the cumulative condition represent a less-than-significant impact to coldwater fish resources of Oroville Reservoir.

<u>Feather River Fisheries Impacts</u>

Impact 3.5-76: Flow-related impacts in the Feather River.

The long-term average Feather River flows released from Oroville Reservoir under the cumulative condition, relative to the existing condition, range from decreases of 14.1 percent during the month of November to increases of 36.4 percent during the month of August. Under the cumulative condition, there would be substantial decreases in flows relative to the existing condition. It is important to note that during months of the critical steelhead over-summer rearing period, the cumulative condition would result in relatively large increases in long-term average Feather River flows (i.e., 25.5 and 36.4 percent in July and August, respective). Nonetheless, because flow decreases greater than 10 percent would occur about 18 percent of the time for the 70-year period of record, and anadromous salmonids and species of management concern may be present during these flow decreases, reductions in flow would represent a potentially significant impact to Feather River fish resources.

Action Alternatives' Incremental Contribution to the Cumulative Condition

No substantial changes in river flow would be anticipated under the cumulative condition relative to the future base. The increase in future SWP demands is the primary factor leading to cumulative effects. The Action Alternatives contribution to the cumulative condition would not be considerable.

Impact 3.5-77: Water temperature-related impacts in the Feather River.

There would not be any increases in the long-term average monthly mean Feather River water temperatures released from Oroville Reservoir under the cumulative condition relative to the existing conditions. During the month of November, the long-term average monthly mean water temperature would decrease by 2.2ºF. There would only be four months (out of 828 months) that would show increases greater than 0.3 percent. There would not be any months in the 69-year period of record that would show water temperature increases greater than 2.5ºF. An application for renewal for the power facilities at Oroville Reservoir is being prepared for submission to FERC in 2006. During this process, the water temperature and fishery resources of Oroville Reservoir and the lower Feather River will undergo detailed analysis to determine the appropriate flow and water temperature requirements that will be part of the new license to maintain or enhance the fisheries of Oroville Reservoir and the lower Feather River. Therefore, because these flow and water temperature requirements will help attenuate any increases in water temperature, small changes in water temperature under the cumulative condition relative to existing conditions would have a less-than-significant impact to Feather River fisheries.

3.5.4.5 Environmental Protection and Mitigation Measures

The fish resources and aquatic habitat mitigation measures included in the Mitigation Plan (Appendix D to the Final EIS/EIR) are shown below.

Prevent Fish Entrainment and Impingement at the Water Supply Intake/Point of Diversion

Diversion of water at the intake structure could create conditions resulting in entrainment or impingement of fish. Installation and operation of fish screens will minimize the potential for this impact. CDFG fish screen experts will be involved in the design and inspection of the fish screens.

Commitment:	Design, construct, operate and maintain fish screens on the water supply intake in a manner consistent with CDFG-approved design.
Responsible Parties:	Reclamation/Construction Contractor - design and construct per CDFG-approved plan PCWA - operation and maintenance per CDFG-approved procedures CDFG - design input, review and approval; performance inspection
Location:	Project area/river channel - water supply intake structure
Timing:	Phase II construction/operations

Monitoring:
Reclamation will require the Construction Contractor to install the fish screens according to CDFG-approved plans. PCWA will monitor the operation of the fish screens and provide maintenance, as needed, according to specific fish screen design and operational procedures.

Reporting Requirements:
Reclamation will submit final designs to CDFG and will notify CDFG when construction is completed. CDFG may inspect the construction or performance of fish screens at the site. PCWA will maintain daily records of screen performance on all days pump station is operational. These records will be summarized in quarterly reports to CDFG for the first two years following Project start-up. After that time, PCWA will make records available to CDFG, upon request.

Description of Activities:
Design and Construction
The Project design team will work with CDFG fish screen experts to finalize the design in a manner that meets CDFG requirements for the Project site. Reclamation will ensure that the Construction Contractor installs the approved fish screens as designed.

Operation and Maintenance
PCWA will operate and maintain the fish screens according to the final approved procedures.

Success Criteria:
Reclamation will document that construction/installation meets CDFG-approved design. PCWA will document project operation and maintenance compliance with appropriate procedures.

Avoid Impacts Upon Auburn Ravine Fish, Aquatic and Terrestrial (Riparian) Resources

The Project, as described in the Draft EIS/EIR, included an increased release of American River water into Auburn Ravine, in exchange for Yuba/Bear River Drum-Spaulding Project water. Change in water source composition potentially would create conditions that might increase straying of American River salmonids into Auburn Ravine. To avoid any potential for such an impact, PCWA will double-pump the increased diversions of American River water, measured against baseline conditions derived from data reflecting monthly pumping levels in the period from 1998 through 2001, from the Auburn Ravine Tunnel directly to its water supply distribution system, rather than to Auburn Ravine. PCWA will not modify this procedure until further environmental evaluations are conducted to evaluate the potential effects of changing water sources or volume in Auburn Ravine.

Commitment:	Minimize alteration of Auburn Ravine aquatic conditions by double-pumping increased diversions of American River water.
Responsible Party:	PCWA
Location:	Auburn Ravine Tunnel and Pump Station; Auburn Ravine
Timing:	Ongoing project operation
Monitoring:	Record American River water deliveries into Auburn Ravine
Reporting Requirements:	Operation records/reports

Description of Activities:
By double-pumping increased American River diversions, PCWA will operate the pump station such that release of American River water into Auburn Ravine, via the Auburn Ravine Tunnel, will be within the limits of recent historical monthly maximum delivery rates.

Success Criteria:
Documentation of double-pump operations and deliveries of American River water into Auburn Ravine within the limits of recent historical monthly maximum delivery rates.

Other Related Mitigation Measures

Water Quality and **Public Health and Worker Safety** include additional measures that would protect fish and aquatic resources in the project area, during both construction and operation of the selected alternative.

PCWA Conservation Measures

Conservation measures are actions to benefit or promote the recovery of listed species that are included by the federal agency as an integral part of the proposed action. These measures will be taken by the federal agency or applicant, and serve to minimize or compensate for, project effects on the species under review. These may include actions taken prior to the initiation of consultation, or actions which the federal agency or applicant have committed to complete in a biological assessment or similar document (USFWS, NMFS and AFS 2001).

PCWA is developing or implementing numerous conservation measures which were discussed by PCWA, Reclamation, and USFWS during internal consultations on the Proposed Project from February through May 1999. These conservation measures include: (1) participation in the western Placer County Natural Communities Conservation Plan (NCCP); (2) resource mapping (baseline habitat inventory); (3) access to PCWA lands (by USFWS); (4) expanded place of use (PCWA and USFWS agreed that if an expanded POU for American River MFP/pump station water was pursued, then a subsequent (and separate) consultation would be conducted); (5) vernal pool preserves (PCWA would provide mapping of vernal pool resources and would encourage associated municipalities in cooperating with the USFWS on preservation of vernal pool resources); (6) programmatic CVP biological opinions (because of Reclamation involvement in the pump station project, PCWA's actions will be consistent with those identified in the USFWS biological opinion for this project); (7) reporting (PCWA agreed to cooperate in reporting of potential impacts to biological resources or potential take of listed species); it is assumed that these reporting responsibilities will also be assigned to participants as part of the Placer County NCCP; (8) planning and communication (PCWA agreed to participate in appropriate planning and communication with USFWS to ensure the receipt of environmental documents and other CEQA-related materials by the USFWS); and (9) general operations and maintenance (PCWA agreed to implement a system of operations and maintenance (O&M) procedures that would incorporate species protection measures).

PCWA also recently agreed to not supply retail treated water service to new developments within environmentally sensitive areas of western Placer County until USFWS has certified that the new development is consistent with the interim conservation strategies of the Placer County Habitat Conservation Plan, that is to be prepared at a later date. Environmentally sensitive areas within western Placer County as used above refers to that area within Placer County west of Highway 65, south of the proposed Highway 65 Lincoln Bypass, and north of Pleasant Creek.

Additionally, PCWA has proposed to undertake a flow and water temperature monitoring program for Auburn Ravine, despite the absence of any expected adverse significant impacts on the aquatic resources of Auburn Ravine from the Proposed Project. Flow and water temperature data will be collected to develop a database for future use in decision-making regarding Auburn Ravine resources. The objective of the flow monitoring is to enhance the ability of resource and water managers to determine water quantities of Auburn Ravine. The water temperature monitoring element objective is to collect data to enable assessment of the effects of watershed activities on Auburn Ravine water temperatures. The program includes installation of seven new flow gages and eight new temperature recorders at strategic locations along Auburn Ravine and near the American River pump station. The program is described in greater detail in the Mitigation Plan (Appendix D to the Final EIS/EIR). The proposed flow and water monitoring locations are shown on **Figure 3.5-4**.

The Water Forum, of which PCWA also is a member, is implementing and proposing to implement numerous additional protection, mitigation, and enhancement measures for threatened and endangered species in the lower American River. Many of these measures require, or will require, a significant commitment of resources, and could result in major enhancement of habitat, or reduction in potential effects on listed species.

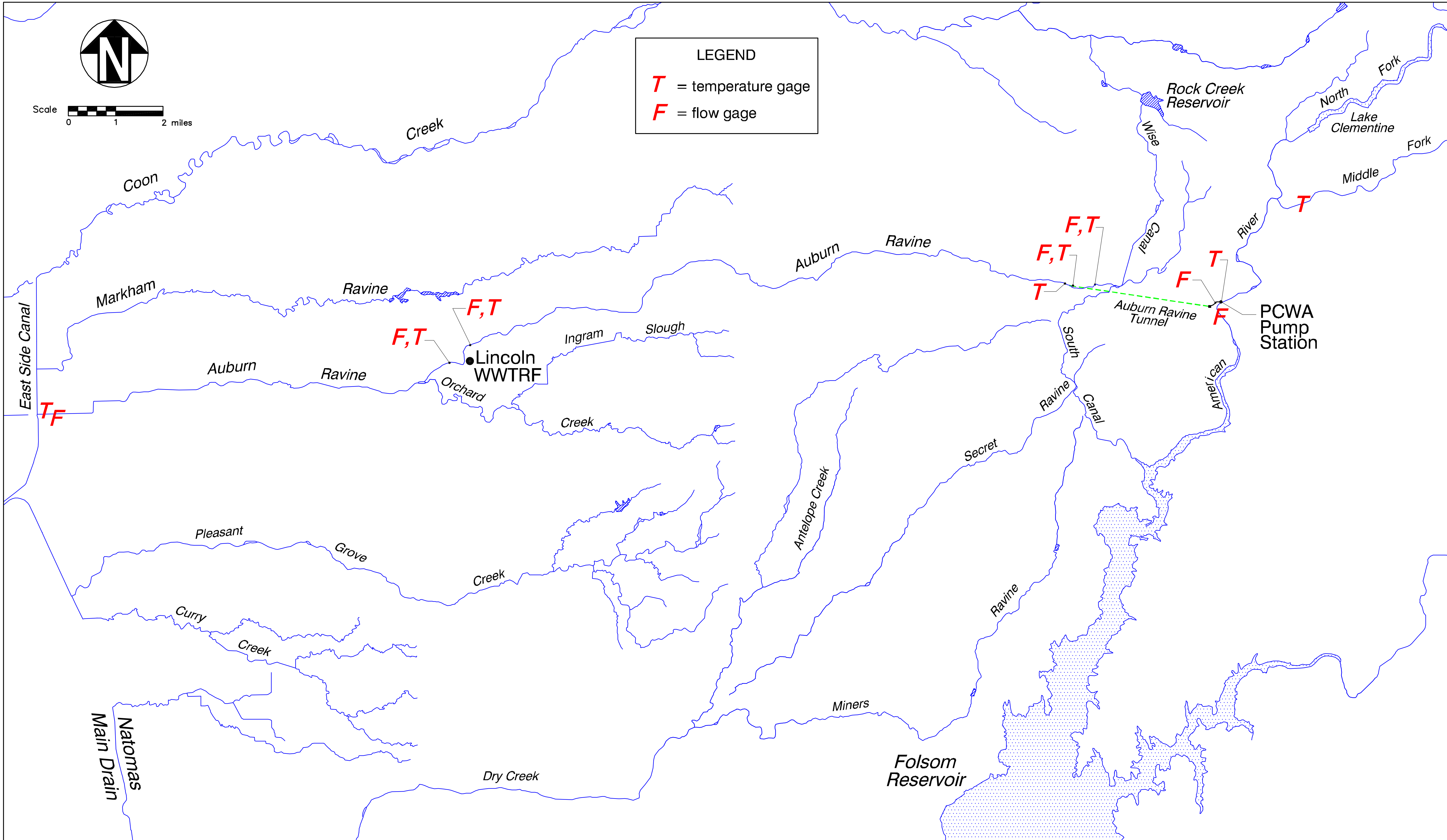


Figure 3.5-4 Suggested Locations for Monitoring Flow and Water Temperature, Auburn Ravine

3.6 TERRESTRIAL RESOURCES

3.6.1 AFFECTED ENVIRONMENT

3.6.1.1 Regional Setting

The regional setting includes the terrestrial resources—riparian and wetland vegetation and associated species that utilize it for habitat—of the American and Sacramento rivers and reservoirs, as well as Oroville Reservoir and the Feather River, that may be influenced by the Proposed Project or alternatives and other reasonably foreseeable future actions. The area is defined in Section 3.2.1 and shown on Figure 2-1. Detailed descriptions of the terrestrial resources associated with these facilities are included in the Cumulative Report (Appendix D of the Draft EIS/EIR). The Cumulative Report also provides a description and evaluation of potential habitat and species impacts that may occur within the water service study area. Section 3.19, ESA Compliance, identifies ESA Section 7 requirements and provides an evaluation of impacts upon federally listed special-status species. The discussion identifies conclusions and determinations for each species and critical habitat.

3.6.1.2 Project Area Setting

The project area represents the direct effect study area for terrestrial resources and encompasses the Middle Fork American River from below Ralston Afterbay to the confluence with the North Fork American River and downstream to Oregon Bar (Figure 2-2).

<u>Middle and North Fork American River</u>

American River Canyon Ecosystem

The foothill canyons of the North and Middle Forks of the American River are within the American River Canyon Ecosystem. The complex topography and geology of the canyon ecosystem create a landscape of high habitat diversity. The Middle and North forks have a relatively high proportion (70 to 75 percent) of their unimpounded mainstems in a north-south orientation, which results in high habitat diversity and ecological value. The northern slopes, and to a lesser degree, northeast facing slopes tend to be cooler and moister because they are not subject to the intense solar radiation characteristic of southern and southwest facing slopes. The dissimilar mesoclimates created by slope aspect have a marked effect on plant distribution, which in turn has habitat implications for wildlife. The net result is higher habitat heterogeneity, smaller patch size, and more habitat edges in canyons with a north-south orientation. The implications of these factors for wildlife are a greater range of habitats available to support a more diverse assemblage of species, and a greater likelihood of all habitat requirements being met on a more local scale (USFWS 1996).

Terrestrial Habitats of the Middle and North Fork American River

Habitats of the Middle and North Forks of the American River include montane riverine, valley-foothill riparian, montane riparian, montane hardwood, montane hardwood-conifer, mixed conifer, blue oak-foothill pine, blue oak woodland, chaparral, and grassland (Mayer and Laudenslayer 1988). The predominant habitats of the Middle and North forks are characterized by montane hardwood and montane hardwood-conifer types.

Riparian Habitat

In general, the dominant riparian species found along both the North and Middle forks of the American River are broad-leaved deciduous trees and shrubs. Species include big leaf maple *(Acer macrophyllum)*, white alder *(Alnus rhombifolia)*, Fremont cottonwood *(Populus fremontii)*, black cottonwood *(Populus trichocarpa)*, button-willow *(Cephalanthus occidentalis)*, sandbar willow *(Salix sessilifolia)*, indian hemp *(Apocynum cannabinum)*, wild grape *(Vitis californica)*, creek dogwood (*Cornus sericea ssp.*), valley oak *(Quercus lobata)*, blackberry *(Rubus ursinus)*, common monkey flower (*Mimulus gluttatus*), scarlet monkey flower (*Mimulus cardinalis*), and indian-rhubarb (*Darmera peltata*). The riparian community also includes the smaller tributaries where California aralia *(Aralia californica)*, columbine *(Aquilegia spp.)*, California bay-laurel *(Umbellulana californica)*, poison oak *(Toxicodendron diversilobum),* and ferns can be found (PARC 1998).

Upland Habitat

The upper canyon walls of both the North and Middle forks of the American River host different upland vegetation species, whose distributions are controlled by the climatic constraints of both the north and south-facing slopes. Typically, ponderosa forests and broadleaf evergreen forests occur on north facing slopes, while foothill woodland and chaparral communities are found on south-facing slopes (PARC 1998).

Ponderosa forests dominate upland habitats on north-facing slopes along both forks between 2,000 to 5,000 feet elevation. Ponderosa pine is the dominant tree of upland vegetation associations, and is accompanied by incense-cedar *(Calocedrus decurrens)*, white fir *(Abies concolor)*, douglas fir *(Pseudotsuga menziesil)*, California black oak *(Quercus kelloggii)*, and sugar pine *(Pinus lambertiana)*. A common understory plant is the pungent mountain misery *(Chamaebatia foliosa)* (PARC 1998).

The foothill woodland vegetation communities along both the North and Middle forks of the American River are composed of oak savannah and grassland habitats. Species include California buckeye *(Aesculus californica)*, interior live oak *(Quercus wislizenii)*, and evergreen shrubs such as manzanita species *(Arctostaphylos spp.)*, deer brush *(Ceanothus integerrimus)*, toyon *(Heteromeles arbutifolia)*, and poison oak. Chaparral communities also occur on serpentine slopes of both the North and Middle fork canyons, although it is much more common along the Middle Fork (PARC 1998).

Project Area

The project area has been heavily disturbed by Auburn Dam construction activities and the annual seasonal pump station installation and removal. Past disturbance is evident in talus slopes, rocky outcrops, extensive areas of boulders and rubble, the Auburn Dam foundation keyway, and the Auburn Dam batch plant/storage area. Annual disturbances of the project area involve rehabilitation of access roadways for installation of the seasonal pump station. Some disturbance of vegetation and wildlife habitat also may occur from use of the site by bicyclists, hikers, and equestrians.

The unstable slopes, existing rock outcrops, and much of the keyway generally are unvegetated or have ruderal vegetation. Excavated bedrock (cofferdam debris) is scattered within the dewatered channel and extends thousands of feet past the bypass tunnel outlet. The dewatered channel appears to be periodically scoured by high winter flows. Pockets of mature oak woodland vegetation have persisted in the project area where the slopes were not graded for access roads or subject to landslides. Mature oak woodland vegetation also occurs upstream and downstream of the project area. The disturbed areas consist of vegetation at various stages of succession, from areas of grasses, shrubs, and small trees to areas of some canopy cover. Limited riparian and wetland vegetation communities also are present in the project area. However, the majority of the project area where construction would occur is either covered by boulders or loose gravel of various sizes, or by grasses and shrubs that have become established in areas that were previously disturbed.

Terrestrial Habitats in the Project Area

Vegetation in the project area has been classified into urban, disturbed, foothill oak woodland, riparian, and wetland habitats as described below. The vegetation in the project area was mapped using a 1997 aerial photograph (scale one inch to 200 feet) and field verification. **Figures 3.6-1** and **3.6-2** show vegetation types in the project area.

Urban Habitat

Urban habitat in the project area includes paved and unpaved roadways, public utilities (e.g., PG&E power station and pipelines), and residential development. Urban areas can provide habitat for plant and animal species that are adapted to human disturbances, such as crows, mourning doves, and squirrels, particularly in ruderal or landscaped areas.

Disturbed Habitat

Grasses and scattered trees and shrubs have become established in the project area in areas with adequate soil. Similar to grasslands, the grasses and wildflowers occurring in the project area germinate with late-fall rains and the plants generally die-off during the summer and early-fall months. Common species in the project area can include soft chess (*Bromus hordaceus*), ryegrass (*Lolium* sp.), and wild barley (*Hordeum murinum* ssp. *leporinum*). Intermixed with these grasses, non-native forbs such as storksbill (*Erodium botrys*) and wild radish (*Raphanus sativus*), and

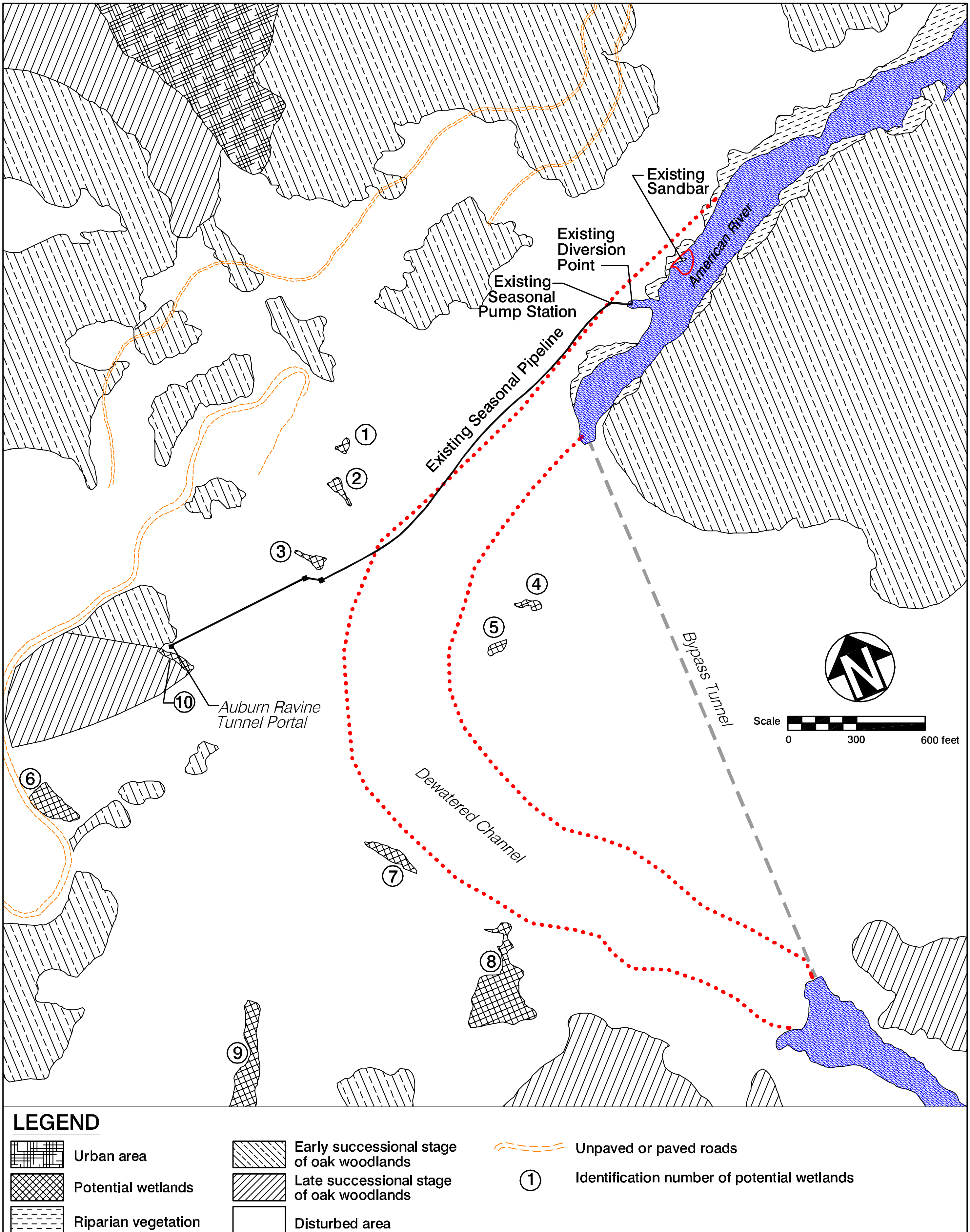


Figure 3.6-1 Habitat Types in the Project Area

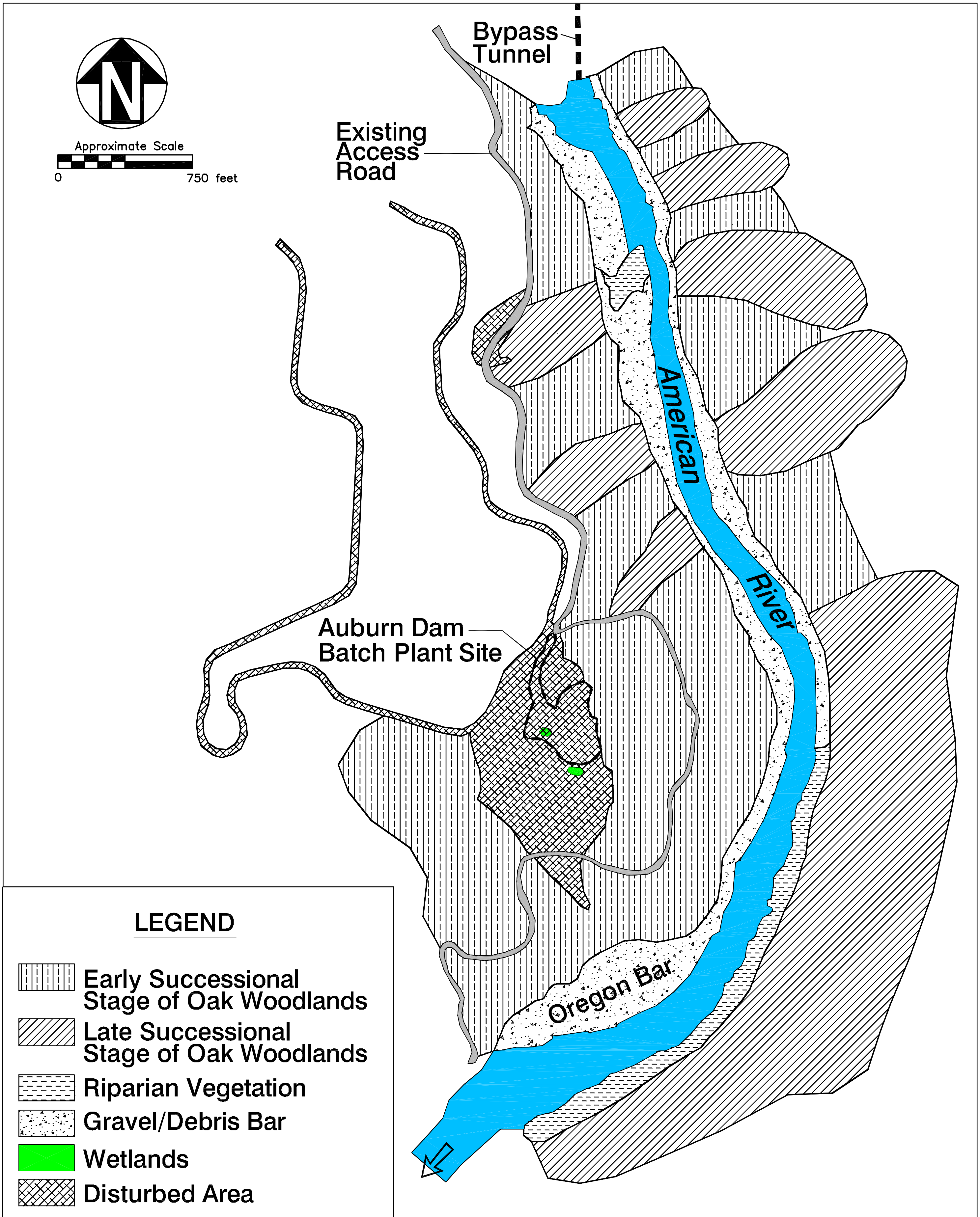


Figure 3.6-2 Habitat Types in the Oregon Bar Area

native forbs such as California poppy (*Eschscholzia californica*) and lupines (*Lupinus* sp.) may occur. Tree of heaven (*Ailanthus altissima*), oaks (*Quercus* sp.), gray pine (*Pinus sabiniana*), California buckeye, coyote brush (*Baccharis pilularis*), and other trees and shrubs were observed scattered in the disturbed areas.

Disturbed habitat can support several wildlife species. Birds, such as wild turkey (*Meleagris gallopavo*), Anna's hummingbirds (*Calypte anna*), killdeer (*Charadrius vociferus*), Canadian geese (*Branta canadensis*), red-tailed hawks (*Buteo jamaicensis*), common garter snake (*Thamnophis sirtalis*), sparrows, and wrens were observed in the areas during site visits.

Figures 3.6-1 and 3.6-2 illustrate the areas that were classified as disturbed. The designation was used for areas with grasses and scattered shrubs and trees providing less than 10 percent canopy cover, areas of bare bedrock, and talus slopes. Disturbed areas include those that have not been disturbed in several years, but where the disturbance has created conditions limiting tree and shrub environment (i.e., areas of cofferdam remnant, bypass tunnel, and batch plant).

Foothill Oak Woodland

Oak woodland occurs in the foothill areas surrounding the North Fork American River. Relatively dense-canopied oak woodlands cover the slopes of the canyon upstream and downstream of the project area. These woodlands occur on poor, shallow, and excessively drained soils and generally provide important nesting and foraging habitat for a variety of bird species, as well as numerous mammal and reptile species (Sawyer and Keeler-Wolf 1995). Characteristic fauna of woodland ecosystems include, but are not limited to, coyote (*Canis latrans*), California ground squirrel (*Spermophilus beecheyi*), raccoon (*Procyon lotor*), California spotted skunk (*Spilegale putoris*), western toad (*Bufo boreas*), and western skink (*Eumeces skiltonianus*), and various species of bat.

The woodlands in the project area are characterized by several oak species, such as the blue oak (*Quercus douglasii*), valley oak, interior live oak, Douglas fir, California buckeye, gray pine, and other tree and shrub species.

The woodlands in the project area occur in various stages of development. The woodlands that can be described as in an early successional stage are composed of grasses and forbs with shrubs and scattered trees. The oak woodlands in the project area are predominantly in an early successional stage. The early successional stage is characterized by saplings and younger tree and shrub individuals that are scattered or grow in clusters among grasses and forbs. The shrub and tree species are characteristic of oak woodlands but with a higher proportion of shrub species. Tree canopy cover ranges from 10 percent to 50 percent.

The late successional stage occurs in small pockets in the area and is characterized by increased canopy cover (i.e., over 50 percent) and older, larger trees. The woodlands increase in canopy cover and height towards the upstream and downstream ends of the project site where the oak woodland appears to be more mature.

Riparian and Wetlands Habitat

Vegetation associated with riparian and potential wetland habitats are similar for the project area. In general, riparian or wetland habitat in the project area occurs in limited, narrow strips along the American River and along drainages on the sides of the canyon. The drainages are seasonal, with flowing water only in winter and spring. One apparently perennial drainage flows through the Auburn Dam site on the west side of the canyon.

Extensive riparian habitat is not common along the American River due to the relatively steep canyon walls leading up from the river course, the high degree of scouring experienced during high river flows, and the lack of sediment load in the river. In the project area, riparian vegetation occurs along the American River from the bypass tunnel entrance upstream to the Tamaroo Bar Rapids (partially shown on Figure 3.6-1). Deposited sediments have formed bars that support limited stands of willows (*Salix* sp.), Fremont cottonwoods, and other associated species. These bars cover small areas and are generally temporary as high flows tend to scour away the vegetation and some sediments periodically.

Along the walls of the American River canyon, numerous seeps flow down the rock faces to the canyon floor forming shallow pools in depressions and level areas. A preliminary wetland delineation survey was conducted in August 1998 to determine if these areas qualify as wetlands within the jurisdiction of the Corps under Section 404 of the Clean Water Act. The areas surveyed in the wetland delineation included only those areas anticipated to be affected by construction of the pump station and access roads, spoil disposal area on the east side of the canyon, and the backwater area, and did not include an evaluation of sites associated with the parking lot and other improvements near Oregon Bar. Figure 3.6-1 indicates the locations in the project area that could be considered wetlands.

Ten potential areas were identified within the Auburn Dam construction site of the study area. These wetlands include seeps (four areas) with typical wetland vegetation, including willows, cattail, and lemon balm; streams (one area) with dense, mature stands of cottonwoods; ponded water (four areas) supporting cattail and with tadpoles; and a perennial spring.

Figure 3.6-2 shows the general habitat types present in the vicinity of Oregon Bar. Potential wetland habitat at Oregon Bar was observed during a site visit on November 28, 2000. These potential wetlands consist of approximately five small ponds and sinks in an area originally disturbed by construction activities associated with the Auburn Dam and associated facilities. Although the origin of these wetted depressions is uncertain, evidence of culverts and stocks of aggregate rock indicate that many were created during or following Auburn Dam construction activities.

As evidenced by the observation of cattails, rushes, cottonwoods, and willows, water is likely available at or immediately below the surface during the majority of the calendar year. In the larger wetted area located between the proposed parking lot area (Figure 2-7) and the existing unimproved road leading to Oregon Bar, and at a second wetted area with a ramp structure leading into it, open water was evident in the center indicating a depth greater than that which would allow the growth of emergent vegetation.

Listed Species and Species Proposed for Listing

Wildlife

Table 3.6-1 lists the terrestrial species, listed or proposed for listing under the federal ESA or CESA, that could be affected by the Proposed Project or alternatives. Descriptions of the habitat and local distribution of these species follow the table.

Table 3.6-1
Federal and State Listed and Proposed Species That May Occur in the Project Area

Common Name	Species Name	Status Federal [a]/State [b]
Birds		
Bald Eagle	*Haliaeetus leucocephalus*	T/E
Little Willow Flycatcher	*Empidonax traillii brewsteri*	--/E

[a] Federal status: E = Endangered; T = Threatened
[b] State status: E = Endangered
-- = Not listed

Bald Eagle *(Federal Threatened/State Endangered)*. Bald eagles typically are found near open water (e.g., reservoirs, lakes, and rivers). Large, dead trees near open water are used for perching and are an important habitat component (USFWS 1986). Bald eagles have been observed at and around Folsom Reservoir during the winter season, although generally in low numbers (Manolis 1998). Nesting and roosting habitat for the bald eagle was not observed in the project area, nor are bald eagles known to nest in the project area. Bald eagles may occur in the project area during the winter (B. Williams, pers. comm. 1998). In addition to the ESA and CESA, bald eagles are protected under the Bald and Golden Eagle Protection Act.

Little Willow Flycatcher *(State Endangered)***.** The little willow flycatcher requires dense willow thickets for nesting and roosting. Ideal habitats occur on the edge of wet meadows, ponds, or backwater areas. The willow thickets in the project area are located along the rapidly flowing North Fork American River, rather than next to the flycatcher's preferred habitats. The project area may provide foraging habitat to migrating flycatchers during May through September, but are unlikely to provide breeding or wintering habitat (B. Williams, pers. comm. 1998).

California Red-Legged Frog *(Federal Threatened)* ***and Valley Elderberry Longhorn Beetle*** *(Federal Threatened)*. The project area also was examined for the presence of the federally listed threatened California red-legged frog (*Rana aurora drayonii*) and the federally listed threatened valley elderberry longhorn beetle (VELB) (*Democerus californicus demorphus*). Surveys and research indicated that the California red-legged frog is not likely to occur at the site (Carrier 1998; Carrier 2002). Wetlands suitable for the California red-legged frog are not present in the area. Also, suitable sites for the California red-legged frog in the adjacent areas are inhabited by bullfrogs (*Rana catesbiana*), thereby precluding occupancy by the red-legged frog in the project area. Recent surveys included a habitat site assessment (March 2002) and site survey according to the USFWS Red-Legged Frog Survey Protocol (USFWS 1997) completed in June 2002. The survey results confirmed the 1998 site survey results (Carrier 2002); no red-legged frogs were observed at the project site. The survey concluded: (1) the project area is not within the historical occupied habitat of California red-legged frogs, (2) habitat that may be potentially suitable to the species is temporary and artificial, (3) given the current occupation of the ponds by bullfrogs, it is unlikely that California red-legged frogs could colonize the area, (4) returning the river to its natural channel will result in the eventual elimination of the ponds, and (5) project implementation would not result in take of the California red-legged frog nor affect species recovery (Carrier 2002).

Elderberry shrubs, the sole habitat of VELB, have been reported upstream of the project area on the north side of Tamaroo Bar (MW and JSA 1995). No exit holes, which would indicate the presence of VELB, were found on the trunks of the elderberry cluster. No elderberry shrubs were observed in or around the areas proposed for construction during the project site surveys. Based on the research and survey results, these species were removed from further consideration in the impact analysis.

Plants

Several listed, candidate species of plants initially identified by USFWS as potentially occurring within the project study area were removed from further consideration in the impact analysis because they are not known to occur within Placer County, as determined through searches of the California Natural Diversity Data Base (CNDDB) and reference to Skinner and Pavlik (1994) and Hickman (1993). These species include the endangered Pine Hill ceanothus (*Ceanothus roderickii*), Stebbins' morning glory (*Calystegia stebbinsii*), El Dorado bedstraw (*Galium californicum ssp. spierrae*), and the threatened Layne's butterweed (*Senecio layneae*).

Species of Concern

Wildlife

Table 3.6-2 lists those species which are classified as "species of concern" by USFWS or as "California species of concern" by CDFG, and which may occur in the project area. Descriptions of the habitats of these species follow the table.

Table 3.6-2
Federal and State Species of Concern That May Occur in the Project Area

Common Name	Species Name	Status Federal [a]/State [b]
Amphibians		
Foothill Yellow-legged Frog	*Rana boylei*	SC/CSC
Reptiles		
California Horned Lizard	*Phrynosoma coronatum frontale*	SC/CSC
Mammals		
Spotted Bat	*Euderma maculatum*	SC/CSC
Greater Western Mastiff-bat	*Eumops perotis californicus*	SC/--

[a] Federal status: SC = Species of Concern
[b] State status: CSC = California Species of Concern
-- = No listing

Foothill Yellow-legged Frog *(Federal and State Species of Concern, CDFG Protected Species, and U.S. Forest Service/Bureau of Land Management Sensitive Species).* The foothill yellow-legged frog inhabits rocky streams in a variety of habitats including valley-foothill hardwood, hardwood-conifer, and riparian communities. They are rarely found far from permanent water, even during rainy weather. Sightings have been reported in portions of the canyon upstream of the project site (J. Hiscox, pers. comm. 2000).

California Horned Lizard *(Federal and State Species of Concern).* The California horned lizard may be found in open areas, usually between shrubs, and especially in sandy areas, washes, floodplains, and wind-blown deposits. Horned lizards have been observed to prefer ants as the main component of their diet. Horned lizards avoid predators and extreme heat by burrowing into loose soil. Periods of inactivity and winter hibernation are spent burrowed into the soil under surface objects such as logs or rocks, in mammal burrows, or in crevices (Zeiner et al. 1988).

Spotted Bat *(Federal and State Species of Concern).* The spotted bat is an obligate rooster in rock crevasses and caves. It emerges at dusk and feeds, primarily on moths, in flight over water and along washes. Although rare, it can occupy habitats ranging from grasslands and arid desert to coniferous forests (Zeiner et al. 1990).

Greater Western Mastiff-Bat *(Federal Species of Concern)***.** The greater western mastiff-bat is an audible bat (emits sound audible to the human ear) and feeds on insects in flight. The nocturnal foraging range for this species can exceed 15 miles and extend over a six- to seven-hour period. Mastiff bats emerge from roosts later in the evening than many bat species, often departing to forage after dark (Zeiner et al. 1990).

Several other wildlife species which were originally determined by USFWS or CDFG to have the potential to occur in the vicinity of the project area have been removed from further consideration in the impact analysis because of the lack of suitable habitat, or because the project area actually is outside of the reported distribution of the species. These species include long-legged myotis (*Myotis volans*), small-footed myotis bat (*Myotis ciliolabrum*), Yuma myotis bat (*Myotis yumanensis*), tricolored blackbird (*Agelaius tricolor*), western burrowing owl (*Athene cunicularia hypugea*), white-faced ibis (*Plegadis chihi*), northwestern pond turtle (*Clemmys marmota marmota*), Sage Creek goracean caddisfly (*Georacea oregona*), and tight coin snail (*Ammonitella yatessi*).

Plants

The project area was examined for several plant species that are classified as species of concern and that were identified by USFWS as having the potential to occur in the project area. El Dorado County mule ears (*Wyethia reticulata*) and Bisbee peak rush-rose (*Heliantheumum suffratescens*) were removed from further consideration in the impact analysis because they were determined to be unlikely to occur in the project area because the site is outside of the known distribution of these species.

3.6.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.6.2.1 Methodology

Facilities-Related Analysis Approach

Facilities-related terrestrial effects refers to the temporary disturbance or permanent loss of vegetation and associated wildlife habitats due to the construction, operation, or maintenance of the Proposed Project or alternatives. The evaluation of potential terrestrial resource impacts was made by identifying: (1) the composition and location of plant communities and wildlife habitats within the project study area through review of aerial maps and on-site surveys; (2) the location (preliminary design) of proposed project alternative features; (3) the type and duration of construction activities; and (4) the areas influenced by operation and maintenance activities. Specific surveys conducted for the project included those for potential wetlands, bat species, red-legged frogs, and VELB. Additional site visits were made to characterize the existing habitat types in the project area.

Special-Status Species

The impact assessment focuses on habitats and special-status species. Special-status species include those that are listed as threatened or endangered by the CDFG or the USFWS, species proposed for state or federal listing, species designated as "species of concern" by USFWS or "special concern species" by CDFG, and species tracked by the CNDDB or California Native Plant Society (CNPS).

The impact assessment involved determining the extent of effects to special-status species and their habitats. To determine which special-status species should be considered in the analysis, lists of species with the potential to occur in the study area were obtained from the USFWS and CNDDB. In addition, research was conducted on each species distribution, life history and habitat to assess which of the species are likely to occur in the study area. Methods used to identify potential environmental effects to the species and their habitat included site surveys, review of information from the USFWS and the CDFG, review of relevant literature, examination of aerial photographs, and initial consultations with CDFG. Informal consultations with the USFWS for the listed species potentially affected by the project and for other wildlife species under the FWCA were initiated on July 10, 1998 by PCWA and Reclamation. Information presented in this section also is intended to support FWCA requirements.

Diversion-Related Analysis Approach

The evaluation of diversion-related terrestrial resource impacts focuses on the potential increase in diversions to result in substantial reductions of river flows or reservoir elevations that could affect the riparian, wetland, and other associated vegetation such that loss of habitat and/or species dependent upon the habitat may occur. The evaluation compares PROSIM hydrologic model results for existing and future conditions with and without a year-round pump station for Folsom Reservoir, the lower American River, and Sacramento River, including the Delta.

Lower American River Riparian Vegetation and Associated Special-Status Species

Cottonwoods (*Populus fremontii*), a dominant tree of riparian forests in the Central Valley, are considered an indicator species for the overall health of riparian forest vegetation. The germination, establishment, growth, and long-term survival of Fremont's cottonwood along the lower American River is dependent upon the dynamic flow regimes and fluvial geomorphic processes of the river. In particular, the capacity of the river to erode, transport, and deposit alluvial materials is central to the structure and maintenance of cottonwood ecosystems. Because cottonwood seed release and establishment has adapted over time to the flow regime and fluvial processes of the lower American River, maintenance of this regime is vital to sustain a viable cottonwood riparian system. Although the ecology of this species does not fully represent the range of conditions under which vegetation occurs in the riparian forest, it provides a model with which to evaluate the effects of flow changes on watercourses such as the lower American River. Data on cottonwood growth under various flow conditions has been adopted into recent regulatory documents such as the final FWCA prepared for the American River Water Resources Investigation (USFWS 1996). Further, investigators such as Sands et al. (1985) and Stromberg (1995) have provided data on the effects of flow changes on cottonwoods that can be used as objective measures of the adequacy of flow to maintain that species and, potentially, large portions of the riparian ecosystem along the lower American River.

While few studies have been conducted on the long-term flow regimes necessary for continued cottonwood regeneration and growth maintenance along the lower American River, several relatively short-term studies have provided insights into the relationship between river flows and cottonwood growth. In one study, the annual radial growth rate of young cottonwoods along a particular segment of the lower American River was found to be significantly related to the groundwater depth and to river flows during the March through October growing season (Stromberg 1995). The study found that cottonwoods had little or no radial growth when average river flows during the growing season dropped below 1,765 cfs. Monthly mean flows of 1,765 cfs are recommended by Stromberg (1995) as necessary for maintenance of radial growth. In order to assure some growth of cottonwoods, the USFWS recommends that an average minimum streamflow of 2,000 cfs occur during the March through October growing season.

A USFWS study concluded that an average flow of 3,000 cfs is required to provide "reasonable" growth and maintenance conditions for riparian vegetation (USFWS 1996). This recommendation is based on work by Caicco (1996 *in* CCOMWP 1999), which identified minimum flows of 3,000 cfs as sufficient for reasonable growth of cottonwoods. The USFWS (1997) correlated monthly mean flows of 3,000 cfs from April though June to peak inundation flows of 5,000 to 13,000 cfs, levels deemed critical to establishment of seedlings on riverine terraces.

Based on the above considerations, the criteria used to determine potentially significant impacts to cottonwoods and associated special-status species and habitats along the lower American River focused on monthly occurrences of flow reductions below Nimbus Dam and H Street Bridge that would be below the indices for maintenance of radial growth (1,765 cfs), some growth (2,000 cfs), and reasonable growth and maintenance of existing cottonwoods (3,000 cfs), during the growing season months of March through October over the 70-year period of record, compared to existing and No Action/No Project Alternative conditions. In addition, these occurrences were further examined to determine the frequency they would occur in two or more consecutive months, and if these consecutive months would fall during the critical growing season months of April to July (CCOMWP 1999).

An additional analysis was performed to assess the exacerbation of an already degraded situation below Nimbus Dam and H Street Bridge for cottonwood radial growth maintenance during the growing season. For flows already below the 1,765 cfs index, flow reductions of five percent or more relative to the existing condition were assessed. The use of flow reductions of less than five percent was established because, as previously discussed, the models used, although mathematically precise, should be viewed as having "*reasonable detection limits.*" Two simulations having river flows at a given location within five percent of each other are considered to be essentially equivalent. Hence, only occasions when modeled flows differed by more than five percent were assessed for their biological significance. It is important to note, however, that this assessment was for disclosure purposes only because flows that are already below the 1,765 cfs flow index under the existing condition would imply that no maintenance of cottonwoods could occur and even if flows are further reduced, reduction would not further deter the maintenance of cottonwoods.

Finally, to assess potentially significant impacts to cottonwood germination, the monthly occurrences of flow reductions below Nimbus Dam and H Street Bridge below the lower index necessary to inundate terraces that are essential for cottonwood germination (i.e., 5,000 cfs) during the reported period for cottonwood seed release (i.e., April to July) was evaluated.

Lower American River Backwater Pond Recharge and Associated Special-Status Species

Backwater pond areas along the American River Parkway are generally the result of naturally formed gravel deposits and man-induced dredging, although some are likely to be remnant oxbow lakes, such as Bushy Lake. These backwater ponds and lagoons are known to occur throughout the lower American River system, but occur predominantly at Sacramento Bar, Arden Bar, Rossmoor Bar, and between Watt and Howe Avenues (Sands et al. 1985).

Backwater ponds can provide a relatively stable still-water habitat with open water areas and near-shore vegetation cover, and add greatly to the diversity of habitat in the riparian zone. Because of their hydrologic connection to the river, river flow and stage are important to maintaining habitat in backwater areas. Studies have been conducted to determine how these backwater ponds are influenced by flows in the lower American River (Sands et al. 1985). These ponds are located at varied distances from the river channel, have varied depths, and are at different elevations along the river. These studies have indicated that flows between 2,700 cfs and 4,000 cfs adequately recharge ponds closest to the river and off-river ponds, respectively (Sands et al. 1985).

Review of various flow regimes indicated that flows of 1,300 cfs were inadequate to recharge backwater ponds (Sands et al. 1985). Under these conditions, water was maintained only in shallow pools which would become choked with vegetation, therefore reducing habitat diversity and overall value through effective removal of open-water habitat. The same study indicated that at flows of 500 cfs, backwater ponds dried up. Because indices of 1,300 and 500 cfs were not adequate to maintain even minimal backwater pond habitat functions, they were not evaluated as reasonable impact assessment criteria.

Based on these considerations, the criteria used to determine potentially significant impacts to backwater recharge and associated special-status species and habitats (including elderberry shrubs and VELB) along the lower American River focused on monthly occurrences of flow below Nimbus Dam and H Street Bridge that would be below the index for continued recharge of ponds closest to the river (i.e., 2,700 cfs) during all months of the year, over the 70-year period of record, relative to the basis of comparison. Monthly occurrences of flow below Nimbus Dam and H Street Bridge that would be below the index for continued recharge of off-river ponds (i.e., 4,000 cfs) also were assessed. In addition, these occurrences were further examined to determine the frequency with which they would occur in two or more consecutive months.

Folsom, Shasta, and Trinity Reservoir Vegetation and Associated Wildlife

Increased diversions from the American River could result in alterations to storage and surface elevations at major CVP reservoirs within the regional study area, including Shasta, Trinity, and Folsom reservoirs. Fluctuations at these reservoirs, in response to day-to-day operations and changes in runoff patterns, can affect vegetation that has been established at or near the water surface and within the drawdown zone. Vegetation, such as willows, that periodically establishes within the drawdown zone or near the waters' edge, is commonly inundated and lost during prolonged periods of high storage. Alternatively, plants that establish during periods of high storage may be lost during periods of reduced reservoir storage or drought.

The criteria used to determine potentially significant impacts to reservoir vegetation focused on change in elevation that would occur during the March through September period (CCOMWP 1999) over the 70-year period of record, relative to the basis of comparison. In addition, the drawdown zone vegetation of these reservoirs was evaluated to determine if it forms a contiguous riparian community, and the degree of its habitat value (CCOMWP 1999). An evaluation of whether or not an impact on terrestrial resources would be substantial must consider both the resource itself and how that resource fits in a regional or local context. Substantial impacts would be those that would diminish, or result in the loss of, an important biological resource, or those that would obviously conflict with local, state, or federal resource conservation plans, goals, or regulations (CCOMWP 1999).

Sacramento River Terrestrial Vegetation and Associated Wildlife

To assess potential significant impacts to riparian vegetation and associated wildlife species in the Sacramento River, substantial long-term average monthly flow reductions below Keswick Dam and at Freeport during the March through October growing season were evaluated. The magnitude of the flow after the reductions also was evaluated. As previously discussed, an evaluation of whether or not an impact on terrestrial resources would be substantial must consider both the resource itself and how that resource fits in a regional or local context. Substantial impacts would be those that would diminish, or result in the loss of, an important biological resource, or those that would obviously conflict with local, state, or federal resource conservation plans, goals, or regulations (CCOMWP 1999).

Sacramento-San Joaquin River Delta Vegetation and Associated Special-Status Species

To assess impacts to the Delta vegetation and associated special-status species, substantial long-term average monthly reductions at Freeport during the March through October growing season were evaluated. The magnitude of the flow after the reductions also was evaluated. In addition, fluctuations in water salinity were assessed by evaluating shifts in X2 position. If Delta habitats were found to be adversely affected by flow reductions and shifts in X2 position, then a finding of potentially significant impact to special-status species dependent on these habitats also was determined.

3.6.2.2 Applicable Laws, Ordinances, Regulations and Standards

The laws, ordinances, regulations, and standards discussed in this section were used to develop resource impact indicators and significance criteria used to evaluate impacts to terrestrial resources. Terrestrial resources in the study area could be protected under one or more of the following:

- Endangered Species Act of 1973, as amended
- California Endangered Species Act
- CEQA Guidelines Section 15380
- Section 404 of the Clean Water Act
- Section 2 of the Fish and Wildlife Coordination Act

Endangered Species Act

The general purpose of the federal ESA is to conserve ecosystems and species that depend on those ecosystems (Section 2). Federally protected special-status terrestrial species in the project area are the responsibility of the USFWS. All actions involving, or potentially involving, listed or proposed terrestrial species are regulated under Section 7(a)(2) of the ESA, which prohibits any federal agency from carrying out any action that is likely to jeopardize the continued existence and recovery of any listed species.

California Endangered Species Act

State endangered and threatened species are regulated under the CESA by the CDFG. Sections 2053, 2055, and 2090 of the CESA require review of proposed projects to ensure that those projects do not jeopardize the continued existence of endangered or threatened species or their habitat (Section 2053); that conservation of these species occur (Section 2055); and that consultation, when appropriate, occur with CDFG to provide mechanisms for accomplishing the above (Section 2090). CDFG also designates "species of special concern" for those species that are considered indicators of regional habitat changes or are considered to be potential future protected species.

California Environmental Quality Act

CEQA Guidelines (Section 15380) provide for including species not listed under the ESA and CESA to be treated as "rare or endangered" under the following circumstances:

- If the species' survival and reproduction in the wild are in immediate jeopardy;
- If the species is existing in such small numbers throughout all or a significant portion of its range that it could become endangered if its environment worsens;
- If the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and could be considered under the federal definition of "threatened;"
- If the project would cause a change in species composition, abundance, or diversity beyond normal variability; or
- If the project would result in the measurable degradation of sensitive habitats through filling, inundation, or other land use alteration.

Clean Water Act Section 404

Wetland impacts fall within the jurisdiction of the Corps under Section 404 of the Clean Water Act. Impacts to greater than three acres of jurisdictional wetlands, or "waters of the United States," would require an individual permit from the Corps while impacts of less than three acres are typically eligible for a Nationwide Permit. Impacts to less than one-third of an acre do not require Corps notification prior to construction of a project. This does not, however, preclude notification of appropriate agencies should listed species be involved.

Fish and Wildlife Coordination Act

Section 2 of the FWCA states that wildlife conservation shall receive equal consideration with other project purposes and will be coordinated with other features of water resources development projects.

3.6.2.3 Impact Indicators and Significance Criteria

The impact assessment provides a comparison of the potential effects upon terrestrial habitat and resources that may result from the Proposed Project or alternatives. **Tables 3.6-3, 3.6-4**, and **3.6-5** provide a summary of impact indicators and significance criteria. The significance criteria described in the tables have been developed for use in assessing potential impacts of the facilities construction, operations, and maintenance. Table 3.6-5 specifically provides CEQA guidelines that provide general guidance on the identification of circumstances that may result in a significant effect on the environment related to terrestrial resources, including special-status species.

Table 3.6-3 Terrestrial Resources Facilities-Related Impact Indicators and Significance Criteria	
Impact Indicators	**Significance Criteria**
❑ Composition and location of plant community or wildlife within the project area, the location of project features, and the type and duration of construction activities. ❑ Acres of wetlands.	❑ Decrease in habitat quantity and quality, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect long-term populations of listed and special-status species. ❑ Decrease in wetland quantity or quality, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect wetland habitat and special-status species.

Table 3.6-4 Terrestrial Resources Diversion-Related Impact Indicators and Significance Criteria	
Impact Indicators	**Significance Criteria**
Upper American River	
❑ Monthly mean flows (cfs) in the upper American River.	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect the growth, maintenance, and reproductive capability of upper American River riparian vegetation.
Folsom Reservoir	
❑ End-of-month water surface elevation (feet/msl) during March through September.	❑ Decrease and degradation of continuous stands of native vegetation of relatively high to moderate wildlife value over seasonal, annual and long-term time periods, relative to the basis of comparison.
Lower American River	
Fremont Cottonwoods[a] and Terrace Inundation	
❑ Monthly mean flows (cfs) below Nimbus Dam and at H Street Bridge occurring each month from March through October.	❑ Decrease in flow below 1,765 cfs, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect the long-term radial growth maintenance of cottonwoods for any month of this period over the 70-year period of record. ❑ Decrease in flow below 2,000 cfs, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect some growth in cottonwoods for any month of this period over the 70-year period of record. ❑ Decrease in flow below 3,000 cfs, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect reasonable growth and maintenance of existing cottonwoods for any month of this period over the 70-year period of record. ❑ Decrease in flow below 5,000 cfs, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect terrace inundation, and therefore, cottonwood germination, for any month of this period over the 70-year period of record.

Table 3.6-4 (Continued) Terrestrial Resources Diversion-Related Impact Indicators and Significance Criteria	
Backwater Recharge	
❑ Monthly mean flows (cfs) below Nimbus Dam and H Street Bridge occurring each month of the year.	❑ Decrease in flow below 2,700 cfs, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect adequate recharge of backwater ponds closest to the lower American River for any month of this period over the 70-year period of record. ❑ Decrease in flow below 4,000 cfs, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect continued recharge of off-river ponds for any month of this period over the 70-year period of record. ❑ Decrease in flow below 2,700 cfs, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect adequate recharge of backwater ponds closest to the lower American River, and therefore affect elderberry shrubs and VELB, which are dependent on this habitat, for any month of this period over the 70-year period of record.
Shasta and Trinity Reservoirs	
❑ End-of-month reservoir water surface elevation (feet/msl) during March through September.	❑ Decrease and degradation of continuous stands of native vegetation of relatively high to moderate wildlife value over seasonal, annual and long-term time periods, relative to the basis of comparison.
Upper Sacramento River	
❑ Monthly mean flows (cfs) from March through October.	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect the growth, maintenance, and reproductive capacity of the riparian vegetation in the upper Sacramento River for any month of this period over the 70-year period of record.
Lower Sacramento River and the Delta	
❑ Monthly mean flows (cfs) from March through October.	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect the growth, maintenance, and reproductive capacity of vegetation in the lower Sacramento River and the Delta for any month of this period over the 70-year period of record.
❑ Position of X2.	❑ Upstream shift in X2 position, relative to the basis of comparison, of sufficient magnitude (i.e., greater than 1 km) and frequency to adversely affect the growth, maintenance and reproductive capacity of vegetation of the Delta for any month of this period over the 70-year period of record.
Oroville Reservoir	
❑ End-of-month reservoir water surface elevation (feet/msl) during March through September.	❑ Decrease in reservoir water surface elevation, and degradation of continuous strands of native vegetation of relatively high to moderate wildlife value over seasonal, annual, and long-term time periods, relative to the basis of comparison.

Table 3.6-4 (Continued) Terrestrial Resources Diversion-Related Impact Indicators and Significance Criteria	
Feather River	
❑ Monthly mean flows (cfs) from March through October below Oroville Dam.	❑ Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect the growth, maintenance, and reproductive capacity of the riparian vegetation of the Feather River for any month of this period over the 70-year period of record.
[a] Freemont cottonwoods are used as in indicator species for assessment of riparian habitats as much of the lower American River habitat is dominated by these species, and the correlation between cottonwoods and flow in the lower American River is well-documented.	

Table 3.6-5
CEQA Thresholds of Significance

Impact Indicators	Significance Criteria
❑ Riparian habitat or other natural communities.	❑ Substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFG or USFWS.
❑ Special-status plant or wildlife species or their habitat.	❑ Substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFG or the USFWS.
❑ Jurisdictional wetlands.	❑ Substantial adverse effect on federally protected wetlands as defined by section 404 of the Clean Water (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means.
❑ The movement or reproductive activities of native resident wildlife species.	❑ Substantial interference with the movement of any native resident wildlife species or with established native resident wildlife corridors, or impede the use of native wildlife nursery sites.
❑ Locally important terrestrial resources.	❑ Conflict with any local policies or ordinances protecting terrestrial resources, such as a tree preservation policy or ordinance.
❑ Inconsistencies between project activities and existing biological conservation plans.	❑ Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state biological conservation plan.

3.6.2.4 Impact Analysis

This section presents the analysis of potential facilities- and diversion-related terrestrial resources impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

Facilities-Related Impacts

No Action/No Project Alternative

Impact 3.6-1: Disturbance of terrestrial resources of the project area due to installation and removal, operation, and maintenance of the seasonal pump station.

Impacts to terrestrial resources under the No Action/No Project Alternative would not differ substantially from the existing condition. Although the pump station and related facilities would be installed earlier and dismantled later in the year, the timing effects on habitats and species would not be significant. The same land and in-river areas (sump pond) would continue to be subject to seasonal pump station construction, operation, and maintenance activities. These areas provide only marginal foraging habitat to wildlife species occurring in the project area. Construction, operation, and maintenance activities under the No Action/No Project Alternative would not result in an overall decrease in habitat quantity or quality, relative to the existing condition, and would represent a less-than-significant impact to terrestrial resources, including special-status species, of the North Fork American River.

Impact 3.6-2: Disturbance of riparian and wetland habitat of the North Fork American River due to installation, removal, operation, and maintenance of the seasonal pump station.

Impacts to riparian and wetland areas under the No Action/No Project Alternative would not differ substantially from the existing condition. Although the seasonal facilities would be installed earlier and dismantled later in the year, the timing effects on habitats and species would not be significant. The same land and in-river areas would continue to be subject to seasonal pump station construction, operation, and maintenance activities. Construction, operation, and maintenance activities under the No Action/No Project Alternative would not result in an overall decrease in riparian or wetland habitat quantity or quality, relative to the existing condition, and would represent a less-than-significant impact to wetland habitats and associated species of the North Fork American River at the project site.

Proposed Project

Impact 3.6-3: Disturbance of terrestrial resources due to construction, operation and maintenance of the year-round pump station.

Noise related to construction (such as that caused by excavation activities) and human presence could disturb endangered and threatened species if they are present in the area (i.e., bald eagle, little willow flycatcher, and American peregrine falcon). Bald eagles could be present during winter, and the little willow flycatcher could be present during spring and fall. Peregrine falcons could be present at the site during any time of the year. However, these species are rare and do not nest in the area, are highly mobile, and could use other similar or higher quality habitats in adjacent areas of the river canyon. Conversion of existing habitats and the temporary and permanent disturbances expected with excavation and fill activities are not anticipated to affect roosting areas for these listed species. Most of the construction activities would occur in a previously dewatered part of the river channel that contains no roosting habitat for the bald eagle or peregrine falcon, and a negligible roosting habitat for the little willow flycatcher. These construction-related impacts also would eliminate a negligible amount of foraging habitat for any of these listed species. Operation activities would likely disturb federally listed species at a level below the existing condition, because the annual installation and dismantling of seasonal facilities would not be necessary.

Special-status species (i.e., California horned lizards, spotted bat, greater mastiff-bat, and yellow-legged foothill frogs) may be temporarily affected by facilities-related construction effects associated with the Proposed Project.

California Horned Lizard

California horned lizards could occur in successional oak woodland and disturbed habitats in the project area. Under the Proposed Project, construction activities in the project area could involve disturbance or alteration of potential horned lizard habitat. The California horned lizard could be affected in two ways: (1) construction of the permanent pump station and other facilities could result in disturbance, harm, or mortality of individuals of this species; or (2) potential habitat for this species could be temporarily disturbed or eliminated. Temporary disturbances could include trampling or compaction of burrow sites or ant colonies, the primary food source of the horned lizard. Environmental protection measures would be implemented prior to and during construction and reduce impacts to California horned lizards to less than significant.

Spotted Bat and Greater Western Mastiff Bat

The spotted bat and greater western mastiff-bat could occupy caves, crevices, and other features of the project study area. Noise from blasting could disturb and cause roosting bats to abandon the area. If other roosting sites are not found soon afterwards, mortality could result. If project features physically altered any roosting sites, the habitat of this species would be reduced, thereby affecting the population of the bats in the project area. Environmental protection measures would be implemented and reduce impacts to these bat species.

Impact 3.6-4: Disturbance of riparian and wetland habitats of the North Fork American River due to construction, operation, and maintenance of project facilities.

Disturbance and loss of riparian and wetland habitat as a result of earthwork, excavation material disposal, and placement of pump station-related facilities has the potential to result in impacts upon foothill yellow-legged frog, western toad, and chorus frog species that have been observed within the project area. The potential area of wetland loss has been estimated at less than one-quarter acre in areas within the east keyway area proposed for excavation material placement and along the west riverbank due to construction activity and possible pump station placement. Disturbance of other wetland or riparian areas also would result from dust accumulation, hydrology alteration, and construction-related equipment use. These activities would result in potentially significant impacts upon the species that utilize these habitats. Reclamation would ensure that a qualified biologist be retained to implement environmental protection measures described below.

Foothill Yellow-legged Frog

Sightings of foothill yellow-legged frogs have been reported upstream of the bypass tunnel inlet. Physical alteration of riparian and upland habitat through construction of the diversion structure, closure of the bypass tunnel and restoration of the river channel could result in short-term temporary loss of habitat and disturbances to individuals of the species. Construction-related noise, however, is not likely to affect this species as reports indicate findings of adult frogs within 10 feet of operation suction dredges (J. Hiscox, pers. comm. 1997). Over the long-term, river channel restoration would result in increased potential habitat area for this species, resulting in a potential benefit (J. Hiscox, pers. comm. 1997). Operation and maintenance activities would not result in substantial disturbance of the newly developed habitat. Environmental protection measures have been identified through discussions with CDFG personnel to minimize potential construction-related impacts to these species. The measures include pre-construction surveys by a qualified biologist to verify the presence of the foothill yellow-legged frogs and photo documentation of habitat conditions. Additionally, any adult tadpoles of the species found in the construction impact area would be captured and relocated to suitable habitat upstream of the site away from the influence of construction-related activities. These measures would reduce impacts to this species to less than significant.

Western Toad and Chorus Frog

Tadpoles of these species were observed at the site during the preliminary wetland delineation for the project (Stallings 1998). Construction-related loss or disturbance of wetland areas would result in impacts upon these species. Operations and maintenance activities would not result in disturbance of wetland areas and would not affect these species. Environmental protection measures to protect and restore wetland habitat have been developed for the project. These measures include avoiding and protecting wetlands to minimize the total area disturbed or lost, and capture and relocation of adult and tadpoles of the species from wetland areas that cannot be avoided or protected during construction to appropriate alternative locations approved by CDFG. River channel restoration would result in re-creation of aquatic habitat through the project area, potentially benefiting these species and impacts would be considered less than significant.

Impact 3.6-5: Disturbance of terrestrial resources of the North Fork American River associated with construction and use of the public river access sites at Oregon Bar.

Improvements at Oregon Bar would result in temporary disturbance and permanent removal of vegetation along the access road, trail, turnaround, and proposed parking area. Vegetation along the road, trail and turnaround areas primarily consist of coyote bush (*Baccharis pilularis*) and grass species such as soft chess (*Bromus hordaceus*), ryegrass (*Lolium sp.*), and wild barley (*Hordeum murinum ssp. leporinum*). These species are ruderal invasive species of relatively low habitat value. Additional species that may be affected along the trail and turnaround nearer to the river, include manzanita shrubs (*Arctostaphylos sp.*), California blackberry (*Rubus ursinus*), toyon (*Heteromeles arbutifolia*), and California coffeeberry (*Rhamnus californica*). These species have somewhat higher habitat value than the ruderal species; however, impacts would be minimized by plantings of native shrubs and grasses along the improved trail and roadway following construction. Minimal grading of the proposed parking area at the Auburn Dam batch plant site would result in removal of sparse herbaceous cover and possibly some shrub species. Due to the highly disturbed nature of this site, these changes would not be considered significant. No mature trees would be removed by these activities. The final parking lot design and construction methods would be sized and implemented such that wetland habitat values at the site would be retained. Open water areas would not be filled; these areas would be fenced for avoidance during construction. Placement of rock, wood fences, or other barrier prior to opening the site for use would minimize potential public disturbances of these habitats.

Increased use of the project area would not result in loss of vegetation beyond the anticipated trampling of ruderal plant species that likely would become established at the parking area and along the road and trails. These impacts would not be considered significant.

Upstream Diversion Alternative

Impact 3.6-6: Disturbance of terrestrial resources due to construction, operation, and maintenance of project facilities.

The Upstream Diversion Alternative construction activities would involve substantially less earthwork than the Proposed Project because this alternative would not include river channel restoration or development of public river access facilities. Construction-related effects upon special-status species at the site generally would be of the same nature as described for the Proposed Project (see Impact 3.6-3) and would be less than significant for threatened or endangered bird species. For the terrestrial species of concern, the impact would be potentially significant due to the potential to harm individuals by trampling or other disturbances or loss of habitat at the site. The same environmental protection measures described for the Proposed Project would be incorporated into the construction management plan for the Upstream Diversion Alternative should it be the one selected. The resultant impact would be less than significant.

Impact 3.6-7: Disturbance of riparian and wetland habitats of the North Fork American River due to installation, operation, and maintenance of project facilities.

The potential impacts to riparian and wetland areas under the Upstream Diversion Alternative would be similar to those described for the Proposed Project (see Impact 3.6-4). Important differences in the Upstream Diversion Alternative would be that the loss of wetland area (up to 0.11 acre) along the eastern Auburn Dam keyway would be permanent and would not be re-created at the site because this alternative would not include river channel restoration. The loss of the wetland habitat would be mitigated through creation of replacement wetland areas through coordination with regulatory agencies, including the Corps. As with the Proposed Project, environmental protection measures would be implemented prior to and during construction of the project. Riparian vegetation would likely become re-established both upstream and downstream of the bypass tunnel, as appears to occur at the site seasonally under existing conditions. The

Upstream Diversion Alternative would not include development of public river access locations, and, would therefore have no impact upon wetland areas observed at the Auburn Dam batch plant site. Overall, impacts upon riparian and wetland habitat and associated special-status or other species would be considered less than significant.

Diversion-Related Impacts

The diversion-related analysis refers to certain tables and graphs prepared to provide additional representation of the modeling results and comparison of simulated conditions. These tables and figures are included in Appendix H to the Draft EIS/EIR and are labeled by the appendix letter, resource section number, and ordered as it is referenced in the impact analysis (H-3.6-1, H-3.6-2, etc.).

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the Existing Condition

The Proposed Project and the Upstream Diversion Alternative would result in the same timing and quantity of increased diversions from the American River. Changes in CVP or SWP operations associated with the Action Alternatives also would be the same. Therefore, the diversion-related analysis presented below represents the potential impacts that could occur with the Action Alternatives.

Impact 3.6-8: Flow-related impacts to riparian vegetation of the upper American River.

Implementation of the Action Alternatives would not significantly affect streamflows in the upper American River, relative to the existing condition (Section 3.5, Fish Resources and Aquatic Habitat). Therefore, no adverse environmental effects on the upper American River riparian vegetation would be anticipated to occur under the Action Alternatives relative to the existing condition. Impacts to upper American River riparian vegetation would be considered less than significant.

Impact 3.6-9: Flow-related impacts to riparian vegetation of the lower American River.

The analysis for flow impacts to riparian vegetation of the lower American River evaluates changes in flow below Nimbus Dam and H Street Bridge during the growing season months, March through October. Tables H-3.6-1 and H-3.6-2 present the simulated frequency of occurrence of flows below specified flow indices in the lower American River below Nimbus Dam and H Street Bridge, respectively, under the Action Alternatives and the existing condition. Simulated long-term average American River flows below Nimbus Dam and H Street Bridge are displayed in Figures H-3.6-1 and H-3.6-2, respectively, for the existing condition and Action Alternatives.

Changes in lower American River flows associated with the Action Alternatives would result in slightly more frequent reduction of flows below the indices indicated for maintenance of cottonwood radial growth, some growth, and reasonable growth and maintenance and the index for terrace inundation. Additionally, these flow reductions would result in a very slight increase in the number of consecutive occurrences where flows would be reduced below the indices, compared to the existing condition. However, overall, these flow reductions are not considered to be of substantial magnitude and/or to occur with enough frequency to have significant adverse effects on the long-term population growth and maintenance of lower American River cottonwoods. Because cottonwoods are considered a good indicator of the health of the lower American River riparian community, flow-related impacts to lower American River riparian vegetation would be less than significant.

Flows to Support Mature Cottonwood Radial Growth Maintenance - 1,765 cfs Index (March Through October)

Under the Action Alternatives, monthly mean flows would not be substantially reduced below the 1,765 flow index, the reported long-term minimum flow required for radial growth maintenance of mature cottonwoods, during March through October. Under the existing condition, monthly mean flows below Nimbus Dam fall below 1,765 cfs in 128 out of the 560 months included in the analysis. Implementation of the Proposed Project or Upstream Diversion Alternative would result in monthly mean flows below 1,765 cfs in 134 out of 560 months. The Action Alternatives would result in monthly mean flows below Nimbus Dam that would be below the maintenance index approximately 1.1 percent more often than under the existing condition. Lower American River flows simulated below H Street Bridge under the existing condition would fall below 1,765 cfs in 138 of the 560 months included in the analysis. The Action Alternatives would result in flows that are below 1,765 cfs in 147 of the 560 months included in the analysis. Therefore, under the Action Alternatives, flows in the lower American River below H Street Bridge would be below the index approximately 1.6 percent more often than under the existing condition.

For flows below Nimbus Dam or H Street Bridge already at or above 1,765 cfs under the existing condition, the Action Alternatives would not reduce flows below the index in consecutive months during any year (out of 70 years modeled) relative to the existing condition. Under Action Alternatives conditions, there would be instances of exacerbation of an already detrimental situation for cottonwood radial growth maintenance during the growing season. For flows below Nimbus Dam that are already below 1,765 cfs under the existing condition, there would be 17 occurrences in which these flows would be reduced by five percent or more under the Action Alternatives. However, in only three occurrences would these flow reductions occur in two or more consecutive months, and in one of these occurrences the consecutive months would fall outside of the critical growing period of April through July. For flows below H Street Bridge, there would be 20 occurrences during the March through October period in which flows that are already below 1,765 cfs under the existing condition would be reduced by five percent or more under the Action Alternatives. However, in only four occurrences would these flow reductions occur in two or more consecutive months, and in two of these occurrences the consecutive months would fall outside of the critical growing period of April through July. Moreover, when flows are already below 1,765 cfs under the existing condition, radial growth maintenance of cottonwoods would not occur and, therefore, further flow reductions under the Action Alternatives would not further deter the maintenance of cottonwoods. Overall, because flow reductions would not occur with sufficient magnitude and frequency to significantly adversely affect the radial growth maintenance of mature cottonwoods, this would represent a less-than-significant impact.

Flows to Support Some Cottonwood Growth - 2,000 cfs Index (March Through October)

Under the Action Alternatives, monthly mean flows would not be substantially reduced below the 2,000 cfs flow index, the reported long-term minimum flow required to support some growth of cottonwoods during the growing season of March through October. Under the existing condition, flows below Nimbus Dam would be below 2,000 cfs in 140 of the 560 months included in the analysis. Under the Action Alternatives, flows below Nimbus Dam would be below 2,000 cfs in 149 of the 560 months included in the analysis. This change represents approximately a 1.6 percent increase in the frequency of monthly mean flows below Nimbus Dam under the 2,000 cfs index. Monthly mean flows for the existing condition below H Street Bridge would fall below the 2,000 cfs index in 176 of the 560 months of the analysis. Under the Action Alternatives, monthly mean flows below H Street Bridge would fall below the 2,000 cfs flow index in 187 out of the 560 months included in the analysis. Overall, the change represents an approximate two percent increase in the frequency that monthly mean flows below H Street Bridge would fall below 2,000 cfs, relative to the existing condition.

For flows below Nimbus Dam that are at or above 2,000 cfs under the existing condition, the Action Alternatives would not reduce flows below the index in consecutive months during any year of the 70-year period of record. For flows below H Street Bridge that are at or above 2,000 cfs under the existing condition, there would be only one occurrence of two or more consecutive months in which the Action Alternatives would reduce these flows below the index, over the 70-year period of record. These consecutive months would fall outside the critical growing season of April through July. Because these flow reductions would not occur with sufficient magnitude and frequency to significantly adversely affect some growth in cottonwoods, this would represent a less-than-significant impact.

Flows to Support Reasonable to Maximum Cottonwood Growth Rates - 3,000 cfs Index (March Through October)

Under the Action Alternatives, monthly mean flows would not be substantially reduced below 3,000 cfs, the reported flow required to support reasonable to maximum cottonwood growth rate during the growing season of March through October. Under the existing condition, monthly mean flows below Nimbus Dam below 3,000 cfs would occur in 302 out of 560 months included in the analysis. Under the Action Alternatives, monthly mean flows below Nimbus Dam would be below 3,000 cfs in 310 out of 560 months included in the analysis. Overall, the Action Alternatives represents about a one percent decrease in the frequency that monthly mean flows would be at or above 3,000 cfs, relative to the existing condition. Under the Action Alternatives, monthly mean flows below H Street Bridge below 3,000 cfs would occur in 325 out of 560 months of the analysis, relative to 320 out of 560 months under the existing condition. Overall, the Action Alternatives represents about a one percent decrease in the frequency that monthly mean flows below H Street Bridge would be at or above 3,000 cfs, relative to the existing condition.

For flows below Nimbus Dam or H Street Bridge that are at or above 3,000 cfs under the existing condition, the Action Alternatives would not reduce flows below the index in consecutive months during March through October, over the 70-year period of record. Because these flow reductions would not occur with sufficient magnitude and frequency to significantly adversely affect reasonable to maximum growth in cottonwoods, this would represent a less-than-significant impact.

Flows to Support Terrace Inundation for Cottonwood Germination - 5,000 cfs Index

Previous field studies conducted on the lower American River concluded that peak flows between 5,000 cfs and 13,000 cfs during April to July (the reported period for cottonwood seed release) are necessary to inundate terraces that are essential for cottonwood germination, with the highest terraces inundated at 50,000 cfs (CCOMWP 1999). Implementation of the Action Alternatives relative to the existing condition would not result in a reduction in the number of occurrences below Nimbus Dam or H Street Bridge in which mean peak flows would be above 5,000 cfs. As a result, this would represent a less-than-significant impact.

Impact 3.6-10: Flow-related impacts to backwater pond recharge in the lower American River (Nimbus Dam and H Street Bridge).

Tables H-3.6-3 and H-3.6-4 and Figures H-3.6-3 and H-3.6-4 present the frequency of occurrence of flows within the ranges required for backwater recharge below Nimbus Dam and at H Street Bridge, respectively, for existing and Action Alternatives conditions. Overall, changes in lower American River flows associated with the Action Alternatives relative to the existing condition would result in a slightly more frequent reduction of flows below the indices for adequate recharge of backwater ponds closer to the lower American River, and the continued recharge of off-river backwater ponds. However, these flow reductions are not considered to be of substantial magnitude and/or to occur with enough frequency to have significant adverse effects on backwater pond habitat of the lower American River, and therefore would be considered less than significant.

Flows to Support Adequate Recharge of the Ponds Closest to the Lower American River - 2,700 cfs Index

Vegetation around backwater ponds closest to the river is typical of the riparian associations in the area and is composed of mixed-age willow, alder, and cottonwood. Because the water is slower moving and the ponds are isolated from human disturbances, these areas tend to be of higher value to wildlife (Sands et al. 1985). Wildlife species that have been recorded in these areas include pied-billed grebe (*Podilymbus podiceps*), American bittern (*Botaurus lengtiginosus*), green heron (*Butorides striatus*), common merganser (*Mergus merganser*), white-tailed kite (*Elanus leucurus*), wood duck (*Aix sponsa*), yellow warbler (*Dendroica petechia*), warbling vireo (*Vireo gilvus*), dusky-footed woodrat (*Neotoma fuscipes*), western gray squirrel (*Sciurus griseus*), Pacific tree frog (*Hyla regilla*), and western toad (*Bufo spp.*).

Under the Action Alternatives, monthly mean flows would not be substantially reduced below the 2,700 cfs flow index, the reported long-term minimum flow required to provide adequate recharge of the ponds closer to the lower American River, relative to the existing condition. Under the existing condition, monthly mean flows below Nimbus Dam below 2,700 cfs would occur in 470 of the 840 months included in the analysis. Implementation of the Action Alternatives would result in monthly mean flows below 2,700 cfs in 474 of the 840 months included in the analysis. The Action Alternatives would result in monthly mean flows below 2,700 cfs below Nimbus Dam approximately 0.5 percent more often than under the existing condition. For flows below H Street Bridge, long-term monthly mean flows below 2,700 cfs under the existing condition would occur in 492 of the 840 months included in the analysis. Implementation of the Action Alternatives would result in monthly mean flows below 2,700 cfs in 499 of the 840 months included in the analysis. Overall, the Action Alternatives would result in monthly mean flows below H Street Bridge that would be below the 2,700 cfs index approximately 0.8 percent more often than under the existing condition.

For flows below Nimbus Dam or H Street Bridge that are at or above 2,700 cfs under the existing condition, the Action Alternatives would not reduce flows below the index in consecutive months during any year of the 70-year period of record. Because flow reductions under the Action Alternatives relative to the existing condition would not occur with sufficient magnitude and/or frequency to significantly adversely affect adequate recharge of ponds closer to the lower American River, this would represent a less-than-significant impact.

Flows to Support Continued Recharge of Off-River Ponds - 4,000 cfs Index

Vegetation associated with off-river ponds would be similar to vegetation for ponds closest to the river (discussed above). Under the Action Alternatives, monthly mean flows would not be substantially reduced below the 4,000 cfs flow index, the reported long-term flow required to provide continued recharge of off-river ponds, relative to the existing condition. Under the existing condition, monthly mean flows below 4,000 cfs below Nimbus Dam would occur in 609 of the 840 months included in the analysis. Implementation of the Action Alternatives would result in monthly mean flows below 4,000 cfs in 611 of the 840 months included in the analysis. The Action Alternatives would result in monthly mean flows below Nimbus Dam that would be below 4,000 cfs approximately 0.2 percent more often than under the existing condition. For flows below H Street Bridge, the existing condition results in monthly mean flows below Nimbus Dam below 4,000 cfs in 623 of the 840 months included in the analysis. Implementation of the Action Alternatives would result in monthly mean flows below 4,000 cfs in 634 of the 840 months included in the analysis. Overall, the Action Alternatives would result in monthly mean flows below H Street Bridge that would be below 4,000 cfs approximately 1.3 percent more often than under the existing condition.

For flows below Nimbus Dam or H Street Bridge that are at or above 4,000 cfs under the existing condition, the Action Alternatives would not reduce flows below the index in consecutive months over the 70-year period of record. Because flow reductions under the Action Alternatives relative to the existing condition would not occur with sufficient magnitude and/or frequency to significantly adversely affect continued recharge of off-river ponds, this would represent a less-than-significant impact.

Impact 3.6-11: Impacts to special-status species dependent on lower American River riparian and open water habitats (Nimbus Dam and H Street Bridge).

Bald eagle, bank swallow, yellow warbler, yellow-breasted chat, river otter, and several other species are special-status species known to occur, nest, or periodically forage in open water and cottonwood forest habitats along the lower American River. Therefore, potential impacts to cottonwood forests also are assessed to determine if special-status species dependent on this habitat would be affected by the Action Alternatives.

As previously discussed, when compared to the existing condition, the Action Alternatives would result in monthly mean flows below Nimbus Dam and H Street Bridge that would be below the 1,765 cfs cottonwood radial growth maintenance flow index approximately 1.1 and 1.6 percent more often, respectively. Moreover, the Action Alternatives would not result in consecutive months over the 70-year period of record in which flows below Nimbus Dam or H Street Bridge that are at or above 1,765 cfs would be reduced below this flow index.

The Action Alternatives also would not result in substantial monthly mean flow reductions below Nimbus Dam and H Street Bridge below the 2,000 cfs flow index for some growth in cottonwoods, relative to the existing condition. The Action Alternatives would result in monthly mean flows below Nimbus Dam and H Street Bridge that are below 2,000 cfs approximately 1.6 and 2.0 percent more often, respectively. Also, flows below Nimbus Dam that are at or above 2,000 cfs under the existing condition would not be reduced under the Action Alternatives below the index in consecutive months, over the 70-year period of record. For flows below H Street Bridge that are at or above 2,000 cfs under the existing condition, there would be only one occurrence of two or more consecutive months in which the Action Alternatives would reduce these flows below this flow index, over the 70-year period of record. Because impacts to cottonwood radial growth maintenance and some growth resulting from the Action Alternatives would be less-than-significant, impacts to special-status species associated with riparian and open water habitats also would be less-than-significant.

Impact 3.6-12: Impacts to special-status species dependent on lower American River backwater pond/marsh habitats.

Sanfords arrowhead, western pond turtle, valley elderberry shrubs, the VELB, and tricolored blackbirds are special-status species known to occur in backwater pond areas along the lower American River. Because impacts to recharge of ponds resulting from the Action Alternatives relative to the existing condition would be less-than-significant, impacts to special-status species associated with backwater pond/marsh habitats also would be less-than-significant.

Impact 3.6-13: Impacts to elderberry shrubs and VELB along the lower American River.

USFWS has designated the American River Parkway as critical habitat for VELB, and this species has been recorded in elderberry shrubs near backwater ponds along the lower American River. Because impacts to backwater habitats under the Action Alternatives relative to the existing condition were determined to be less than significant, elderberry shrubs that are dependent on these habitats also are not expected to be adversely affected. Impacts to elderberry shrubs and VELB would be less than significant.

Impact 3.6-14: Impacts associated with Folsom, Shasta, and Trinity reservoir vegetation.

Compared to the existing condition, the Action Alternatives would result in essentially equivalent long-term average end-of-month water elevations for Folsom, Trinity, and Shasta reservoirs. Folsom, Shasta, and Trinity reservoir water levels fluctuate seasonally and annually, and therefore non-native (weedy) vegetation becomes established in areas below the high water line during periods of low water. Because the drawdown zone is vegetated primarily with non-native herbaceous plants and scattered willow shrubs that do not form a contiguous riparian community, they are not considered of high wildlife value, and will likely reestablish as water levels fluctuate. Vegetation in these regions is ephemeral, desiccating when reservoir levels drop over consistent periods of time, and succumbing to inundation when water levels rise. Therefore, the value of nearshore habitat is related to the stability of reservoir surface water levels. Because maintenance of a consistent water elevation runs counter to inflow patterns and common flood control and water supply practices, quality nearshore vegetation and the associated wildlife habitat that it would provide can rarely establish. Although project conditions would result in variations in end-of-month water elevation relative to the existing condition, areas of high and consistent habitat values are not adversely affected under the Action Alternatives. Based on these findings, elevation fluctuations associated with the Action Alternatives would represent a less-than-significant impact to reservoir vegetation.

Impact 3.6-15: Flow-related impacts to riparian vegetation of the upper Sacramento River.

Much of the Sacramento River is confined by levees that reduce the natural diversity of riparian vegetation. Agricultural land (e.g., rice, dry grains, pastures, orchards, vineyards, and row and truck crops) is common along the lower reaches of the Sacramento River, but is less common in the upper portions (CDFG 1988). The bands of riparian vegetation that occur along the Sacramento River are similar to those found along the lower American River, but are somewhat narrower and not as botanically diverse. The riparian communities consist of Valley oak, cottonwood, wild grape, box elder (*Acer negundo*), elderberry (*Sambucus mexicanus*), and willow. Freshwater, emergent wetlands occur in the slow moving backwaters and are primarily dominated by tules (*Scirpus acutus* var. *occidentalis*), cattails, rushes, and sedges (SAFCA and Reclamation 1994). Although riparian vegetation occurs along the Sacramento River, these areas are confined to narrow bands between the river and the river side of the levee.

The wildlife species inhabiting the riparian habitats along the lower Sacramento River are essentially the same as those found along the lower American River. These include, but are not limited to, black phoebe (*Sayornis nigricans*), sora rail (*Porzana carolina*), great horned owl, Swainson's hawk (*Buteu swainsoni*), ash-throated flycatcher, wood duck, great blue heron, great egret, green heron, California ground squirrel, and coyote. The freshwater/emergent wetlands represent habitat for many wildlife species, including reptiles and amphibians such as the western pond turtle, bullfrog, and Pacific tree frog. Agricultural areas adjacent to the river also represent foraging habitat for many raptor species.

Under the Action Alternatives, long-term average flows on the upper Sacramento River during the March through October growing season would be essentially equivalent to slightly increased relative to the existing condition. The Action Alternatives would result in long-term average flow decreases below Keswick Dam ranging from three to seven cfs during the months of August, September and October, and increases ranging from one to 18 cfs during the remaining months of the growing season. During the critical months of the growing season, the Action Alternatives would result in flow increases that would have the potential to benefit riparian vegetation in the

Sacramento River. In the context of riparian vegetation effects, the frequency and magnitude of flow decreases under the Action Alternatives would be small considering that monthly mean flows would range from 5,345 to 13,270 cfs during the months of the growing season. Because the largest and only long-term average flow reduction in the upper Sacramento River during the growing period of March through October that would occur under the Action Alternatives (i.e., October) would vary from the existing condition by only one percent, flows under the Action Alternatives are not expected to adversely affect riparian vegetation along the river, and impacts are considered less than significant.

Impact 3.6-16: Impacts to vegetation associated with the lower Sacramento River and the Delta.

Lower Sacramento River riparian vegetation would be similar to upper Sacramento River vegetation (discussed above).

The analysis of effects on riparian vegetation within the lower Sacramento River is based on the modeling of primary growing season (March through October) river flows at Freeport under the existing condition and the Action Alternatives. The largest long-term average flow reduction under the Action Alternatives relative to the existing condition would be two percent during the month of August. The Action Alternatives would result in long-term average flow decreases at Freeport ranging from 17 to 24 cfs during most months of the growing season. In the context of riparian vegetation effects, the frequency and magnitude of these flow decreases under the Action Alternatives would be small considering that long-term average flows would range from 12,043 (i.e., October) to 33,441 cfs (i.e., March) during the months of the growing season. Also, tidal action influences the river stage in this area. Because flow reduction would not be of sufficient magnitude and frequency to significantly alter existing riparian habitat dependent on the lower Sacramento River flows, flows under the Action Alternatives are not expected to adversely affect riparian vegetation or species along the river and impacts are considered less than significant.

Most of the vegetation in the Delta consists of irrigated agricultural fields and associated ruderal (disturbed), non-native vegetative "fringes" that border cultivated fields. Throughout much of the Delta, these areas border the levees of various sloughs, channels, and other waterways within the historic floodplain. Native habitats include remnant riparian vegetation that persists in some areas, with brackish and freshwater marshes also being present. Saline wetlands consist of pickleweed (*Salicornia virginica*), cord grass (*Spartina* sp.), glasswort (*Salicornia* sp.), saltgrass (*Distichlis spicata*), sea lavender (*Limonium californicum*), arrow grass (*Triglochin* spp.), and shoregrass (*Monanthochloe littoralis*). These wetlands are very sensitive to fluctuations in water salinity, which are determined by water flows into the Delta (San Francisco Estuary Project 1993).

Under the Action Alternatives, there would not be a shift in the long-term average position of X2 relative to the existing condition. In fact, the maximum upstream shift for any individual month of the year in the position of X2, over the 70-year period of record, would be 0.7 km. Because Sacramento River flow reductions would not be of sufficient magnitude and frequency, and because there would not be a shift in the long-term average X2 position, flows under the Action Alternatives are not expected to adversely affect vegetation associated with the Delta, and impacts are considered less than significant.

Impact 3.6-17: Impacts to Delta habitats of special-status species.

The wetlands of the Delta represent habitat for a number of shorebirds and waterfowl species including California black rail (*Laterallus jamaicensis coturniculus*), western sandpiper (*Calidris mauri*), long-billed curlew (*Numenius americanus*), greater yellow-legs (*Tringa melanoleuca*), American coot (*Fulica americana*), gadwall (*Anas strepera*), canvas back (*Aythya valisineria*), American wigeon, common moorhen, killdeer and mallard. These areas also support a number of mammals such as river otter (*Lutra canadensis*), beaver (*Castor canadensis*), coyote, gray fox, and muskrat. Several species of reptiles and amphibians also occur in this region.

When compared to the existing condition, the Action Alternatives would result in infrequent long-term average flow reductions in the Sacramento River during certain times of the year. However, flows would not be reduced by sufficient magnitude and/or frequency to significantly alter existing habitats dependent on the Delta. In addition, under the Action Alternatives, there would not be a shift in the long-term average position of X2 relative to the existing condition. The maximum upstream shift for any individual month of the year in the position of X2, over the 70-year period of record, would be 0.7 km. Because Delta habitats would not be adversely affected, the special-status species dependent on these habitats also would not be expected to be adversely affected; therefore, this impact would be considered less than significant.

Impact 3.6-18: Impacts to Oroville Reservoir or Feather River vegetation and special-status species.

The Action Alternatives would not result in substantial changes in storage or elevation at Oroville Reservoir, or in flow in the Feather River, relative to the existing condition. Any small changes that might occur would be considered to represent less-than-significant impacts upon these resources.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the No Action/No Project Alternative in the Future (2025)

Impact 3.6-19: Flow-related impacts to riparian vegetation of the upper American River.

The Action Alternatives would not significantly affect streamflows in the upper American River, relative to the No Action/No Project Alternative (see Section 3.5, Fish Resources and Aquatic Habitat). Therefore, adverse environmental effects to the upper American River riparian vegetation are not anticipated to occur under the Action Alternatives relative to the No Action/No Project Alternative. Impacts to upper American River riparian vegetation are considered less than significant.

Impact 3.6-20: Flow-related impacts to riparian vegetation of the lower American River.

Tables H-3.6-5 and H-3.6-6 present the simulated frequency of occurrences of flows below specific flow indices on the lower American River below Nimbus Dam and H Street Bridge, respectively, under the No Action/No Project Alternative and Action Alternatives. Simulated long-term American River flows below Nimbus Dam and H Street Bridge are displayed in Figures H-3.6-3 and H-3.6-4, respectively, for the No Action/No Project and Action Alternatives.

Overall, changes in lower American River flows associated with the Action Alternatives relative to the No Action/No Project Alternative would result in slightly more frequent reduction of flows below the indicated indices for maintenance of cottonwood radial growth, some growth and reasonable to maximum growth, and the index for terrace inundation. However, these flow reductions are not considered to be of substantial magnitude and/or to occur with enough frequency to have significant adverse effects on the long-term population growth and maintenance of lower American River cottonwoods. Because cottonwoods are considered a good indicator of the health of the lower American River riparian community, flow-related impacts to lower American River riparian vegetation would represent a less-than-significant impact.

Flows to Support Mature Cottonwood Radial Growth Maintenance - 1,765 cfs Index (March Through October)

Under the Action Alternatives, monthly mean flows would not be substantially reduced below the 1,765 cfs flow index. Under the No Action/No Project Alternative, monthly mean flows below Nimbus Dam fall below 1,765 cfs in 151 out of the 560 months included in the analysis for March through October. The Action Alternatives would result in monthly mean flows below Nimbus Dam that would fall below 1,765 cfs in 154 out of the 560 months included in the analysis. Overall, the Action Alternatives represents a 0.6 percent increase in the frequency that monthly mean flows would fall below 1,765 cfs, relative to the No Action/No Project Alternative. Under the Action Alternatives below H Street Bridge, monthly mean flows would fall below 1,765 cfs in 175 out of the 560 months included in the analysis for the growing season over the 70-year period of record, relative to 173 out of the 560 months under the No Action/No Project Alternative condition. Overall, the Action Alternatives below H Street Bridge represent a 0.4 percent increase in the frequency that monthly mean flows would fall below 1,765 cfs, relative to the No Action/No Project Alternative.

For flows below Nimbus Dam or H Street Bridge already at or above 1,765 cfs under the No Action/No Project Alternative, the Action Alternatives would not reduce flows below the index in consecutive months over the 70-year period of record. For flows below Nimbus Dam that are already below 1,765 cfs under the No Action/No Project Alternative, there would be 21 occurrences in which those flows are further reduced by five percent or more under the Action Alternatives. However, in only one occurrence would these flow reductions occur in two or more consecutive months, and these consecutive months would fall outside of the critical growing period of April through July. For flows below H Street Bridge, there would be 26 occurrences during the March through October period in which flows under the No Action/No Project Alternative that are already below the 1,765 cfs flow index are further reduced by five percent or more under the Action Alternatives. However, in only one occurrence would these flow reductions occur in two or more consecutive months, and these consecutive months would fall outside of the critical growing period of April through July. Moreover, when flows are already below the 1,765 cfs flow index under the No Action/No Project Alternative, maintenance of radial growth cottonwoods would not occur and, therefore, further flow reductions under the Action Alternatives would not further deter the maintenance of cottonwoods. Overall, because these flow reductions would not occur with sufficient magnitude and frequency to significantly adversely affect maintenance of cottonwoods, this would represent a less-than-significant impact.

Flows to Support Some Cottonwood Growth - 2,000 cfs Index (March Through October)

Under the Action Alternatives, monthly mean flows would not be substantially reduced below the 2,000 cfs index, relative to the No Action/No Project Alternative. Under the Action Alternatives below Nimbus Dam, monthly mean flows would fall below 2,000 cfs in 166 out of the 560 months included in the analysis (March through October, 70-year period of record), relative to 164 out of the 560 months under the No Action/No Project Alternative. The Action Alternatives below Nimbus Dam represent a 0.4 percent increase in the frequency that monthly mean flows would fall below 2,000 cfs, relative to the No Action/No Project Alternative. Under the Action Alternatives below H Street Bridge, monthly mean flows would fall below 2,000 cfs in 212 out of 560 months included in the analysis, relative to 209 out of 560 months under the No Action/No Project Alternative. The Action Alternatives below H Street Bridge represent a 0.5 percent increase in the frequency that monthly mean flows would fall below 2,000 cfs during the growing season, relative to the No Action/No Project Alternative (Tables H-3.6-5 and H-3.6-6).

Relative to the No Action/No Project Alternative, the Action Alternatives would not reduce flows below Nimbus Dam below 2,000 cfs in consecutive months during the growing season of March through October. For flows below H Street Bridge relative to the No Action/No Project Alternative, there would be only one occurrence of two or more consecutive months during the growing season of March through October, over the 70-year period of record, in which the Action Alternatives would reduce flows below the 2,000 cfs index. Because these flow reductions would not occur with sufficient magnitude and frequency to significantly affect some growth in cottonwoods, this would represent a less-than-significant impact.

Flows to Support Reasonable to Maximum Cottonwood Growth Rates - 3,000 cfs Index (March Through October)

Under the Action Alternatives, monthly mean flows would not be substantially reduced below the 3,000 cfs flow index, relative to the No Action/No Project Alternative. Under the No Action/No Project Alternative, monthly mean flows below Nimbus Dam would fall below 3,000 cfs in 323 out of 560 months included in the analysis. Under the Action Alternatives, monthly mean flows below Nimbus Dam would fall below 3,000 cfs in 327 out of 560 months included in the analysis. Overall, the Action Alternatives below Nimbus Dam represent a one percent decrease in the frequency that monthly mean flows would be at or above 3,000 cfs, relative to the No Action/No Project Alternative. Under the Action Alternatives, monthly mean flows below H Street Bridge would fall below 3,000 cfs in 353 out of 560 included in the analysis, relative to 348 out of 560 months under the No Action/No Project Alternative. Overall, the Action Alternatives below H Street Bridge represent a one percent decrease in the frequency that monthly mean flows would be at or above 3,000 cfs during the March through October period, relative to the No Action/No Project Alternative.

For flows below Nimbus Dam or H Street Bridge that are at or above 3,000 cfs under the No Action/No Project Alternative, the Action Alternatives would reduce flows below 3,000 cfs in consecutive months during the growing season of March through October, over the 70-year period of record. Because flow reductions would not occur with sufficient magnitude and frequency to significantly adversely affect reasonable to maximum growth and maintenance in cottonwoods, this would represent a less-than-significant impact.

Flows to Support Terrace Inundation for Cottonwood Germination - 5,000 cfs Index

Previous field studies conducted on the lower American River concluded that peak flows between 5,000 cfs and 13,000 cfs during April to July (the reported period for cottonwood seed release) are necessary to inundate terraces that are essential for cottonwood germination, with the highest terraces inundated at 50,000 cfs (CCOMWP 1999). The Action Alternatives would result in only one reduction in the number of occurrences below Nimbus Dam in which mean peak flows would be above 5,000 cfs, and no reduction below H Street Bridge, relative to No Action/No Project Alternative. As a result, this impact would be less than significant.

Impact 3.6-21: Flow-related impacts to backwater pond recharge in the lower American River (Nimbus Dam and H Street Bridge).

Tables H-3.6-7 and H-3.6-8 present the frequency of occurrence of flows below the index required for backwater recharge, below Nimbus Dam and at H Street Bridge, respectively, for the No Action/No Project and the Action Alternatives.

Overall, changes in lower American River flows associated with the Action Alternatives relative to No Action/No Project Alternatives would result in slightly more frequent reduction of flows below the indices for adequate recharge of backwater ponds closer to the lower American River, and the continued recharge of off-river backwater ponds. However, these flow reductions are not considered to be of substantial magnitude and/or to occur with enough frequency to have significant adverse effects on backwater pond habitat of the lower American River, and therefore would be considered less than significant.

Flows to Support Adequate Recharge of the Ponds Closest to the River - 2,700 cfs Index

Under the Action Alternatives, monthly mean flows would not be substantially reduced below 2,700 cfs, relative to the No Action/No Project Alternative. Under the No Action/No Project Alternative, monthly mean flows below Nimbus Dam fall below 2,700 cfs in 487 of the 840 months included in the analysis. The Action Alternatives would result in monthly mean flows below 2,700 cfs in 489 of the 840 months included in the analysis. The Action Alternatives would result in monthly mean flows below Nimbus Dam that would fall below 2,700 cfs approximately 0.2 percent more often than under the No Action/No Project Alternative. For flows below H Street Bridge, the No Action/No Project Alternative results in monthly mean flows below Nimbus Dam that fall below 2,700 cfs in 523 of the 840 months included in the analysis. The Action Alternatives would result in monthly mean flows below 2,700 cfs in 527 of the 840 months included in the analysis. Overall, the Action Alternatives would result in monthly mean flows below H Street Bridge that would be below 2,700 cfs approximately 0.5 percent more often than under the No Action/No Project Alternative.

For flows below Nimbus Dam or H Street Bridge that are at or above 2,700 cfs under No Action/No Project Alternative, the Action Alternatives would not reduce flows below the flow index in consecutive months during any year of the 70-year period of record. Because flow reductions under the Action Alternatives would not occur with sufficient magnitude and/or frequency to significantly adversely affect adequate recharge of ponds closest to the lower American River relative to the No Action/No Project Alternative, this would represent a less-than-significant impact.

Flows to Support Continued Recharge of Off-River Ponds - 4,000 cfs Index

Under the Action Alternatives, monthly mean flows would not be substantially reduced below 4,000 cfs, relative to the No Action/No Project Alternative. Under the No Action/No Project Alternative, monthly mean flows below Nimbus Dam fall below 4,000 cfs in 639 of the 840 months included in the analysis. The Action Alternatives would result in monthly mean flows below 4,000 cfs in 644 of the 840 months included in the analysis. Therefore, the Action Alternatives would result in monthly mean flows below Nimbus Dam that would be below the index approximately 0.6 percent more often than under the No Action/No Project Alternative. For flows below H Street Bridge, the No Action/No Project Alternative would result in monthly mean flows that would fall below 4,000 cfs in 667 of the 840 months included in the analysis. The Action Alternatives would result in monthly mean flows below 4,000 cfs in 670 of the 840 months included in the analysis. Overall, the Action Alternatives would result in long-term average flows below H Street Bridge that would be below 4,000 cfs approximately 0.4 percent more often than under the No Action/No Project Alternative.

For flows below Nimbus Dam or H Street Bridge that are at or above 4,000 cfs under the No Action/No Project Alternative, the Action Alternatives would not reduce flows below the index in consecutive months, over the 70-year period of record. Because flow reductions under the Action Alternatives relative to the No Action/No Project Alternative would not occur with sufficient magnitude and/or frequency to significantly adversely affect continued recharge of off-river ponds, this would represent a less-than-significant impact.

Impact 3.6-22: Impacts to special-status species dependent on lower American River riparian and open water habitats.

As previously discussed, when compared to the No Action/No Project Alternative, the Action Alternatives would result in monthly mean flows below Nimbus Dam and H Street Bridge that are below the 1,765 cfs radial growth maintenance flow index approximately 0.6 and 0.4 percent more often, respectively. Moreover, the Action Alternatives would not result in any consecutive months over the 70-year period of record in which flows below Nimbus Dam or H Street Bridge that are at or above the 1,765 cfs index would be reduced below this index.

The Action Alternatives also would not result in substantial reductions in monthly mean flows below Nimbus Dam and H Street Bridge below the 2,000 cfs flow index for some growth, relative to the No Action/No Project Alternative. The Action Alternatives would result in monthly mean flows below Nimbus Dam and H Street Bridge that are below 2,000 cfs approximately 0.4 and 0.5 percent more often than No Action/No Project Alternative, respectively. Flows below Nimbus

Dam that are at or above the 2,000 cfs index under No Action/No Project Alternatives, would not be reduced under the Action Alternatives below the index in consecutive months during the growing period, over the 70-year period of record. For flows below H Street Bridge that are at or above 2,000 cfs under No Action/No Project Alternatives, there would be only one occurrence in which the Action Alternatives would reduce these flows below the index in two or more consecutive months during the growing period, over the 70-year period of record. Because impacts to radial growth maintenance and some growth for cottonwoods resulting from the Action Alternatives would be less-than-significant, impacts to special-status species associated with riparian and open water habitats also would be less-than-significant.

Impact 3.6-23: Impacts to special-status species dependent on lower American River backwater pond/marsh habitats.

Because impacts to recharge of ponds resulting from the Action Alternatives relative to the No Action/No Project Alternative would be less-than-significant, impacts to special-status species associated with backwater pond/marsh habitats also would be less-than-significant.

Impact 3.6-24: Impacts to elderberry shrubs and VELB.

USFWS has designated the American River Parkway as critical habitat for VELB, and this species has been recorded in elderberry shrubs near backwater ponds along the lower American River. Because impacts to backwater habitats under the Action Alternatives relative to the No Action/No Project Alternative were determined to be less than significant, elderberry shrubs that are dependent on these habitats also are not expected to be adversely affected. Impacts to elderberry shrubs and VELB are considered less than significant.

Impact 3.6-25: Impacts associated with Folsom, Shasta, and Trinity reservoir vegetation.

Compared to the No Action/No Project Alternative, the Action Alternatives would result in essentially equivalent long-term average end-of-month water elevations for Folsom, Trinity and Shasta reservoirs for the March through September growing period. Folsom, Shasta, and Trinity reservoirs have water levels that routinely fluctuate seasonally and annually. Although the Action Alternatives would result in minor variations in end-of-month water elevation relative to No Action/No Project Alternatives, areas of high and consistent habitat values are not adversely affected. Therefore, water surface elevation fluctuations associated with the Action Alternatives would represent a less-than-significant impact to reservoir vegetation in the project area.

Impact 3.6-26: Impacts to vegetation associated with the upper Sacramento River.

Under the Action Alternatives, long-term average flows on the upper Sacramento River during the March through October growing season would be essentially equivalent to the No Action/No Project Alternative. The Action Alternatives would result in long-term average flow decreases below Keswick Dam ranging from one to 13 cfs during the months of May, August, September and October, and increases ranging from one to 27 cfs during the remaining months of the growing season. During the critical months of the growing season (i.e., April through July), the Action Alternatives would generally result in flow increases that would have the potential to benefit riparian vegetation in the Sacramento River. In the context of riparian vegetation effects, the frequency and magnitude of flow decreases under the Action Alternatives would be small considering that long-term average flows would range from 5,016 to 13,149 cfs during the months of the growing season. Because the largest long-term average flow reduction in the upper Sacramento River during the growing period of March through October that would occur under the Action Alternatives (i.e., May) would vary from the No Action/No Project Alternative by only two percent, flows under the Action Alternatives are not expected to adversely affect riparian vegetation along the river, and would represent a less-than-significant impact.

Impact 3.6-27: Impacts to vegetation associated with the lower Sacramento River.

The largest long-term average flow reduction during March through October under the Action Alternatives relative to the No Action/No Project Alternative would be three percent. The Action Alternatives would result in long-term average flow decreases at Freeport ranging from 10 to 47 cfs during March, May, August and October. In the context of riparian vegetation effects, the frequency and magnitude of these flow decreases under the Action Alternatives would be small considering that long-term average flows would range from 11,443 (i.e., October) to 33,065 cfs (i.e., March) during the months of the growing season. Also, tidal action influences the river stage in this area. Because flow reductions would not be of sufficient magnitude and frequency to significantly alter existing riparian habitat dependent on the lower Sacramento River flows and Delta inflows, the Action Alternatives would not expected to adversely affect riparian vegetation along the river, and impacts are considered less than significant.

In addition to lower Sacramento River flows, the Delta wetlands are very sensitive to fluctuations in water salinity, which are determined by water flows into the Delta (San Francisco Estuary Project 1993). Under the Action Alternatives, there would not be a shift in the long-term average position of X2 relative to No Action/No Project Alternative. In fact, the maximum upstream shift for any individual month of the year in the position of X2, over the 70-year period of record, would be 0.7 km. Because Sacramento River flow reductions would not be of a sufficient magnitude and frequency, and there would be no shift in the long-term average X2 position, the Action Alternatives are not expected to adversely affect riparian vegetation along the river associated with the Delta, and impacts are considered less than significant.

Impact 3.6-28: Impacts to Delta habitats of special-status species.

When compared to the No Action/No Project Alternative, the Action Alternatives would result in infrequent long-term average flow reductions in the Sacramento River during certain times of the year. However, these flows would not be reduced by sufficient magnitude and/or frequency to significantly alter existing habitats dependent on the Delta. In addition, under the Action Alternatives, there would be no shift in the long-term average position of X2 relative to the No Action/No Project Alternative. The maximum upstream shift for any individual month of the year in the position of X2, over the 70-year period of record, would be 0.8 km. Because Delta habitats would not be adversely affected, the special-status species dependent on these habitats also would not be expected to be adversely affected; therefore, this impact would be considered less than significant.

Impact 3.6-29: Impacts to Oroville Reservoir and Feather River vegetation and special-status species.

The Action Alternatives would not result in substantial changes in storage or elevation at Oroville Reservoir, or in flow in the Feather River, relative to the No Action/No Project Alternative. Any small changes that might occur would be considered to represent less-than-significant impacts upon these resources.

Cumulative Impacts

Impact 3.6-30: Flow impacts to riparian vegetation of the upper American River.

The cumulative condition would not significantly affect streamflows in the upper American River, relative to the existing condition (see Section 3.5). Therefore, no adverse environmental effects on the upper American River riparian vegetation are anticipated to occur under the cumulative condition, relative to the existing condition. Impacts to upper American River riparian vegetation are considered less than significant.

Impact 3.6-31: Flow impacts to riparian vegetation of the lower American River

Tables H-3.6-9 and H-3.6-10 present the frequency of flows within the ranges required for minimal maintenance and growth, and optimal growth of cottonwoods below Nimbus Dam and H Street Bridge, respectively, for existing and the cumulative condition. Simulated long-term average American River flows below Nimbus Dam and H Street Bridge are displayed in Figures H-3.6-5 and H-3.6-6, respectively, for the existing and the cumulative condition.

Overall, changes in lower American River flows associated with the cumulative condition relative to the existing condition would result in more frequent reduction of flows below the indicated indices for maintenance of cottonwood radial growth, some growth, and reasonable to maximum growth and maintenance, and the index for terrace inundation. However, these flow reductions are not considered to be of substantial magnitude and/or to occur with enough frequency to have significant adverse effects on the long-term population growth and maintenance of lower American River cottonwoods. Because cottonwoods are considered a good indicator of the health of the lower American River riparian community, flow-related impacts to lower American River riparian vegetation associated with the cumulative condition would be considered less than significant.

Flows to Support Mature Cottonwood Radial Growth Maintenance - 1,765 cfs Index (March Through October)

Under the cumulative condition, monthly mean flows would not be substantially reduced below the 1,765 cfs flow index, relative to the existing condition. Under the existing condition, monthly mean flows below Nimbus Dam below 1,765 cfs would occur in 128 out of 560 months included in the analysis (March through October growing period). The cumulative condition would result in monthly mean flows below Nimbus Dam below 1,765 cfs in 154 out of 560 months included in the analysis for the March through October growing period. Overall, the cumulative condition below Nimbus Dam represent approximately a 4.6 percent increase in the frequency that monthly mean flows fall below 1,765 cfs, relative to the existing condition. Under the cumulative condition, monthly mean flows below H Street Bridge would fall below 1,765 cfs in 174 out of the 560 months included in the analysis, relative to 138 out of 560 months under the existing condition. Overall, the cumulative condition represents a 6.4 percent increase in the frequency that monthly mean flows below H Street Bridge fall below the 1,765 cfs index, relative to the existing condition.

For flows below Nimbus Dam or H Street Bridge at or above 1,765 cfs under the existing condition, the cumulative condition would reduce flows in only six occurrences during two or more consecutive months below the index, over the 70-year period of record, and these consecutive months would not occur during the critical growing months of April through July. Under the cumulative condition, there will be instances of the exacerbation of an already detrimental situation for cottonwood radial growth maintenance during the growing season. For flows below Nimbus Dam that are already below 1,765 cfs under the existing condition, there would be 67 occurrences during the March through October period in which flows under the existing condition that are already below 1,765 cfs would be reduced by five percent or more under the cumulative condition. However, in only eight occurrences would these flow reductions occur in two or more consecutive months, and in three of these eight instances the consecutive months would fall outside of the critical growing period of April through July. For flows below H Street Bridge, there would be 76 occurrences during the March through October period in which flows that are already below 1,765 cfs under the existing condition would be reduced by five percent or more under the cumulative condition. In 15 occurrences would these flow reductions occur in two or more consecutive months, and in seven of these 15 instances the consecutive months would fall outside of the critical growing period of April through July. Moreover, when flows are already below 1,765 cfs under the existing condition, radial growth maintenance of cottonwoods would not occur and, therefore, further flow reductions under the cumulative condition would not further deter the maintenance of cottonwoods.

Compared to the existing condition, the cumulative condition would result in monthly mean flows below the index for maintenance of radial growth of cottonwoods more often than under the existing condition; however, these flows would not be reduced with enough frequency to significantly alter existing riparian vegetation dependant on flows in the lower American River. This impact would be considered less than significant.

Flows to Support Some Cottonwood Growth - 2,000 cfs Index (March Through October)

Under the cumulative condition, monthly mean flows would not be substantially reduced below 2,000 cfs, relative to the existing condition. Under the cumulative condition, monthly mean flows below Nimbus Dam would fall below 2,000 cfs in 166 out of the 560 months included in the analysis for March through October, relative to 140 out of 560 months under the existing condition. Overall, the cumulative condition represents approximately a 4.6 percent increase in the frequency that monthly mean flows below Nimbus Dam fall below 2,000 cfs, relative to the existing condition. Under the cumulative condition, monthly mean flows below H Street Bridge would fall below 2,000 cfs in 212 out of the 560 months included in the analysis over the 70-year period of record, relative to 176 out of 560 months under the existing condition. Overall, the cumulative condition represents a 6.4 percent increase in the frequency that monthly mean flows below H Street Bridge would fall below 2,000 cfs, relative to the existing condition (Tables H-3.6-9 and H-3.6-10).

For flows below Nimbus Dam that are at or above 2,000 cfs under the existing condition, the cumulative condition would reduce flows below the flow index in only five occurrences of two or more consecutive months over the 70-year period of record, and these consecutive months would fall outside the critical growing months of April through July. For flows below H Street Bridge that are at or above 2,000 cfs under the existing condition, there would be only four occurrences of two or more consecutive months, over the 70-year period of record, in which the cumulative condition would reduce these flows below the index. None of these occurrences would occur during the critical growing period of April through July. Because these flow reductions would not occur with sufficient magnitude and frequency under the cumulative condition relative to the existing condition to significantly affect some growth in cottonwoods, this would represent a less-than-significant impact.

Flows to Support Reasonable to Maximum Cottonwood Growth Rates - 3,000 cfs Index (March Through October)

Under the cumulative condition, monthly mean flows would not be substantially reduced below 3,000 cfs, relative to the existing condition. Under the existing condition, monthly mean flows below Nimbus Dam below 3,000 cfs would occur in 302 out of 560 months included in the analysis for the March through October growing season. Under the cumulative condition, monthly mean flows below Nimbus Dam would fall below 3,000 cfs in 327 out of 560 months included in the analysis. Overall, the cumulative condition represents approximately a four percent decrease in the frequency that monthly mean flows below Nimbus Dam would be at or above 3,000 cfs, relative to the existing condition. Under the cumulative condition, monthly mean flows below H Street Bridge would fall below 3,000 cfs in 353 out of the 560 months included in the analysis for the growing season, over the 70-year period of record, relative to 320 out of 560 months that would fall below 3,000 cfs under the existing condition. Overall, the cumulative condition represents approximately a six percent decrease in the frequency that monthly mean flows below H Street Bridge would be at or above 3,000 cfs flow relative to the existing condition (Tables H-3.6-5 and H-3.6-6).

For flows below Nimbus Dam or H Street Bridge that are at or above 3,000 cfs under the existing condition, the cumulative condition would reduce flows below the index in three occurrences of two or more consecutive months over the 70-year period of record, and these consecutive months would fall outside of the critical growing period of April through July. Because these flow reductions would not occur with sufficient magnitude and frequency to significantly adversely affect reasonable to maximum growth in cottonwoods, this would represent a less-than-significant impact.

Flows to Support Terrace Inundation for Cottonwood Germination - 5,000 cfs Index

Previous field studies conducted on the lower American River concluded that peak flows between 5,000 and 13,000 cfs during April to July (the reported period for cottonwood seed release) are necessary to inundate terraces that are essential for cottonwood germination, with the highest terraces inundated at 50,000 cfs (CCOMWP 1999). The cumulative condition would result in only two instances of reduction in the number of occurrences for either Nimbus Dam or H Street Bridge in which mean peak flows would be above 5,000 cfs, relative to the existing condition. As a result, this impact would be less than significant.

Impact 3.6-32: Flow impacts to backwater pond recharge in the lower American River (Nimbus Dam and H Street Bridge).

Tables H-3.6-11 and H-3.6-12 present the frequency of occurrence of flows below the indices required for backwater recharge, below Nimbus Dam and at H Street Bridge, respectively, for existing and cumulative conditions.

Overall, changes in lower American River flows associated with the cumulative condition relative to the existing condition would result in more frequent reduction of flows below the indices for adequate recharge of backwater ponds closer to the lower American River, and the continued recharge of off-river backwater ponds. However, these flow reductions are not considered to be of substantial magnitude and/or to occur with enough frequency to have significant adverse effects on backwater pond habitat of the lower American River, and therefore would be considered less than significant.

Flows to Support Adequate Recharge of the Ponds Closest to the River - 2,700 cfs Index

Under the cumulative condition, monthly mean flows would not be substantially reduced below 2,700 cfs, relative to the existing condition. Under the existing condition, monthly mean flows below Nimbus Dam below 2,700 cfs would occur in 469 of the 840 months included in the analysis. The cumulative condition would result in monthly mean flows below 2,700 cfs in 489 of the 840 months included in the analysis. The cumulative condition would result in monthly mean flows below Nimbus Dam that would be below the index approximately 2.4 percent more often than under the existing condition. For flows below H Street Bridge, the existing condition would result in monthly mean flows below 2,700 cfs in 492 of the 840 months included in the analysis. The cumulative condition would result in monthly mean flows below 2,700 cfs in 527 of the 840 months included in the analysis. Overall, the cumulative condition would result in monthly mean flows below H Street Bridge that would be below the index approximately 4.2 percent more often than under the existing condition.

For flows below Nimbus Dam that are at or above 2,700 cfs under the existing condition, the cumulative condition would reduce flows below the flow index in only one occurrence of two or more consecutive months over the 70-year period of record. For flows below H Street Bridge that are at or above 2,700 cfs under the existing condition, the cumulative condition would reduce flows below the index in four occurrences of two or more consecutive months over the 70-year period of record. Because flow reductions under the cumulative condition would not occur with sufficient magnitude and/or frequency to significantly adversely affect adequate recharge of ponds closer to the lower American River relative to the existing condition, this would represent a less-than-significant impact.

Flows to Support Continued Recharge of Off-River Ponds – 4,000 cfs Index

Under the cumulative condition, monthly mean flows would not be substantially reduced below the 4,000 cfs flow index, relative to the existing condition. Under the existing condition, monthly mean flows below Nimbus Dam below 4,000 cfs would occur in 609 of the 840 months included in the analysis. The cumulative condition would result in monthly mean flows below 4,000 cfs in 644 of the 840 months included in the analysis. The cumulative condition would result in monthly mean flows below Nimbus Dam that would be below the index approximately 4.2 percent more often than under the existing condition. For flows below H Street Bridge, the existing condition result in monthly mean flows below 4,000 cfs in 623 of the 840 months included in the analysis. The cumulative condition would result in monthly mean flows below 4,000 cfs in 670 of the 840 months included in the analysis. Overall, the cumulative condition would result in monthly mean flows below H Street Bridge that would be below 4,000 cfs approximately 5.6 percent more often than under the existing condition.

For flows below Nimbus Dam that are at or above 4,000 cfs under the existing condition, the cumulative condition would reduce flows below the index in nine occurrences of two or more consecutive months for all months of the year, over the 70-year period of record. For flows below H Street Bridge that are at or above 4,000 cfs under the existing condition, the cumulative condition would reduce flows below the index in 12 occurrences of two or more consecutive months for all months of the year, over the 70-year period of record. These flow reductions under the cumulative condition would not occur with sufficient magnitude and/or frequency to significantly adversely affect continued recharge of off-river ponds relative to the existing condition; this would represent a less-than-significant impact.

Impact 3.6-33: Impacts to special-status species dependent on lower American River riparian and open water habitats.

As previously discussed, when compared to the existing condition, the cumulative condition would result in monthly mean flows below Nimbus Dam and H Street Bridge that are below the 1,765 cfs maintenance of radial growth in cottonwoods flow index approximately 4.6 and 6.6 percent more often, respectively. Moreover, for flows below Nimbus Dam or H Street Bridge already at or below the 1,765 cfs maintenance flow index under the existing condition, the cumulative condition would reduce flows in six occurrences during two or more consecutive months below the index, over the 70-year period of record, and these consecutive months would not occur during the critical growing months of April through July.

The cumulative condition also would not result in substantial reductions in monthly mean flows below Nimbus Dam and H Street Bridge below the 2,000 cfs index for some growth in cottonwoods relative to the existing condition. The cumulative condition would result in monthly mean flows below Nimbus Dam and H Street Bridge that are below the 2,000 cfs flow index approximately 4.6 and 6.4 percent more often, respectively. Also, for flows below Nimbus Dam that are at or above 2,000 cfs under the existing condition, the cumulative condition would reduce flows below the index in only five occurrences of two or more consecutive months over the 70-year period of record, and these consecutive months would fall outside the critical growing months of April through July. For flows below H Street Bridge that are at or above

2,000 cfs under the existing condition, there would be only four occurrences of two or more consecutive months, over the 70-year period of record, in which the cumulative condition would reduce these flows below the index. None of these occurrences would occur during the critical growing period of April through July. Because impacts to radial growth maintenance and some growth for cottonwoods resulting from the cumulative condition would be less-than-significant, impacts to special-status species associated with riparian and open water habitats also would be less-than-significant.

Impact 3.6-34: Impacts to special-status species dependent on lower American River backwater pond/marsh habitats.

Because impacts to recharge of ponds resulting from the cumulative condition relative to the existing condition would be less-than-significant, impacts to special-status species associated with backwater pond/marsh habitats also would be less-than-significant.

Impact 3.6-35: Impacts to elderberry shrubs and VELB.

USFWS has designated the American River Parkway as critical habitat for the VELB, and this species has been recorded in elderberry shrubs near backwater ponds along the lower American River. Because impacts to backwater habitats under the cumulative condition relative to the existing condition were determined to be less than significant, elderberry shrubs that are dependent on these habitats also are not expected to be adversely affected. Impacts to elderberry shrubs and VELB are considered less than significant.

Impact 3.6-36: Impacts associated with Folsom, Shasta, and Trinity reservoir vegetation.

Compared to the existing condition, the cumulative condition would result in lower long-term average end-of-month water elevations for Folsom, Trinity and Shasta reservoirs for the March through September growing period that would range from two to 11 feet. Folsom, Shasta, and Trinity reservoirs have water levels that routinely fluctuate seasonally and annually. Although the cumulative condition would result in variations in end-of-month water elevation relative to the existing condition, areas of high and consistent habitat values are not adversely affected. Therefore, water surface elevation fluctuations associated with the cumulative condition would represent a less-than-significant impact to reservoir vegetation in the project area.

Impact 3.6-37: Impacts to vegetation associated with the upper Sacramento River.

Under the cumulative condition, long-term average flows on the upper Sacramento River during the March through October growing season would be reduced relative to the existing condition. The cumulative condition would result in long-term average flow decreases below Keswick Dam ranging from 80 to 825 cfs during the growing season. In the context of riparian vegetation effects, the frequency and magnitude of flow decreases under the cumulative condition would be small considering that monthly mean flows would range from 5,016 to 13,149 cfs during the months of the growing season. For example, the individual 825 cfs flow reduction represents only a 6.1 percent reduction relative to the existing condition during that month. Because flow reductions in the upper Sacramento River during the growing period of March through October that would occur under the cumulative condition would not be of sufficient magnitude and/or frequency to significantly alter existing riparian vegetation dependent on the upper Sacramento River flows, impacts to riparian vegetation are considered less than significant.

Impact 3.6-38: Impacts to vegetation associated with the lower Sacramento River.

The largest long-term average flow reduction during the growing season of March through October under the cumulative condition relative to the existing condition would be 4.7 percent during the month of October. The cumulative condition would result in long-term average flow decreases at Freeport ranging from 399 to 828 cfs during most months of the growing season, and increases ranging from 36 to 466 cfs during the months of April, July, and August. In the context of riparian vegetation effects, the frequency and magnitude of these flow decreases under the cumulative condition would be small considering that monthly mean flows would range from 11,443 (i.e., October) to 33,065 cfs (i.e., March) during the months of the growing season. Also, tidal action influences the river stage in this area. Because flow reductions would not be of sufficient magnitude and frequency to significantly alter existing riparian habitats along the river, this would represent a less-than-significant impact.

In addition to lower Sacramento River flows, the Delta wetlands are very sensitive to fluctuations in water salinity, which are determined by flows into the Delta (San Francisco Estuary Project 1993). Under the cumulative condition, long-term average position of X2 would remain essentially equivalent to the existing condition. The maximum upstream shift for any individual month of the year in the position of X2, over the 70-year period of record, would be 4.4 km. Because Sacramento River flow reductions and shifts in X2 position would not be of a sufficient magnitude and frequency to significantly alter existing riparian habitats associated with the Delta, this would represent a less than significant impact.

Impact 3.6-39: Flow impacts to special-status species habitat of the Delta.

When compared to the existing condition, the cumulative condition would result in long-term average flow reductions in the Sacramento River during certain times of the year. However, these flows would not be reduced by sufficient magnitude and/or frequency to significantly alter existing habitats dependent on the Delta. In addition, under the cumulative condition, long-term average position of X2 would remain essentially equivalent to the existing condition. The maximum upstream shift for any individual month of the year in the position of X2, over the 70-year period of record, would be 4.4 km. Because Delta habitats would not be adversely affected, the special-status species dependent on these habitats also would not be expected to be adversely affected; therefore, this impact would be considered less than significant.

Impact 3.6-40: Impacts to vegetation and special-status species associated with Oroville Reservoir.

Compared to the existing condition, the cumulative condition would result in substantially lower long-term average end-of-month elevation for the March through September vegetation growing period over the 70-year period of record. Long-term end-of-month elevation reductions for Oroville Reservoir would range from 6 to 18 feet. During individual years, reductions of up to 76 feet in end-of-month elevation would occur. Given the relatively large reduction in end-of-month water surface elevation indicated by the modeling results, potentially significant impacts to vegetation associated with Oroville Reservoir would occur under the cumulative condition.

Action Alternatives' Incremental Contribution to the Cumulative Condition

No substantial changes in reservoir elevation would be anticipated under the cumulative condition relative to the future base. The increase in future SWP demands is the primary factor leading to cumulative effects. The Action Alternatives' contribution to the cumulative condition would not be considerable.

Impact 3.6-41: Impacts to vegetation and special-status species associated with the Feather River.

As previously mentioned, the primary growing season for riparian vegetation within this region occurs during the months of March through October. The largest long-term average flow reduction under the cumulative condition relative to the existing conditions for the March through October growing period would be 5.7 percent during the month of March. Conversely, long-term average flow increases under the cumulative condition relative to the existing conditions for the March through October growing period would be up to 36.4 percent (i.e., August). Changes in flow for the Feather River represent a less-than-significant impact to riparian vegetation and associated special-status species.

3.6.2.5 Environmental Protection and Mitigation Measures

The mitigation measures shown below have been incorporated into the Mitigation Plan (Appendix D of the Final EIS/EIR) to reduce the impacts upon terrestrial resources to levels considered less than significant.

Establish Buffer Zone to Avoid Disturbance of and Prevent the Permanent Loss of Riparian, Wetland and Pond Vegetation and Associated Habitat

Riparian, wetland, and pond vegetation exist at and adjacent to (upstream and downstream) the Project site. Avoidance buffer zones will minimize the extent of habitat disturbance or modification due to Project construction. Ultimately, restoration of the river channel will result in improvements to aquatic habitat conditions at the site, relative to the existing condition.

Commitment:	Establish a 10-foot buffer zone around all riparian and wetland or pond areas to be avoided during construction. Clearly mark the buffer area with temporary fencing, flagging or other suitable material.
Responsible Parties:	Reclamation/Construction Contractor
Location:	Project area
Timing:	During all phases of construction (2002 through 2004)
Monitoring:	Monitoring to ensure temporary buffer markers remain in place
Reporting Requirements:	Daily inspector reports

Description of Activities:
Reclamation will require the Construction Contractor to identify and create buffer zones around riparian, wetland and pond habitats within and immediately adjacent to the Project area. The Construction Contractor will indicate the buffer zones and avoidance areas with temporary markers and/or fencing.

Success Criteria:
Riparian, wetland and pond habitat buffer zones will remain clearly marked throughout construction and encroachment will be avoided by construction personnel.

Minimize Impacts Upon State and Federal Special-Status Species in the Project Area

Commitment:	Protect individuals and habitat for state and federal special-status species from Project construction impacts by performing pre-construction site surveys. Inform Construction Contractor personnel of potential presence of special status species in the Project area and provide procedures for avoidance or relocation, if necessary, to USFWS- or CDFG-designated habitat.
Responsible Parties:	Reclamation/Construction Contractor - On-site Monitor
Location:	Project area/river channel
Timing:	Prior to and during all phases of construction (2002 through 2004)
Monitoring:	No specific monitoring requirements
Reporting Requirements:	Conduct survey and document results. Construction personnel will indicate participation in education/ informational session by signing participation statements.

Description of Activities:
Reclamation biologists will conduct a site survey to evaluate potential presence of special status species (**Table 3.6-6**) within project construction area. Information regarding the state and federal special-status species that potentially occur within the Project construction area will be included in the Construction Contractor personnel education/information presentations and materials. Table 3.6-6 lists those species which are classified as "species of concern" (SC) by USFWS or as "California species of concern" (CSC) by CDFG, and which may occur in the project area.

Success Criteria:
Document completion of survey and successful avoidance and/or relocation of these species, as needed, in construction compliance reports.

Table 3.6-6 Federal and State Species of Concern That May Occur in the Project Area		
Common Name	**Species Name**	**Status Federal [a]/State [b]**
Amphibians		
Foothill Yellow-legged Frog	*Rana boylei*	SC/CSC
Reptiles		
California Horned Lizard	*Phrynosoma coronatum frontale*	SC/CSC
Mammals		
Spotted Bat	*Euderma maculatum*	SC/CSC
Greater Western Mastiff-bat	*Eumops perotis californicus*	SC/--
[a] Federal status: SC = Species of Concern [b] State status: CSC = California Species of Concern -- = No listing		

Measures for Entrapped, Injured or Dead Special-Status Animal Species

Commitment: All reasonable efforts will be made to allow any entrapped animals to escape. Any dead or injured animals will be turned over to CDFG or USFWS.
Responsible Parties: Reclamation/Construction Contractor - On-site Monitor
Location: Entire Project area, including staging sites and access routes
Timing: During all phases of construction (2002 through 2004), as needed
Monitoring: No specific monitoring requirement
Reporting Requirements:
A written report detailing the date, time, location, and general description of the circumstances under which an animal was found must be submitted to CDFG and/or USFWS no later than three business days following the incident.

Description of Activities:
Reclamation will require the Construction Contractor to ensure that all injured or killed special-status species are reported to CDFG or USFWS and handled appropriately.

Success Criteria:
All incidents are reported to CDFG or USFWS and handled appropriately. Include documentation in construction compliance reports.

Restoration of Permanent Riparian, Wetland and Pond Vegetation/Habitat Loss

Commitment: Restoration of river channel through Project area will provide enhancement of wetland and riparian habitat such that all construction-related permanent vegetation loss is fully mitigated.
Responsible Party: Reclamation
Location: Project area/river channel

Timing: Post-construction
Monitoring: Monitor re-establishment of wetland, pond, and riparian vegetation associated with the restored river channel
Reporting Requirements: Provide Summary Reports, including photographs of the Project site, with benchmarks prior to construction, and at years 1, 3, 5, and 10 following river restoration

Description of Activities:
Restoration of the North Fork American River channel, including creation of a "naturally functioning" river system will provide overall vegetation and associated habitat enhancement at the Project site. Reclamation will monitor the long-term natural re-establishment of vegetation and habitat areas and report to resources and permitting agencies. In consultation with these agencies, Reclamation may implement an adaptive vegetation restoration strategy, if needed, to supplement natural re-growth at the site.

Success Criteria: Document natural re-establishment of vegetation in Project area.

<u>Other Related Mitigation Measures</u>

Fish Resources and Aquatic Habitat, Mitigation Measure 3.1-2, avoids changes to the flow and water source composition of Auburn Ravine, thereby avoiding any Project-related change to terrestrial (riparian) resources along the Auburn Ravine corridor.

Noise, Mitigation Measure 3.9-2, results in lower operational noise levels in the Project area than under existing conditions, reducing operational noise impacts to wildlife.

Public Health and Worker Safety Mitigation Measure 3.10-5, design of the public river access features includes installation of posts and other barriers to prevent off-road travel, thereby minimizing the impacts of increased vehicular access at the Project site upon individual wildlife species and habitat.

3.7 WATER QUALITY

3.7.1 AFFECTED ENVIRONMENT

3.7.1.1 Regional Setting

The regional setting includes water bodies whose water quality may be indirectly affected by the Proposed Project or alternatives. Because the Proposed Project and other reasonably foreseeable actions within the American River Basin would result in changes to CVP system operations, and potentially influence SWP operations, certain CVP and SWP system components and associated waterways are included in the regional study area. These facilities include: Trinity and Shasta reservoirs, the upper and lower Sacramento River, Folsom Reservoir, Lake Natoma, the lower American River, Delta, Oroville Reservoir, and the Feather River. Detailed descriptions of the beneficial uses and water quality of these resources are included in the Cumulative Report (Appendix D of the Draft EIS/EIR).

3.7.1.2 Project Area Setting

The project area represents the direct effect study area for water quality and includes the Middle Fork American River from below Ralston Afterbay to the confluence with the North Fork American River and downstream to Oregon Bar (Figure 2-2).

The beneficial uses of the Middle and North Forks of the American River include:

- Municipal and domestic supply
- Agricultural supply
- Water contact and non-contact recreation
- Potential warm freshwater habitat
- Cold freshwater habitat
- Cold freshwater spawning, reproduction, and/or early development of fish
- Wildlife habitat

Water quality in the American River is considered to be good, although historical water quality data for the North Fork and Middle Fork are sparse (Corps 1991). During construction activities for Auburn Dam, Reclamation collected water samples at two sites upstream of the Auburn Dam construction site and two sites downstream. These samples were analyzed for pH and turbidity. Although construction of Auburn Dam was halted in 1977, monitoring was conducted weekly until 1995. Data for 1991 and 1992 were evaluated. Because data for other years shows little variation, the 1991-1992 water year is considered to be representative of the entire period (P. Vonich, pers. comm. 1998). Turbidity was low at the nearest downstream and upstream monitoring sites, with annual averages just below or above one Nephelometric Turbidity Unit (NTU). The pH ranged from 7.0 to 8.2 at the four monitoring sites. Information on sediment in the river was not readily available; however, turbidity results indicate the river carries little sediment during low flows.

Several wastewater sources discharge into the North and Middle Forks of the American River, or to their tributaries. Sources of wastewater discharge include two sawmills located at Foresthill; one is on a tributary to Devil's Canyon and the North Fork American River, the other discharges directly into the Middle Fork American River.

3.7.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.7.2.1 Methodology

Facilities-Related Analysis Approach

The anticipated construction, operation, and maintenance impacts on water quality were assessed in part by consulting with project engineers on the project design team and Reclamation staff. Specifically examined were the diversion and intake structure configurations, changes in sedimentation at the diversion structure, and channel stability as it relates to water quality.

The impact assessment focuses primarily upon recreation and drinking water uses because these water quality standards are more stringent than water quality standards for other beneficial uses and purposes. The effects of the project on water quality for fisheries resources, primarily water temperature-related, are discussed in Section 3.5, Fish Resources and Aquatic Habitat. Wildlife uses generally receive lower water quality standards than fish; groundwater recharge, and industrial and agricultural supply require lesser standards than drinking water supply; and navigation and power generation are not dependent on water quality.

Diversion-Related Analysis Approach

The assessment of water quality impacts within the regional study area water bodies focuses on the potential for the alternatives to result in increased water quality constituent concentrations through the reduced contribution of flows with low constituent concentrations. The focus of the analysis is on the quality of water available to downstream users for drinking water supply and for recreational uses of the river downstream of the project site. Reclamation's PROSIM model was used to simulate hydrologic conditions over a 70-year period of record (1922 through 1992) for Folsom Reservoir, the lower American River, and the Sacramento River, including the Delta.

The evaluation of water quality impacts is based on a comparison of CVP reservoir surface water storage volumes and American and Sacramento river flows under existing and future conditions with and without the project. Because the timing and amount of the proposed diversion increases under the Proposed Project and Upstream Diversion Alternative are identical, the analysis of impacts is combined into one discussion and referred to as "Action Alternatives."

The model simulations and comparisons were described in Section 3.3.2. Additional details of the hydrologic modeling process are included in Appendix E of the Draft EIS/EIR.

3.7.2.2 Applicable Laws, Ordinances, Regulations, and Standards

Applicable laws, ordinances, regulations, and standards were reviewed to identify permitting and other regulatory compliance requirements for the alternatives. The Corps, RWQCB, CDFG, CDPR, and the counties of Placer and El Dorado have water quality policies and/or standards applicable to the study area. Water quality-related objectives, policies, and permit requirements are discussed below.

Regional Water Quality Control Board - Water Quality Control Plan

In the WQCP for the Central Valley Region (the Basin Plan), the RWQCB (1994) establishes beneficial uses for water bodies in the Sacramento River basin. Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning. The RWQCB establishes water quality objectives to protect these beneficial uses from waste discharges. Water quality objectives are defined as the limits or levels to which constituents (e.g., copper) or characteristics (e.g., temperature) can be changed without unreasonably affecting beneficial uses.

Based on the beneficial uses identified for regional and project area water bodies listed in Section 3.7.1 and Appendix D, Chapter 3.0, of the Draft EIS/EIR, and a review of the waste discharges that could result from the alternatives, a summary of the water quality constituents potentially altered were identified and are listed in **Table 3.7-1**. The RWQCB objectives for these constituents for the affected water bodies also are described.

Table 3.7-1
Water Quality Objectives for the Affected Water Bodies

Constituent	Beneficial Use	Objective
Sediment	All uses	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.
Turbidity	All uses	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits: ❑ Where natural turbidity is between 0 and 5 NTU, increases shall not exceed 1 NTU. ❑ Where natural turbidity is between 5 and 50 NTU, increases shall not exceed 20 percent. ❑ Where natural turbidity is between 50 and 100 NTU, increases shall not exceed 10 percent. ❑ Where natural turbidity is greater than 100 NTU, increases shall not exceed 10 percent.
Source: RWQCB 1994		

The RWQCB Basin Plan allows conditional waivers of waste discharge requirements for construction activities under the limitation that BMPs are implemented. The assumption is that if these BMPs are implemented properly, the Basin Plan water quality objectives will be met. For longer-term construction projects (e.g., requiring more than a few days), daily monitoring is required to confirm that water quality objectives are being met. A mixing zone of approximately 100 to 300 feet may be allowed, depending on site conditions (K. Landau, pers. comm. 1998).

BMPs for construction activities are designed to minimize erosion and control sedimentation. The objectives of these BMPs generally are to:

- Minimize soil disturbance/vegetation removal;
- Stabilize and revegetate soils after disturbance and before the rainy season;
- Trap loosened sediments; and
- Design an adequate stormwater runoff control system (Basin Plan).

Maintenance activities, as with construction activities, also are required to meet the Basin Plan's water quality objectives. Generally, short-term maintenance activities are assumed to not result in violations of water quality objectives. For longer-term maintenance activities (e.g., a week-long activity occurring more than once a month), daily monitoring is required to confirm that water quality objectives are being met. A mixing zone of approximately 100 to 300 feet would be allowed, depending on site conditions (K. Landau, pers. comm. 1998).

El Dorado County General Plan

The El Dorado County General Plan (1995) has several goals, objectives, and policies applicable to water quality, including:

Goal 7.3 Conserve, enhance, and manage water resources and protect their quality from degradation.

Objective 7.3.2 Maintenance of and, where possible, improvement of the quality of underground and surface water.

Policy 7.3.2.1 Stream and lake embankments shall be protected from erosion, and streams and lakes shall be protected from excessive turbidity.

Placer County General Plan

The Placer County General Plan (1994) has two policies that address water quality:

Policy 6.A.4(e) Where creek protection is required or proposed, the County should require public and private development to:

> Use design, construction, and maintenance techniques that ensure development near a creek will not cause or worsen natural hazards (such as erosion, sedimentation, flooding, or water pollution) and will include erosion and sediment control practices such as: (1) turbidity screens and other management practices, which shall be used as necessary to minimize siltation, sedimentation, and erosion, and shall be left in place until disturbed areas are stabilized with permanent vegetation that will prevent the transport

of sediment off-site; and (2) temporary vegetation sufficient to stabilize disturbed areas.

Policy 6.A.7 The County shall discourage grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of creeks and damage to riparian habitat.

3.7.2.3 Impact Indicators and Significance Criteria

Table 3.7-2 lists the impact indicators and significance criteria used in the water quality analysis.

Table 3.7-2
Water Quality Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ Turbidity of the North Fork American River.	❑ An increase in the natural turbidity of the North Fork American River of 1 NTU or greater (applying an appropriate mixing zone). [a]
❑ Potential for increased concentration of contaminants in affected water bodies indicated by decreases in: ▪ end-of-month reservoir storage for Folsom, Shasta, Trinity; or Oroville; and ▪ monthly mean flow for lower American River, upper and lower Sacramento River and Feather River below Oroville Reservoir.	❑ A substantial increase in the concentration of contaminants in affected water bodies, based on: ▪ A substantial change in end-of-month reservoir storage, relative to the basis of comparison, for any month of the year over the 70-year simulation for Folsom, Shasta, Trinity, and Oroville reservoirs, or ▪ Change in monthly mean flow (cfs) of substantial magnitude or frequency, for any month of the year over the 70-year simulation, for the lower American River (Nimbus Dam and Watt Avenue), upper Sacramento River (Keswick), and lower Sacramento River (Freeport) and Feather River.
Monthly mean location of X2 and Delta export/inflow ratios for all months of the year.	▪ Change in position of X2 and Delta exportl/inflow ratio, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect water quality and downstream transport flows over the 70-year period of record.

[a] The natural turbidity in the North Fork American River is between 1 and 5 NTU. An increase of 1 NTU was chosen in accordance with RWQCB objectives for turbidity levels in this range (see Table 3.7-1). Note: further consideration of this requirement is anticipated as part of the regulatory permitting process to be undertaken prior to construction of the selected alternative.

3.7.2.4 Impact Analysis

This section presents the analysis of potential facilities- and diversion-related water quality impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

Facilities-Related Impacts

No Action/No Project Alternative

Impact 3.7-1: Construction activities could increase sediment and turbidity in the river, which would affect the quality of water available for downstream beneficial uses.

Under the No Action/No Project Alternative, installation of the seasonal pumps would occur earlier in the diversion season, and removal would occur later in the fall/early winter, making it more vulnerable to damage from high river flows. Installation and removal activities would involve the same practices as currently implemented during seasonal pump station construction, including compliance with regulatory permit terms and conditions to protect water quality. Additional protection measures, including monitoring, may be required in the event of high flows and/or flooding could require occasional rebuilding of the sump pond and reinstallation of project facilities. These measures would be developed through consultation with the Corps, RWQCB, and CDFG, as appropriate. Therefore, compared to the existing condition, turbidity would not be expected to increase by more than 1 NTU. Therefore, the impact would be less than significant.

Proposed Project

Impact 3.7-2: Construction of the pump station and river access facilities could increase sediment and turbidity in the river, which could affect the quality of water available for downstream beneficial uses.

Construction activities for the Proposed Project would involve considerable excavation and spoil movement (up to one million cubic yards), however, much of this excavation would occur in the dewatered channel or other disturbed areas at the site. Closure of the bypass tunnel would require some in-river activity. The movement of such a large amount of material related to channel excavation has the potential to result in increased sediment loading and elevated turbidity levels in the American River and downstream of the project site due to the potential for loose materials to be deposited in the river channel. This potential impact would be minimized to levels considered less-than-significant through standard BMPs discussed later in this section.

Road widening would result in vegetation removal and associated soil disturbance that could result along the embankment adjacent to the road, which potentially would increase turbidity in the receiving waters. Collectively, the construction-related ground-disturbing impacts are not anticipated to result in a substantial amount of soil disturbance. Development of the turnaround and three parking spaces across from the bypass tunnel outlet would occur as part of the channel restoration activities, and would occur prior to re-watering the riverbed. Due to the distance from the river there would be no direct contribution of soil or rock materials to the river. All materials to be removed from the channel would be deposited in designated excavation material disposal locations and stabilized prior to re-watering of the river channel. The parking area proposed for the former Auburn Dam concrete batch plant also is a sufficient distance from the river that no direct contribution of construction materials to the water would be anticipated. Implementation of construction BMPs for erosion control and grading activities would minimize the potential for direct release of materials to the river during road widening and trail improvements that would take place between the upper flat parking area and Oregon Bar at the river. Few improvements would be made from the point of the proposed vehicle turnaround area near Oregon Bar and the river itself. These improvements generally would include development of improved drainage courses for surface water runoff and would be performed manually to minimize the extent of vegetation and ground disturbance.

Incorporation of environmental protection measures, including compliance with regulatory permit terms and conditions, would serve to minimize the release of sediments and other materials into the river channel. It is expected that such measures would prevent the elevation of turbidity levels above unacceptable levels. Additionally, because of the scope and duration of the construction activities, the construction contractor would be responsible for water quality monitoring at designated sampling sites up and downstream of the construction activity to confirm that water quality objectives are being met. The details of this monitoring program would be determined through the permitting and consultation with RWQCB. Should the monitoring results indicate an unacceptable increase of turbidity levels due to construction, the lead agencies, in consultation with the RWQCB, would develop and implement additional protective measures to prevent significant water quality impacts.

Construction activities also would comply with the Corps' Nationwide Permit, and the RWQCB's Water Quality Certification and NPDES Permit, which necessitate measures that would minimize increases in sedimentation and turbidity. These measures would be documented in a construction erosion and sedimentation control plan to be developed and approved prior to commencement of construction. The plan would identify the specific BMPs for control of sediment transport, including specific regulatory permit terms. The BMPs would be identified in the construction specifications. Specific BMPs that that may be incorporated into the plan for the selected alternative are listed under Section 3.7.2.5, Environmental Protection and Mitigation Measures.

Additionally, the NPDES Permit compliance would include development and implementation of a stormwater pollution prevention plan (SWPPP) for the construction site, including staging areas. Required elements of the SWPPP include:

- Specific erosion and sediment control practices;
- Post-construction controls; and
- Monitoring and inspection.

The relationship of the project site to the nearest water supply intakes and the planned closure of the river in the vicinity of construction activities further minimize the potential for water quality to affect these uses. The distance to the nearest water supply intakes at Folsom Dam (13 to 14 miles) combined with the sedimentation that occurs in the reservoir would reduce the potential for impacts upon drinking water quality.

Implementation of the BMPs and compliance with regulatory permit terms and conditions would result in a less-than-significant impact upon the downstream water quality and designated beneficial uses.

Increases in sedimentation and turbidity sedimentation and turbidity due to the Proposed Project would be expected to be greater than during No Action/No Project Alternative seasonal pump station construction activities, but would be mitigated through implementation of specific BMPs, such as the ones listed above, or others as determined appropriate for the project through consultation and permitting with regulatory agencies.

Impact 3.7-3: Operation and maintenance activities could increase sediment and turbidity in the river and affect the quality of water available for downstream beneficial uses.

Short-term maintenance activities generally are assumed to not violate water quality objectives. Short- and long-term maintenance activities would be performed in compliance with regulatory permit terms and conditions. These conditions typically specify minimization of water quality impacts by limiting all in-river activities to the extent practicable and requiring proper disposal of excavated materials away from the river channel. For longer-term maintenance activities (e.g., a week-long activity occurring more than once a month), turbidity monitoring upstream and downstream of the diversion structure would be required to determine if activities are in compliance with water quality objectives. If turbidity is increased by more than 1 NTU, maintenance practices would be modified to decrease sedimentation disturbance. Compliance with these measures would ensure that maintenance-related activities of the Proposed Project result in less-than-significant water quality impacts at and downstream of the project site, thereby protecting downstream beneficial uses.

The Proposed Project maintenance activities generally would result in the same types of potential impacts at the project site, primarily the potential to disturb ground surfaces adjacent to the river channel from on-site travel, or the river bed due to in-river dredging. Under the Proposed Project, the need for in-river work likely would be reduced to once every three or four years, depending upon the effects of seasonal flooding upon the diversion structure, compared to annual dredging performed as part of the seasonal pump station activity. As described above, the Proposed Project maintenance activities would be in compliance with regulatory permits and prevent the increase of sedimentation and turbidity levels in compliance with state standards. It is anticipated that the Proposed Project would result in a less than significant water quality impact compared to existing and No Action/No Project Alternative conditions.

Impact 3.7-4: Use of the public river access sites and associated road and trail improvements could increase runoff contaminants and increase turbidity in the North Fork American River.

Use of the river access parking areas potentially would involve up to 53 cars at one time on a peak summer day. These vehicles could result in increased contribution of oil or other contaminants to local surface water runoff. Using stormwater control BMPs, the parking areas would be designed to reduce the potential for direct contribution of vehicle-related materials to the river.

Additionally, the public river access areas would include installation of sanitary facilities including restrooms and trash containers to minimize potential water quality impacts from increased human activity in the project area. Based on the limited use of the area and inclusion of proper drainage and sanitary improvements, increased use of the area is anticipated to have a less-than-significant impact on water quality.

It is also noted that the Proposed Project would not result in use of motorized watercraft in the project area, therefore, pollutants associated with motorized watercraft would not be introduced to the project area.

Upstream Diversion Alternative

Impact 3.7-5: Construction activities could increase sediment and turbidity in the river, which could affect the quality of water available for downstream beneficial uses.

Construction activities for the Upstream Diversion Alternative would be similar to the Proposed Project, however, the dewatered river channel would not be restored and the pubic river access sites would not be developed. A much smaller quantity of excavation would take place (72,000 cubic yards). As with the Proposed Project, construction activities result in the potential to increase sedimentation and turbidity in the American River at and downstream of the project site, possibly affecting the quality of water available for downstream beneficial uses.

The environmental protection measures and permit compliance requirements described for the Proposed Project (Impact 3.7-2) generally would be the same for the Upstream Diversion Alternative. Implementation of these measures would result in less-than-significant impacts upon the quality of water available for downstream drinking water and recreation uses.

Sedimentation and turbidity increases would potentially be greater under the Upstream Diversion Alternative than under the No Action/No Project Alternative; however, due to the implementation of environmental projection measures, turbidity levels in the river are not anticipated to increase above acceptable levels. These activities therefore represent a less-than-significant impact.

Impact 3.7-6: Operation and maintenance activities could increase sediment and turbidity in the river and affect the quality of drinking water available to downstream users.

Maintenance activities under the Upstream Diversion Alternative would be similar to those required for the Proposed Project. As for the Proposed Project (see Impact 3.7-3), the Upstream Diversion Alternative maintenance practices would include water quality protection measures and monitoring for turbidity to ensure levels do not increase by more than 1 NTU. These practices would therefore result in less-than-significant effects upon local and downstream water quality. As for the Proposed Project, the impact upon downstream water quality for drinking water and recreation uses would be less than significant.

Cumulative Facilities-Related Impacts

Impact 3.7-7: Construction, operation and/or maintenance of the alternatives could contribute to cumulative water quality impacts which could affect the quality of water available for downstream beneficial uses.

Because the Proposed Project or alternatives would incorporate extensive measures to minimize and prevent potential water quality impacts, the project is not anticipated to result in a contribution to cumulative water quality impacts for the North Fork American River. Additionally, ongoing and future activities within the canyon (such as annual installation of the seasonal pumps and future planned projects involving Foresthill Bridge) already include or would be required to incorporate similar protection measures to minimize degradation of river water quality.

Assuming implementation of project-specific environmental protection measures and compliance with permit terms and conditions (see Impacts 3.7-2, 3.7-3, and 3.7-4), the alternatives would result in a less-than-significant contribution to cumulative facilities-related impacts upon water quality.

Diversion-Related Impacts

The diversion-related analysis refers to certain tables and graphs prepared to provide additional representation of the modeling results and comparison of simulated conditions. These tables and figures are included in Appendix H to the Draft EIS/EIR and are labeled by the appendix letter, resource section number, and ordered as it is referenced in the impact analysis (H-3.6-1, H-3.6-2, etc.). Additionally, the reader is referred to the Hydrologic Modeling Technical Memorandum (Appendix E of the Draft EIS/EIR) and to the model data output (Appendix I of the Draft EIS/EIR).

The only potential diversion-related effect to water quality in the upper American River would be to water temperature in the river below the diversion site. These effects are addressed in Section 3.5, Fish Resources and Aquatic Habitat.

No Action/No Project Alternative

The increased pump station diversion under the No Action/No Project Alternative would be less than evaluated for the Action Alternatives (see below). Based on the evaluation of modeling performed for the Action Alternatives, it is expected that the No Action/No Project Alternative would not result in significant increases in contaminant concentrations downstream of the project site or in other CVP system water bodies.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the Existing Condition

The Proposed Project and the Upstream Diversion Alternative would result in the same timing and quantity of increased diversions from the American River. Changes in CVP or SWP operations associated with the Action Alternatives also would be the same. Therefore, the diversion-related analysis presented below represents the potential impacts that could occur with the Action Alternatives.

Impact 3.7-8: Increased diversions could result in increased concentration of contaminants in the North Fork American River, which could affect the quality of drinking water available downstream and at other locations in the CVP system.

Increased diversions from the North Fork American River associated with an Action Alternative could be expected to reduce storage levels in Folsom Reservoir and to reduce flows in the lower American River. Because the CVP reservoirs are operated in an integrated fashion, reduced storage levels in Folsom Reservoir have the potential to affect storage levels in Shasta and Trinity reservoirs and to affect flows in the Sacramento River and into the Delta.

Reduced contribution of high quality flows from the North Fork American River can potentially affect water quality in downstream water bodies by reducing dilution flows. The potential for this indirect effect on water quality would be greatest during the summer time when flows were already low. Loss of dilution is most important where a high quality flow is diluting a poor quality water flow. However, since the North Fork American River and Folsom Reservoir are of relatively high quality water, the importance of dilution is minor.

Reduction in water flows in the lower American River and reduction in storage levels in Folsom Reservoir due to the Action Alternatives would not be substantial when compared to existing conditions. Long-term average storage levels in Folsom Reservoir would be reduced by less than 1 percent. Long-term average flows in the lower American River would be reduced by less than 2 percent. Lower Sacramento River flows would be reduced by less than 0.1 percent on average. Shasta Reservoir and Trinity Reservoir storage levels would be reduced by less than 0.1 percent as a long-term average. Upper Sacramento River flows would be changed even less. These small reductions in dilution flows, acting indirectly on concentrations or levels of water quality parameters have only a small potential to impact water quality.

Levels or concentrations of water quality parameters of interest such as nutrients, pathogens, total dissolved solids, total organic carbons, turbidity, and priority pollutants (e.g., metals, organics) would not be expected to be altered substantially, if at all, by the Action Alternatives. Any direct or indirect impacts to water quality in downstream or other CVP project area water bodies resulting from reductions in North Fork American River flows would be less than significant.

Overall, measurable increases in constituent concentrations/levels that could occur under the project alternatives would not be expected to be sufficiently large to cause state or federal drinking water quality criteria or standards to be exceeded in the downstream or project area water bodies when they would not otherwise be exceeded. Therefore, impacts to water quality due to the Proposed Project or Upstream Diversion Alternative would be less than significant.

Impact 3.7-9: Impacts to Delta water quality.

Throughout the entire 70-year period of record included in the analysis, Delta outflow reductions of more than three percent occurred during only seven individual months (out of 350 months) under the Action Alternatives relative to the existing condition. Under the Action Alternatives, there would be no shift in the long-term average position of X2 relative to the existing condition.

The model simulations conducted for the Action Alternatives included conformance with X2 requirements set forth in the SWRCB Interim Water Quality Control Plan, as well as Interior's Final Administrative Proposal for the Management of 3406(b)(2) Water. Therefore, the Delta export-to-inflow ratios under the Action Alternatives would not exceed the maximum export ratio as set by the SWRCB Interim Water Quality Control Plan. Overall, impacts to Delta water quality would be considered less than significant.

Impact 3.7-10: Impacts to Oroville Reservoir or Feather River water quality.

The Action Alternatives would not result in substantial changes in storage or elevation at Oroville Reservoir, or in flow in the Feather River, relative to the existing condition. Any small changes that might occur would be considered less-than-significant impacts upon water quality and related beneficial uses. See discussion under Impact 3.7-8.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the No Action/No Project Alternative in the Future (2025)

Impact 3.7-11: Increased diversions could result in increased concentration of contaminants in the North Fork American River, which could affect the quality of drinking water available downstream and at other locations in the CVP system.

Increased diversions from the North Fork American River associated with the Action Alternatives as compared to the future No Action/No Project Alternative could be expected to reduce storage levels in Folsom Reservoir and to reduce flows in the lower American River. Because the CVP reservoirs are operated in an integrated fashion, reduced storage levels in Folsom Reservoir have the potential to affect storage levels in Shasta and Trinity reservoirs and to affect flows in the Sacramento River and into the Delta.

Reduction in water flows in the lower American River and reduction in storage levels in Folsom Reservoir due to the Action Alternatives would not be substantial compared to the No Action/No Project Alternative. Long-term average storage levels in Folsom Reservoir would be reduced by less than one percent. Long-term average flows in the lower American River would be reduced by less than two percent. Lower Sacramento River flows would be reduced by less than 0.1 percent on average. Shasta Reservoir and Trinity Reservoir storage levels would be reduced by less than 0.1 percent as a long-term average. Upper Sacramento River flows would be changed even less. These small reductions in dilution flows, acting indirectly on concentrations or levels of water quality parameters have only a small potential to impact water quality.

Levels or concentrations of water quality parameters of interest would not be expected to be altered substantially, if at all, by the Action Alternatives. Any direct or indirect impacts to water quality in these water bodies resulting from reductions in North Fork American River flows or Folsom Reservoir storage would be less than significant.

Overall, measurable increases in constituent concentrations/levels that could occur under one of the Action Alternatives would not be expected to be sufficiently large to cause state or federal water quality criteria or standards to be exceeded in the downstream or project area water bodies when they would not otherwise be exceeded. Therefore, impacts to water quality due to the Action Alternatives relative to the No Action/No Project Alternative would be less than significant.

Impact 3.7-12: Impacts to Delta water quality.

Reductions in the long-term average Delta outflow of up to 0.3 percent for any given month would occur under the Action Alternatives relative to the No Action/No Project Alternative, as shown in Table H-3.5-51. In 40 of the 840 months simulated, the Delta outflow was reduced by more than one percent relative to the future No Action/No Project Alternative. There were only eight months out of the 840 months included in the analysis, or about one percent of the time, when the Delta outflow would decrease by more than three percent under the Action Alternatives relative to the No Action/No Project Alternative.

Under the Action Alternatives, there would be only a 0.1 km upstream shift in one month's long-term average position of X2 relative to the long-term average position under the No Action/No Project Alternative.

The Delta export-to-inflow ratios under the Action Alternatives relative to the No Action/No Project Alternative would not exceed the maximum export ratio as set by the SWRCB Interim Water Quality Control Plan. Overall, impacts to Delta water quality would be less than significant.

Impact 3.7-13: Impacts to Oroville Reservoir or Feather River water quality.

The Action Alternatives would not result in substantial changes in storage or elevation at Oroville Reservoir, or in flow in the Feather River, relative to the No Action/No Project Alternative. Any small changes that might occur would be considered less-than-significant impacts upon water quality and related beneficial uses. See discussion under Impact 3.7-11.

Cumulative Impacts

The cumulative effects were determined based on a comparison of the future condition with implementation of an Action Alternative plus other reasonably foreseeable actions or projects (cumulative condition) to existing conditions. In instances where potentially significant or significant effects are identified, there is a further analysis to determine the Action Alternatives' incremental contribution to the cumulative condition. The reader is referred to Appendix E for further explanation of the modeling methodology and assumptions and Appendix I for results from the simulations.

Impact 3.7-14: Increased diversions could result in increased concentration of contaminants in the North Fork American River, which could affect the quality of drinking water available downstream and at other locations in the CVP study area.

Changes in operation of the CVP system associated with the cumulative condition could be expected to substantially reduce storage levels in Folsom, Shasta, Trinity, and Oroville reservoirs and to substantially reduce flows in the lower American River, Sacramento River, and Feather River compared to existing conditions. Long-term average storage levels would be reduced by up to 11 percent in Folsom Reservoir, up to 7 percent in Shasta Reservoir, up to 5 percent in Trinity Reservoir, and up to about 8 percent in Oroville Reservoir. Long-term average flows would be reduced by up to 15 percent in the lower American River, up to 10 percent in the upper Sacramento River, up to 5 percent in the lower Sacramento River, and up to about 14 percent in the lower Feather River. The greatest reduction in flow would be in September, October and November - months when the existing flow is already low. These reductions in dilution flows, acting indirectly on concentrations or levels of water quality parameters have potential to impact water quality.

Increases in constituent concentrations or levels that may occur under the cumulative condition could be sufficiently large to cause state or federal water quality criteria or standards to be exceeded in the downstream or project area water bodies when they would not be exceeded in the existing condition. Therefore, impacts to water quality due to the cumulative condition relative to the existing condition are potentially significant.

Action Alternatives' Incremental Contribution to the Cumulative Condition

Impacts on water flows and storage levels associated with the Action Alternatives would be small. Long-term average storage levels would be reduced by less than 1.2 percent in Folsom Reservoir, by less than 0.1 percent in Shasta Reservoir, by less than 0.2 percent in Trinity Reservoir, and by less than 1 percent in Oroville Reservoir. Long-term average flows would be reduced by less than 2 percent in the lower American River, by less than 0.2 percent in the upper Sacramento River, by less than 0.3 percent in the lower Sacramento River, and by less than 1 percent in the lower Feather River. These reductions in dilution flows, acting indirectly on concentrations or levels of water quality parameters would have negligible contribution to the cumulative impacts on water quality.

The Action Alternatives' incremental contribution to the cumulative condition water quality would be less than significant.

Impact 3.7-15: Impacts to Delta water quality.

The greatest reductions in the long-term average Delta outflow under the cumulative condition was 8.3 percent (during the month of October) relative to the existing condition, as shown in

Table H-3.5-88. The long-term average position of X2 would move upstream less than one kilometer relative to the existing condition.

The Delta export-to-inflow ratios under the cumulative condition would not exceed the maximum export ratio as set by the SWRCB Interim Water Quality Control Plan. Even though the cumulative condition would not cause X2 or Delta outflow standards to be violated, the cumulative condition could result in decreased outflow and upstream shift in the position of X2, which could be considered a potentially significant impact to Delta water quality. Overall, impacts to Delta water quality would be potentially significant.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis indicates that reductions in the long-term average Delta outflow of up to 0.3 percent could occur under the cumulative condition relative to the future base condition, as shown in Table H-3.5-89. In addition, under the cumulative condition, there would not be more than a 0.1 km shift in the long-term average position of X2 relative to the future base condition. The Delta export-to-inflow ratios under CVP operations associated with the Action Alternatives would not exceed the maximum export ratio as set by the SWRCB Interim Water Quality Control Plan. Based on these and the above-discussed results, implementation of the year-round pump station project would not significantly contribute to future potentially significant impacts to Delta water quality.

3.7.2.5 Environmental Protection and Mitigation Measures

The Proposed Project or Upstream Diversion Alternative would include incorporation of environmental protection measures, as described in the impact analysis. These measures, plus regulatory permit terms and conditions would ensure protection of water quality at and downstream of the project site.

The mitigation measures included in the Mitigation Plan (Appendix D to the Final EIS/EIR) are provided below.

Removal of Construction Litter and Debris

Commitment:	Remove litter and construction debris from the Project area and dispose of at an appropriate site.
Responsible Parties:	Reclamation/Construction Contractor - On-site Monitor
Location:	Project area
Timing:	During all phases of construction (2002 through 2004), as needed
Monitoring:	Inspect construction areas for compliance with litter and debris control measures
Reporting Requirements:	Construction compliance reports/daily inspector reports

Description of Activities:
Reclamation will require Construction Contractor to keep site clear of construction-related litter and debris; specifically, in areas near the river channel.

Success Criteria:
No litter or construction debris is noted in the Project area, on inspection.

Construction-Related Water Quality Protection Measures

Commitment:	Stormwater runoff control measures that prevent contaminants, soil or sediment from entering the river shall be implemented, monitored for effectiveness, and maintained throughout construction operations. The specific measures to be implemented for this project will be determined as part of the permitting process prior to construction. Construction specifications will include all required measures indicated in permits for erosion control, stormwater runoff control, and dewatering specifics.
Responsible Parties:	Reclamation/Construction Contractor - On-site Monitor
Location:	Construction areas
Timing:	During all phases of construction (2002 through 2004)
Monitoring:	Inspect construction areas for compliance with water quality control measures
Reporting Requirements:	Construction compliance reports/daily inspector reports

Description of Activities:
Reclamation will require the Construction Contractor to implement terms and conditions of regulatory permits including all applicable construction BMPs for stormwater runoff and erosion control to minimize the potential for direct release of materials to the river during Project construction.

The Construction Contractor will be responsible to meet the terms of the permit(s). Should monitoring or site inspection indicate unacceptable conditions due to construction, the lead agencies, in consultation with the RWQCB or other permitting agencies, will develop and implement additional protective measures to prevent water quality impacts.

The Project water quality protection measures to be required by permitting agencies may include one or more of the following:

- Terms limiting the period or type of construction activities that occur within the ordinary high water line of the American River up- and downstream of the bypass tunnel.
- Restrictions upon storage and stockpiling of construction materials, including vehicles and supplies, and chemicals or other hazardous materials to designated construction staging areas.
- Designation of vehicle/equipment fueling and wash-down areas, away from the floodway and designed to contain potential spills.

- Regular maintenance of construction vehicles and equipment such that leaks of fuels, lubricants and other materials are prevented.
- Removal of construction litter/debris and proper disposal practices at the end of each construction day and particularly prior to the start of the rain season.
- Requirement to minimize near and in-river activities to the extent possible.
- Implementation of post-construction management activities including restoration or improvement of drainage patterns and stabilization of stream banks and hillsides (upland areas) within the construction area; stabilization may include revegetation with a seed mix of plants native to the area, mulch or some other form of protection.

Success Criteria:
Document permit compliance in construction compliance report or as required by individual permitting agencies.

Project Operation and Maintenance Water Quality Protection

Commitment:	Protect downstream beneficial water uses by incorporating standard BMPs into the operation and maintenance of the Project to avoid water quality impacts.
Responsible Party:	PCWA
Location:	Project area/river channel
Timing:	Project operation and maintenance
Monitoring:	As required by permitting agencies
Reporting Requirements:	Comply with regulatory permit reporting requirements

Description of Activities:
PCWA will comply with regulatory permit terms and conditions in all short- and long-term maintenance activities for the pump station, intake facilities, and diversion structure.

Success Criteria:
Document compliance with regulatory permit terms and conditions.

Minimize Water Quality Impacts From Increased Public Access

Commitment:	Reduce the potential for pollutants to enter the river.
Responsible Party:	Reclamation
Location:	Project area (public river access features)
Timing:	Ongoing during operation of public river access
Monitoring:	Monitor use of parking areas such that capacity is not exceeded; monitor proper functioning of drainage control structures; and track public sanitation facility maintenance.

Reporting Requirements: No specific reporting requirement.

Description of Activities:
Reclamation will ensure that design of the public river access features limits the number of cars permitted into the Project area and further restricts the proximity of vehicles to the river. Reclamation will ensure that the design incorporates drainage control structures into all access roads, trails and parking areas to reduce direct contribution of pollutants into the river.

Through its Auburn SRA management agreement, Reclamation will require CDPR to maintain the public river access facilities such that trash containers will be emptied and restrooms will be cleaned regularly to avoid accumulation of litter in the Project area.

Success Criteria:
Public river access area is maintained appropriately and water quality/pollution impacts avoided.

3.8 RECREATION

3.8.1 AFFECTED ENVIRONMENT

3.8.1.1 Regional Setting

The regional setting includes recreation areas or facilities that may be influenced by the Proposed Project or alternatives through reductions in flows or reservoir elevations due to changed CVP or SWP operations that affect water-based or water-enhanced recreation of the water body. Regional water resources included in this evaluation include: Trinity and Shasta reservoirs, the upper and lower Sacramento River, Folsom Reservoir, Lake Natoma, the lower American River, the Delta, Oroville Reservoir, and the Feather River. Descriptions of the water-based recreation activities associated with these waterways and water bodies are included in the Cumulative Report (Appendix D of the Draft EIS/EIR).

3.8.1.2 Project Area Setting

The project area represents the direct effect study area and encompasses the water-based recreation resources of the Middle Fork American River below Ralston Afterbay and the North Fork American River from the confluence with the Middle Fork to just downstream of Oregon Bar (Figure 2-2).

Middle Fork American River

The Auburn State Recreation Area (SRA) is managed by the CDPR and receives approximately 850,000 visitors annually (CDPR 2002). The Middle Fork American River from below Ralston Afterbay lies within the Auburn SRA and extends 24 miles downstream to the confluence with the North Fork. The Auburn SRA includes approximately 40,000 acres of lands withdrawn for the proposed Auburn Dam and Reservoir Project. Twenty-five thousand acres are managed by CDPR under the 1977 agreement with Reclamation. The remaining 15,000 acres are scattered throughout the canyon and are either privately owned or federal lands. Broad management guidelines for the public use area of Auburn Dam Project lands were established under Public Law 89-161, the enabling legislation for the construction of Auburn Dam.

The Middle Fork American River is the most popular river in the Auburn SRA for whitewater boating. Water released from the PCWA MFP through Ralston Afterbay supports rafting, kayaking, and canoeing throughout the year. PCWA currently has an informal arrangement with Middle Fork American River commercial whitewater companies to release water from Ralston Afterbay on weekend mornings to augment flows down the river for whitewater use. Releases of 1,000 to 1,100 cfs typically are released beginning at 7:00 a.m. and continue to be released for several hours, depending on water operations (Anderson 1998).

Water released at 7:00 a.m. usually reaches the confluence of the Middle and North Forks at approximately 3:00 p.m. The released water provides river boating opportunities along the Middle Fork. These releases are particularly important during the summer and early fall months when river flows may be below 300 cfs. Adequate flows for whitewater boating are above 1,000 cfs and the minimum flow needed is approximately 800 cfs (Cassady and Calhoun 1995; T. Reed, pers. comm. 1998; Anderson 1998).

Most whitewater boating occurs in the summer (97 percent of the year's whitewater use), with the boating season beginning in late May and extending into September (CDPR and Reclamation 1992). The majority of the river stretches along the Middle Fork American River tend to be difficult whitewater and require intermediate to advanced level skills, or the services of a commercial rafting company (Anderson 1998). There are three distinct whitewater runs on the river: (1) the Tunnel Chute run; (2) the Mammoth Bar run; and (3) Murderer's Bar run. The Tunnel Chute run extends from just below Ralston Afterbay to the old Greenwood Bridge site. It is a Class IV run with one Class V rapid and a portage. The Mammoth Bar Run is a Class II run which extends from the old Greenwood Bridge site to Mammoth Bar. The Murderer's Bar run extends from Mammoth Bar to the confluence, ending just above the Highway 49 bridge. This run is a Class IV with one Class V rapid. The confluence area offers the last takeout point above the project site. **Figure 3.8-1** provides a map of recreational opportunities along the Middle Fork American River.

North Fork American River

Boating and other water-related activities are discouraged downstream of the confluence to the project site (CDPR and Reclamation 1992) and prohibited within the area 1/2-mile upstream and 1/2-mile downstream of the Auburn Dam construction bypass tunnel (posted CDPR order #318-02-91) due to hazards associated with the bypass tunnel (Anderson 1998, CDPR 2000). At normal river stages, the entire flow of the river is diverted into the bypass tunnel, which presents hazards that may not be evident until after a boater has entered the tunnel. Specifically, river-borne debris such as logs can become lodged in the tunnel and pose a significant pinning or drowning hazard to boaters or swimmers. At 4,000 cfs, the tunnel is passable with a four-foot high gap at the downstream tunnel portal, according to the most recent engineering survey of the area (MW et al. 1998). However, at flows greater than 10,000 cfs, the upstream tunnel portal can be entered while the downstream tunnel portal is completely submerged. Although undocumented, noncommercial whitewater boating, fishing, and swimming are known to occur in the area (J. Dampier, pers. comm. 1998).

Project Area River Characteristics

Currently, the Auburn reach of the North Fork American River is divided into two segments by the dam construction site. If boating were allowed in the project area, the stretch above the bypass tunnel would be an easy Class I to Class II river trip through a narrow canyon appropriate for novice boaters, families, and unguided trips with one Class II+ rapid (Tamaroo Bar Rapid). These river characteristics would be suitable for use by individuals with a wide range of boating skills. This trip would begin with a short warm-up leading directly into fairly long cobble bar type rapids with swift water and a tricky left turn against a rock face near the bottom.

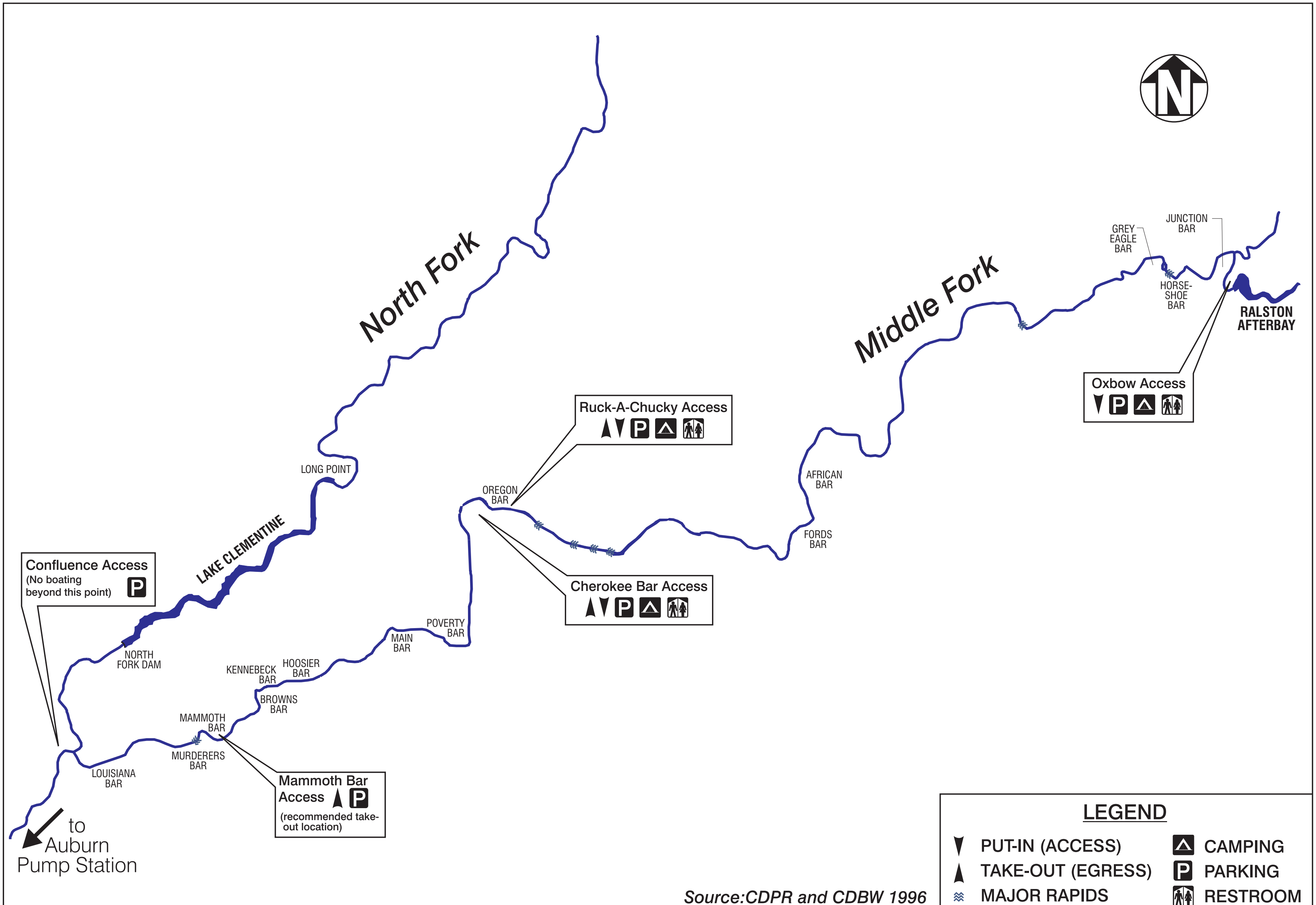


Figure 3.8-1 Recreational Opportunities Along the Middle Fork American River

PCWA-043

Downstream of the project area, steeper, longer, and more closely spaced rapids increase the difficulty of the stretch to a Class II to Class III run. This downstream segment of the river supports a large volume of cofferdam remnants, which makes the riverbed unstable. As a result, the rapids tend to change with each flood event (Anderson 1998; Anderson 2002).

Increased boating opportunities below the Middle Fork/North Fork confluence would be open to non-motorized river uses, including canoes, kayaks, and rafts. Motorized boating currently is prohibited by posted order on the rivers of the Auburn SRA (with the exception of Lake Clementine). The posted order would apply to the river reach within the project area. Commercial whitewater boating is prohibited on the North Fork American River between the Middle Fork/North Fork confluence and the project area. No commercial river use is proposed as part of this project; nor is any being considered by CDPR at this time. Any future consideration of commercial river activities would require separate feasibility study, planning, environmental review and analysis.

Other river-related uses that have been known to occur within the project area include fishermen who use the river below the diversion tunnel, swimmers and others who use the beach area along the river below Robie Point and use the stretch of river between the Middle Fork/North Fork confluence and the Auburn Dam site by hikers, sunbathers and anglers.

Project Area Trail Use

Although boating is either discouraged or prohibited in areas downstream of the Middle Fork/North Fork confluence to approximately 1/2-mile below the project site (CDPR and Reclamation 1992), the North Fork American River canyon provides opportunities for hiking, biking, sight-seeing, and horseback riding. As with other areas in the region, May through September are peak use months for these activities.

The Auburn SRA has a system of trails, which provide access for a variety of uses including hiking and trail running, equestrian, and mountain biking (**Figure 3.8-2**). The Auburn-to-Cool Trail is a multi-use trail used by hikers, mountain bikers, and equestrians. The trail extends from Auburn, down the western side of the river canyon in the project area, crosses the southwestern end of the dewatered river channel, passes up onto the cofferdam remnants and then follows the eastern canyon wall of the river before heading east towards Cool (Figure 3.8-2). From the east side of the river, the Auburn-to-Cool Trail intersects with other Auburn SRA trails which provide access to the towns of Foresthill and Georgetown, and to other recreational use areas such as Knickerbocker Flat, Lake Clementine, and the river canyons of the North and Middle forks. The trail became widely used during closure of Mountain Quarries Bridge (otherwise known as No Hands Bridge) in 1996, located just downstream of the Highway 49 river crossing (Mountain Quarries Bridge/No Hands Bridge has since been re-opened).

A trail counter installed in November and December of 2001 on the Auburn-to-Cool Trail counted 589 trail uses. Based on seasonal use patterns, CDPR estimated the two-month count to equate to 2,500-3,500 annual trail users. The Auburn-to-Cool Trail intersects the Western States Trail, a nationally registered trail that extends from Sacramento to Utah. The Western States Trail begins in the Auburn Staging Area, located near the Gold Country Fairgrounds in Auburn,

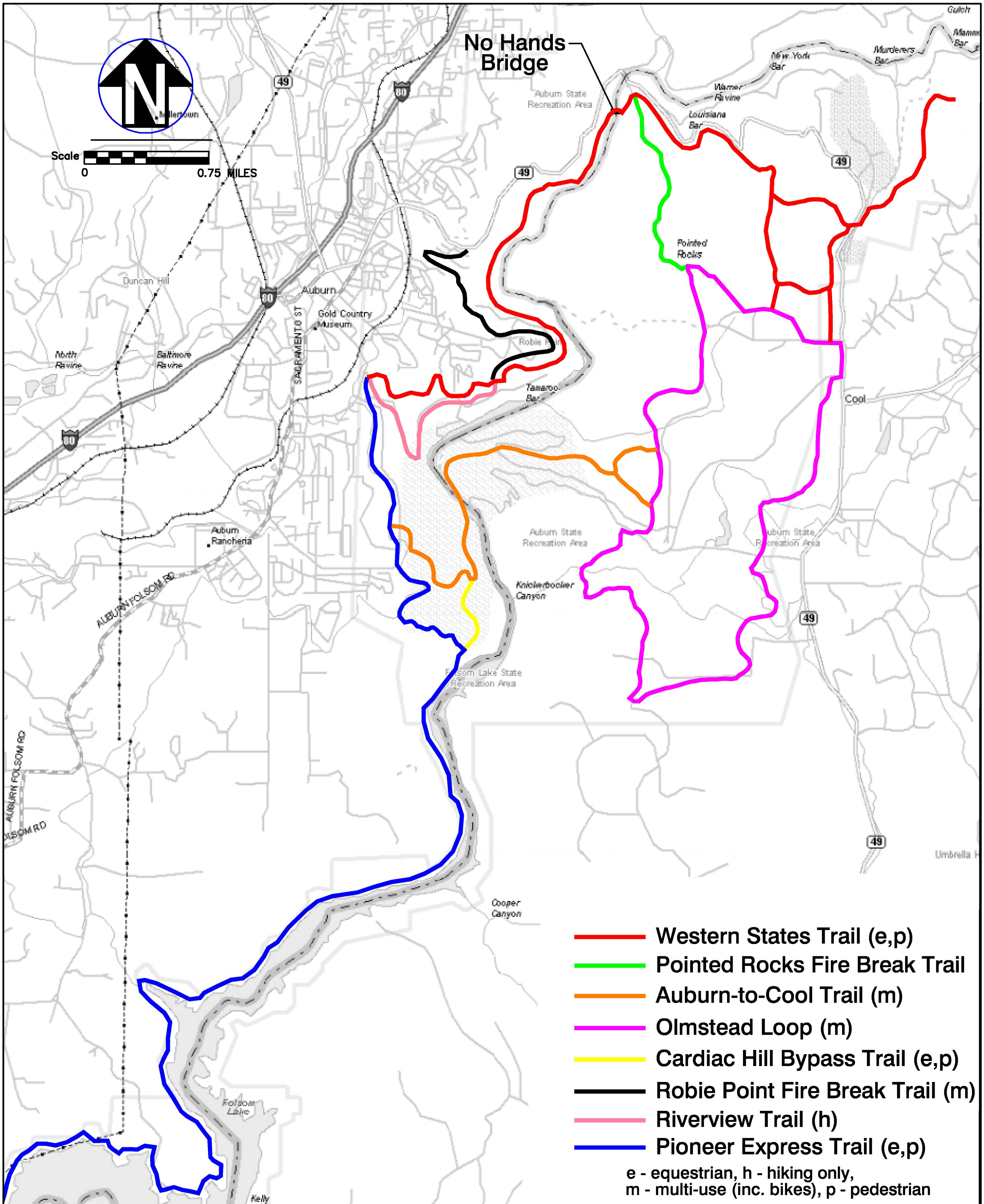


Figure 3.8-2 American River Pump Station Project Area, Recreation Trails Map

passes down to the confluence of the Middle and North forks of the river, along the Middle Fork, and then into the Sierra Nevada Mountains. The Western States trail is the main trail along the Middle Fork and intersects with other Auburn SRA trails (CDPR and Reclamation 1992). Two recreational events of national significance held on the Western States route and which pass through the SRA are the Tevis cup endurance ride (100 miles) and the Western States Endurance Run (100 miles).

Other recognized trail systems within the vicinity of the project area include the Cardiac Hill Trail, the Pioneer Express Trail, and the Robie Point Firebreak Trail. Despite the officially designated closure of the area to public use, the area has many unofficial trails and construction roads that are used by the public.

3.8.2. ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.8.2.1 Methodology

Facilities-Related Analysis Approach

The anticipated construction, operation, and maintenance impacts on recreation were assessed in part by consulting with Reclamation and CDPR staff. Specifically examined were the location and nature of project components, changes in access roads and access to the river, changes in boating and swimming opportunities or trail access, and potential hazards to recreationists.

Diversion-Related Analysis Approach

Diversion-related effects were evaluated for the Middle Fork American River, Folsom Reservoir, Lake Natoma, the lower American River, Sacramento River reservoirs, the upper and lower Sacramento River, and the Delta. The project alternatives' increased water diversions may result in reductions in river flows and reservoir storage volumes. To evaluate diversion-related impacts to regional water bodies, therefore, recreation impacts were analyzed based on a comparison of reservoir elevations and river flows under existing conditions and project alternative conditions (over a 70-year period of record). The cumulative analysis of recreation impacts is based on a comparison of these parameters under cumulative and existing conditions. In instances where a potentially significant or significant cumulative impact is identified, further analysis was performed to assess the project's incremental contribution to the future cumulative condition.

Hydrologic modeling results were reviewed to determine whether the magnitude of reductions in elevations or flows would affect recreation on these water bodies. The model simulations and comparisons are described in Section 3.3.2. Additional details of the hydrologic modeling are included in Appendix E of the Draft EIS/EIR.

3.8.2.2 Applicable Laws, Ordinances, Regulations, and Standards

Auburn State Recreation Area Interim Resource Management Plan

CDPR, through a management agreement with Reclamation, manages the public use of the Reclamation lands in the Auburn SRA. The area supports and offers the potential for unique and diverse recreational opportunities. The Auburn Interim Resource Management Plan provides planning goals and objectives to address agency and public concerns for protection and enhancement of recreation and natural resources of the area. CDPR and Reclamation will soon be undertaking efforts to update this plan. These efforts will include re-assessment of existing resources, public interests, and possible improvements to accommodate recreation while protecting the natural resources and primitive setting of the upper American River reaches.

American River Parkway Plan

The American River Parkway Plan was adopted by the County of Sacramento in 1985 (Sacramento County 1985). The plan is an element of the Sacramento County General Plan. It establishes goals and policies for the parkway, presents a description of parkway resources, and provides area plans to guide resource protection and development. Policy 3.1 of the plan discusses flow issues, as follows:

> *"Water flow in the lower American River should be maintained at adequate levels to permanently sustain the integrity of the water quality, fisheries, waterway recreation, aesthetics, riparian vegetation, wildlife, and other river-dependent features and activities of the Parkway. The required flow levels of the lower American River should be established at higher levels than those required under Decision 1400 of the State Water Resources Control Board. State and federal policy should provide for the maintenance of flows in the optimum range in the lower American River."*

The plan explains that Decision 1400 flows (e.g., 1,500 cfs for recreation) are inadequate and that the decision has no legal effect without the completion of the Auburn Dam. It acknowledges that research is ongoing to establish adequate flows for the lower American River, including recreation flows. When required flows are determined, the plan states that "those flows will be incorporated into the policies of this Plan."

State Wild and Scenic Rivers Act

The State Wild and Scenic Rivers Act was passed by the California Legislature in 1972 (Public Resources Code (PRC) Section 5093.50 *et seq.*). The Legislature declared that it was the state's intent that "certain rivers which possess extraordinary scenic, recreation, fishery, or wildlife values shall be preserved in their free-flowing state, together with their immediate environments, for the benefit and enjoyment of the people of the state." The Act restricts the construction of dams, reservoirs, diversions, and other water impoundments. A diversion facility may be authorized if the Secretary of the Resources Agency determines that (a) it is needed to supply domestic water to the residents of the county through which the designated river flows, and (b) it will not adversely affect the natural character of the river (PRC Section 5093.55[a]; DWR 1994).

The upper portion of the North Fork American River from Colfax-Iowa Bridge to the upper end of Lake Clementine is eligible for listing for its scenic values. The North Fork American River from below lake Clementine to the bypass tunnel in the project area is eligible for listing for its recreational values. The Middle Fork American River from Oxbow Dam to the confluence with the North Fork American River is eligible for listing for its scenic values (City of Sacramento 1993). The lower American River was included in the state Wild and Scenic River System and was given the classification of “recreational river” (PRC Sections 5093.54[e], 5093.545 [h]). The state defines a recreational river as a river “readily accessible by road or railroad, that may have some development along [its] shorelines, and that may have undergone some impoundment or diversion in the past” (PRC Section 5093.53[c]).

National Wild and Scenic Rivers Act

The National Wild and Scenic Rivers System was established in 1968 with the enactment of P.L. 90-542 (16 USC 1271 *et seq.*). Under this system, rivers possessing “outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values” can (or will?) be protected as wild, scenic, or recreational.

The upper portion of the North Fork from Colfax-Iowa Bridge to the upper end of Lake Clementine is eligible for listing for its scenic values. The North Fork from below lake Clementine to the bypass tunnel in the project area is eligible for listing for its recreational values. The Middle Fork from Oxbow Dam to the confluence with the North Fork is eligible for listing for is scenic values (City of Sacramento 1993). The lower American River from Nimbus Dam to its confluence with the Sacramento River was added to the National Wild and Scenic Rivers System based on the state’s petition in 1981 and is designated a “recreational river.” Recreational rivers are ones “that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past” (16 USC 1273[6][3]).

As a result of its designation under the act, federally assisted projects affecting the lower American River are subject to the Secretary of the Interior’s determination that the project “will not invade the area or unreasonably diminish” the river’s recreational value (16 USC 1278[a]; see also *Swanson Mining Corporation v. FERC*, 790 F.2d 96 [D.C. Cir. 1986]; and the American River Parkway Plan). When seeking authorization or appropriations for a project that affects the protected values of the lower American River, the relevant federal agency must notify the Secretary of the Interior of its intent, and report to Congress on the project’s conformity with the act and its effect on the protected values of the river (16 USC 1278[a]).

El Dorado County General Plan

The El Dorado County General Plan was adopted in 1996 (El Dorado County General Plan 1996). It is a long range statement of local public policy for the use of public and private land, which provides a framework for encouraging economic development while managing growth, conserving agricultural lands, protecting the environment, developing effective and efficient public services and preserving the County's rural character. The Non-Motorized Transportation Systems component defines a network of regional bikeways and trails that interface with and complement adjacent counties' and local (city) routes. Under this component, Hiking and Equestrian Trails shall be separated from the travel roadway whenever possible by curbs and barriers (such as fences and rails), landscape buffering, and special distance. The plan calls for use of existing public corridors such as power transmission line easements, railroad rights-of-way, irrigation district easements, and roadways for multiple-use trailways, where possible.

3.8.2.3 Impact Indicators and Significance Criteria

Significance criteria for recreational use of the Middle Fork American River were developed from various sources (Cassady and Calhoun 1995; T. Reed, pers. comm. 1998; Anderson 1998). The significance criteria used for recreation use of Folsom, Shasta, and Trinity reservoirs, the lower American River, and the upper and lower Sacramento River and Delta are based on the Water Forum Proposal Final EIR (CCOMWP 1999). The Water Forum Proposal Final EIR presents an extensive review of sources that suggest minimum, maximum, and optimum flows for common recreational activities at each of the water bodies in the regional study area. These discussions and evaluations are herein incorporated by reference. The results of these evaluations and the thresholds of significance that were developed from them in the Water Forum Final EIR are used in this document to evaluate regional recreational impacts. Significance criteria for each of the potentially affected water bodies are presented in **Table 3.8-1** along with other recreational criteria.

Table 3.8-1
Recreation Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ Accessibility of recreational trails.	❑ Permanent closure of recreation trails through the project site.
❑ Recreational safety hazards.	❑ A substantial increase in exposure to hazards for recreationists, for either land- or water-based activities.
❑ American River public access and river conditions that contribute to water-based recreational activities.	❑ A substantial change in river access or channel conditions that contribute to water-based recreational activities, relative to the basis of comparison, with sufficient frequency to adversely affect recreation..
❑ Consistency with applicable regulations and planning documents, guiding recreation in the study area.	❑ A conflict or inconsistency with relevant policies, plan goals, or objectives relative to the basis of comparison such that recreation would be adversely affected.

Table 3.8-1 (Continued)
Recreation Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ River flows that determine whitewater rafting and other boating opportunities.	❑ A substantial decrease in the duration of Middle Fork flows below the 850 cfs threshold for whitewater boating, relative to the basis of comparison, sufficient to adversely affect recreation. ❑ A substantial change in lower American River flows above or below the 1,750 to 6,000 cfs minimum/maximum range of adequate recreational flow, relative to the basis of comparison, with sufficient frequency to adversely affect recreation (CCOMWP 1999). ❑ A substantial change in lower American River flows above or below the 3,000 to 6,000 cfs optimum range of recreational flows, relative to the basis of comparison, with sufficient frequency to adversely affect recreation (CCOMWP 1999). ❑ A substantial decrease in upper or lower Sacramento River flows below 5,000 cfs or a substantial decrease in flows, relative to the basis of comparison, with sufficient frequency to adversely affect recreation (CCOMWP 1999). ❑ A substantial decrease in the contribution of lower Sacramento River flows to the Delta, relative to the basis of comparison, with sufficient frequency to adversely affect recreation.
❑ Folsom Reservoir water surface elevations that determine boat ramp availability.	❑ A change in Folsom Reservoir elevation that would result in a substantial decrease in availability or optimum use of boat ramps, wet slips or swimming beaches, relative to the basis of comparison, with sufficient frequency to adversely affect recreation (CCOMWP 1999): ■ When all boat ramps are useable (420 feet or higher) ■ When the marina wet slips are useable (412 feet or higher) ■ When the swimming beaches are useable (420 to 455 feet) ■ When at least one of the low-water ramps is useable on both the east and west sides of the lake (375 feet or higher) ■ When the lake level is within its optimum range for high quality recreation activities (435 to 455 feet)

Table 3.8-1 (Continued)
Recreation Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ Shasta and Trinity reservoir water surface elevations that determine boat ramp availability.	❑ A change in Shasta Reservoir elevation that would result in a substantial increase in boat ramp closures, relative to the basis of comparison, with sufficient frequency to adversely affect recreation (CCOMWP 1999): ▪ When all boat ramps are useable (1,020 feet or higher) ▪ When at least one boat ramp is useable on each arm of the lake (941 feet or higher) ▪ When recreational use of shoreline areas begins to decline (1,007 feet) ❑ A change in Trinity Reservoir elevation that would result in a substantial increase in boat ramp closures relative to the basis of comparison, with sufficient frequency to adversely affect recreation (USFWS et al. 1999): ❑ When only one major boat ramp is useable (2,170 feet to <2,295 feet)
❑ Feather River flows below Oroville Dam for all months of the year.	❑ Reservoir water surface elevations that Reservoir water surface elevations that A substantial change in Feather River flows, relative to the basis of comparison, with sufficient magnitude and frequency to adversely affect recreation in the Feather River.
❑ Oroville Reservoir water surface elevation.	❑ A substantial change in Oroville Reservoir elevation, relative to the basis of comparison, with sufficient magnitude and frequency to adversely affect recreation in Oroville Reservoir.
Source: Water Forum EIR (CCOMWP 1999); Trinity River Mainstem Fishery Restoration Draft EIS/EIR (USFWS et al. 1999)	

3.8.2.4 Impact Analysis

This section presents the analysis of potential facilities- and diversion-related recreation impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

Facilities-Related Impacts

No Action/No Project Alternative

Impact 3.8-1: Impacts to public recreation trail access.

Continued installation and removal of the seasonal pump station under the No Action/No Project Alternative would not affect recreation in the project area beyond that which currently occurs. Because the project site conditions would not change from existing conditions under this alternative, there would be a less-than-significant impact to trails through the area.

Impact 3.8-2: Impacts to public safety.

Construction activities associated with installation and removal of the seasonal pump station, as well as operational activities, would not increase hazards to land or water-based recreational activities within the project area beyond those currently experienced. Because the project site conditions would not change from existing conditions under this alternative, potential hazards associated with unauthorized recreational activities and presence of the bypass tunnel remain a significant issue.

Increased patrolling of the area by Reclamation or CDPR may further reduce but would not eliminate all unauthorized uses. Under this alternative, there would be no feasible means for eliminating the bypass tunnel hazard.

Proposed Project

Impact 3.8-3: Impacts to public recreation trail access.

Several trails pass around or through the project study area including Pioneer Express, Cardiac Hill, Cardiac Hill Bypass, Auburn to Cool, Riverview, Western States, Robie Point Fire Break, Pointed Rocks Fire Break and Olmstead Loop trails (Figure 3.8-2). Construction of the Proposed Project would not affect public use of the Pioneer Express, Western States, Robie Point Fire Break, Pointed Rocks Fire Break or Olmstead Loop trails.

The Proposed Project would result in temporary closure of recreation trails through the project area during construction, although Reclamation and CDPR would work with special trail event coordinators to provide access through or around the project site such that annual events would not be adversely affected by construction or operation of the Proposed Project. Closure of the bypass tunnel and restoration of North Fork American River flows would result in bifurcation of the Auburn-to-Cool Trail where it currently crosses the dewatered river channel. The Proposed Project also includes development of new trails to provide access to Oregon Bar and along access roads to minimize multiple user conflicts in the area that may result as a result of increased public access in the area.

Closure of active construction areas to restrict public access would be necessary to protect the public and facilitate pump station construction, bypass tunnel closure, and river channel restoration. Restricted access in the project area is appropriate and required to protect the health and safety of the general public from the various hazards (i.e., heavy construction equipment operations, blasting, extensive earthwork and unsafe materials, including explosives) associated with construction of the Proposed Project as well as to protect the construction area and equipment. The total area closed to public access would vary by construction phase and activity.

Reclamation's construction contractor would place security fencing around all active construction and equipment storage areas and post warning and no trespassing signs at restricted areas. During blasting, the construction contractor would restrict use of portions of the Auburn-to-Cool, Riverview and other project area trails as needed to protect the public from potential injury. Although blasting activities would be confined to relatively small sites within the project area, trail access would be closed at the canyon rim, or at safe distances away from the blasting activity. Such closures would vary in duration depending upon blasting activity. In some instances, trail access detours may be provided to maintain uses in the area; re-routed trails would be indicated by trail markers or other visible cues. Permitted trail use (i.e., equestrian, pedestrian) would be the same as existing designations.

Trail closure information would be provided to the general public through a public outreach program to include local signage (i.e., at the canyon rim on both the Placer and El Dorado county sides), newspaper notices, radio announcements, and coordination with trail advocacy organizations, as determined appropriate. Through these efforts, Reclamation, with assistance from CDPR, would minimize the extent and duration of trail closure impacts and public trail access during construction of the Proposed Project to the extent possible while still addressing public safety concerns and facilitating project construction with minimal disruption. Overall, the temporary impacts due to limitations on public access to project area recreation trails would be reduced to less than significant.

Special annual events utilizing these trails would not be expected to be adversely affected by construction of the Proposed Project. CDPR would work with special event coordinators and Reclamation's construction contractor for annual events including the Western States Endurance Run, Tevis Cup Western States Trail Ride and the American River 50 Mile Endurance Run, and to avoid trail access impacts for these events. Coordination with event sponsors would enable CDPR and Reclamation to ensure safe, adequate passage along event routes for the set-up, operation and break-down/clean-up associated with each event. The impact of the Proposed Project upon these annual trail events would be considered less than significant.

Closure of the bypass tunnel and river channel restoration would result in the bifurcation of the Auburn-to-Cool Trail through the project site. Loss of the Auburn-to-Cool access would be considered a significant unavoidable impact. The lead agencies and CDPR have developed a mitigation measure to prepare a feasibility study evaluating the provision of a multi-use bridge or alternative trail alignment(s) to provide a crossing of the North Fork American River within the Auburn SRA, near the project site. As part of this commitment, PCWA and the State of California would provide funding toward the study and implementation of such a project, if determined to be feasible (see Section 3.8.2.4, Environmental Protection and Mitigation Measures).

Reclamation would be responsible for oversight of the construction contractor's management of public trail impact mitigation, including approval of trail use restrictions and monitoring the placement and condition of posted closure and/or warning signs. Any damaged signs would be replaced upon discovery. With the exception of the loss of the Auburn-to-Cool Trail river crossing in the project area, the Proposed Project construction impacts upon public recreation trails would be considered less than significant due to the incorporation of environmental protection and mitigation measures.

Impact 3.8-4 Impacts to public safety.

Public access to the site would be restricted and directed away from active construction areas, thereby reducing potential safety hazards for recreation or other public activities in the project area. This would be considered a less than significant impact.

Closure of the bypass tunnel results in the removal of a significant public safety hazard. This is considered a beneficial aspect of the Proposed Project.

Final design of the pump station facilities and the river restoration components would consider the anticipated increased public use of the project area. The PCWA project components would not be considered appropriate for access by the general public. As appropriate, the water supply facilities would be fenced and gates locked to prevent unauthorized access.

The diversion structure would be integrated into the river channel restoration and would be designed to provide a recreation benefit. River boating and swimming activities have associated hazards that cannot be totally eliminated, but are not directly or indirectly due to the project itself. As part of the channel design, areas would be developed to allow easy entry and exit of the river.

CDPR would manage the project area recreation activities and provide emergency assistance as needed. Additionally, rangers, park aids and volunteers would patrol the area to control and stop inappropriate use of the area that may pose safety or other hazards.

Overall, the impacts upon safety and recreation at the site would be considered an improvement over existing conditions.

Impact 3.8-5: Diversion upstream backwater effect on North Fork American River.

The diversion structure would result in a backwater effect upstream from the project site that would potentially inundate the Tamaroo Bar rapids. Preliminary design information indicates that this effect would be minimized through project design, to the extent feasible. Because the Proposed Project provides an overall improvement for boating, including a navigable artificial rapid as part of the diversion design, the anticipated increased frequency of inundation at Tamaroo Bar, relative to the existing condition, is considered less than significant.

Impact 3.8-6: Increased recreation use at the Middle Fork/North Fork confluence associated with public river access at Auburn Dam and Oregon Bar.

The improved river access and river restoration features of the Proposed Project would result in related increased use of the Middle Fork/North Fork confluence area, primarily for boating-related activity. Because the access to the project area would be considered "limited" the potential increase in demand at the confluence would not be considered substantial. However, on peak summer days and weekends, the confluence area does not have sufficient parking to accommodate users. The increased demand for parking and access to the confluence area under the Proposed Project would therefore result in a potentially significant impact for recreation facility management and enjoyment. There are not feasible measures to reduce this impact as part of the Proposed Project. However, CDPR and Reclamation will be initiating long-term planning efforts to update the Auburn SRA Interim Resource Management Plan (IRMP) to address issues throughout the Auburn SRA. This future planning effort will be comprehensive and would undergo environmental review (preparation of environmental documentation) to provide the public an opportunity to evaluate the influences of increased recreation activity in the area upon the environment.

In the interim, the unmet demand for increased parking at the confluence remains a potentially significant and unavoidable impact.

Upstream Diversion Alternative

Impact 3.8-7: Impacts to public recreation trail access.

Project area trails are listed under Impact 3.8-3 and shown on Figure 3.8-2. As with the Proposed Project, active construction areas would be closed to public access during construction of the Upstream Diversion Alternative. These measures are considered necessary and appropriate to protect the public and facilitate pump station construction. The total area closed to public access would vary by construction phase and activity.

The Upstream Diversion Alternative impacts upon project area trails would be similar to the Proposed Project (Impact 3.8-3) with the following exceptions: (1) Auburn-to-Cool Trail would not be bifurcated as the North Fork American River would not be restored to the dewatered channel; and (2) no additional trails would be developed as the public river access features would not be constructed.

Similar to the Proposed Project, special events or activities utilizing these trails would not be expected to be adversely affected by construction of the Upstream Diversion Alternative. CDPR would work with special event coordinators and Reclamation's construction contractor to avoid trail access impacts to annual events including the Western States Endurance Run, Tevis Cup Western States Trail Ride and the American River 50 Mile Endurance Run. The impact of the Upstream Diversion Alternative upon these annual trail events would be considered less than significant.

The public outreach program included in the Mitigation Plan, and trail management practices related to blasting activities would generally be the same as discussed for the Proposed Project.

Overall, the potential Upstream Diversion Alternative construction and project operation impacts upon public recreation trails would be considered less than significant due to the incorporation of environmental protection and mitigation measures.

Impact 3.8-8: Impacts to public safety.

Public access to the site would be restricted during construction, thereby reducing potential safety concerns due to recreation or other public activities in the project area, making construction-related impacts less than significant. The design of the pump station and related facilities would include fencing and other features to eliminate risk of injury to the public.

Hazards associated with unauthorized use of the river in the project area and presence of the bypass tunnel would remain significant safety issues. Environmental protection measures proposed as part of the Upstream Diversion Alternative include providing public information regarding the potential hazards and recreational use restrictions prior to reopening the area; posting of additional safety information/warning signs; placement of a buoyed cable line upstream of the tunnel inlet to discourage boat travel toward or through the tunnel; and creation of a flat-water pool area to enable exiting the river prior to the tunnel to reduce the hazards to recreationists, but would not eliminate them. This would be considered a potentially significant impact.

Impact 3.8-9: Diversion upstream backwater effect on North Fork American River.

As discussed under Impact 3.8-5, the year-round diversion would result in an upstream backwater effect. Because the Upstream Diversion Alternative does not involve rewatering of the river channel and creation of a new navigable rapid in the project area, the loss of rapids due to increased inundation of Tamaroo Bar is a potentially significant impact of this alternative.

Diversion-Related Impacts

Under current operating procedures, Lake Natoma and Keswick and Lewiston reservoirs serve as regulating reservoirs for Folsom Reservoir, Shasta Reservoir and Trinity Reservoir, respectively. This function enables releases from the larger upstream dams to fluctuate as needed for electrical power generation or other purposes while releases from the regulating dams on the downstream rivers can be made to change less abruptly. As a result, the water levels of Lake Natoma and Keswick and Lewiston reservoirs fluctuate regularly, but within a much smaller range of water surface elevation than Folsom, Shasta, and Trinity reservoirs. This creates relatively stable shoreline and launch-ramp conditions for swimming, fishing, and boating.

Therefore, although under the Action Alternatives, the upstream dam release schedules would change, they would not alter the function of the three regulating reservoirs. Even though water release patterns would be different from the existing condition, the Folsom and Nimbus dams, the Shasta and Keswick dams, and the Trinity and Lewiston dams would still be operated in a coordinated way. Consequently, the historical range of water level fluctuations on Lake Natoma and Keswick and Lewiston reservoirs would be expected to continue into the future without substantial change.

Whiskeytown Reservoir acts in some respects like a large regulating reservoir between the Trinity and Sacramento river basins. It is subject to small daily fluctuations due to power and water temperature operations, but would be unaffected by the diversions of the Proposed Project or alternatives.

The diversion-related analysis refers to certain tables and graphs prepared to provide additional representation of the modeling results and comparison of simulated conditions. These tables and figures are included in Appendix H to the Draft EIS/EIR and are labeled by the appendix letter, resource section number, and ordered as it is referenced in the impact analysis (H-3.8-1, H-3.8-2, etc.).

No Action/No Project Alternative

The increased pump station diversion under the No Action/No Project Alternative would be less than evaluated for the Action Alternatives (see below). Based on the evaluation of modeling performed for the Action Alternatives, it is expected that the No Action/No Project Alternative would not result in significant impacts upon recreation activities associated with water bodies of the American River, Sacramento River or Delta, within the regional and project study areas.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the Existing Condition

The Proposed Project and the Upstream Diversion Alternative would result in the same timing and quantity of increased diversions from the American River. Changes in CVP or SWP operations associated with the Action Alternatives also would be the same. Therefore, the diversion-related analysis presented below represents the potential impacts that could occur with the Action Alternatives.

Impact 3.8-10: Impacts to water recreation activities on the Middle Fork American River.

Operation of the Action Alternatives would require some reoperation of the MFP as diversion amounts are increased. This reoperation would alter flow through the Middle Fork American River. Flow modifications during the summer and early fall months could affect the ability of whitewater boaters to travel down the river, thereby reducing Middle Fork American River whitewater boating opportunities. In addition, commercial whitewater companies could be economically affected by reservoir re-regulation if flow modifications reduced their ability to provide whitewater services to consumers.

Flows in the Middle Fork American River often occur as a result of regulated releases from Ralston Afterbay. The Ralston Afterbay, located approximately 20 miles east of the City of Auburn, is one of five MFP diversion dams and is operated as a re-regulating reservoir for the MFP.

Under the Action Alternatives, PCWA would continue to release higher flow rates from Ralston Afterbay on summer weekend mornings according to its informal agreement with Middle Fork commercial whitewater boating companies. However, to meet the higher base flows necessary for the project diversion and minimum flow requirements, the duration of higher flows suitable for rafting could be reduced.

To evaluate the impacts to whitewater boating on the Middle Fork American River, a hydrologic study of the Middle Fork American River was performed. This study, the Upstream Hydrologic Analysis (SWRI 1998), evaluates changes in operations of the MFP and associated changes in flows of the upper American River that would be necessary for proposed diversion patterns in the project area.

Table 3.8-2 shows the results of this hydrologic analysis as they pertain to whitewater boating on the Middle Fork American River. Analysis results indicate that the duration of daily releases for recreation may be reduced by up to eight hours each month of the June through October recreation season. This represents a potentially significant and unavoidable impact on whitewater boating and commercial whitewater companies along the Middle Fork American River.

Table 3.8-2
Total Monthly Hours When Middle Fork American River Flows Would be Greater than 850 cfs

	June	July	August	September	October
Existing Condition	440	469	458	200	166
Action Alternatives	439	461	454	197	166
Unit Change (Hours)	-1	-8	-4	-3	0
Percent Change	0	-2	-1	-2	0

The Proposed Project would provide public boating opportunities within the North Fork American River Canyon below the confluence to Oregon Bar/Folsom Reservoir. Restoration of this opportunity through the project area would provide a different type of boating experience and would not be considered a replacement for the loss of more challenging whitewater boating opportunities found an the Middle Fork American River. Boating miles for commercial rafting would not increase as a result of this project, but additional boatable river miles and greater public accessibility would be provided. Because this area presently is not officially open for public boating use, the additional boating access, primarily suited for novices, would be considered a beneficial aspect of the project. The Upstream Diversion Alternative would not provide this opportunity.

Impact 3.8-11: Impacts to lower American River recreation.

Water-dependent and water-enhanced recreation use on the lower American River is higher in May through September than in other months because of the warm, sunny weather. Therefore, the focus of this evaluation was the effect of changes in CVP operations associated with the Action Alternatives during May through September.

When compared to the existing condition, the Action Alternatives would result in, at times, less frequent occurrences of lower American River flows within the optimal and maximum and minimum ranges for recreation. However, neither the frequency nor the magnitude of these changes is sufficient to adversely impact recreation. Therefore, this impact would be considered less than significant.

Table H-3.8-1 presents a summary of the number of years of the 70-year simulation in which the monthly mean flows below Nimbus Dam would remain within the optimal range for river recreation (3,000 to 6,000 cfs) and within the minimum to maximum range for adequate river recreation flow (1,750 to 6,000 cfs) under the existing condition and Action Alternatives. The table shows that over the course of the 70-year simulation, the Action Alternatives would result in monthly mean flows within the optimal flow range for recreation slightly less often than under existing conditions. In May, the number of years with flows in the optimal range would decrease by two years, in June it would increase by one year, in July it would decrease by three years, and in August and September it would decrease by one year when compared to the existing condition. For the entire May through September recreation season, there is a 3.6 percent decrease in the total number of months in which the flows would fall within the optimal range when compared to existing conditions.

According to the simulation results presented in Table H-3.8-1, the number of months the flows in the lower American River would be within the minimum to maximum range would be unchanged in May, July, and September and would decrease by one month in June, and one month in August. This is a decrease from existing conditions of 0.8 percent for the May through September recreation season.

Based on the above assessment, the Action Alternatives would have a less-than-significant impact on water-dependent and water-enhanced recreation use on the lower American River.

Impact 3.8-12: Impacts to boating at Folsom Reservoir.

When compared to the existing condition, the Action Alternatives would result in slightly less years when the reservoir surface elevation would be above the minimum required for boaters' access to launching ramps and marinas. However, this effect is not sufficient to adversely impact boating at Folsom Reservoir. Therefore, this impact is considered less than significant.

The primary boating season at Folsom Reservoir encompasses the months March through September, with peak use occurring in May, June, July, and August. Therefore, the focus of this assessment is the effect of changes in CVP operations associated with the Action Alternatives during the boating season. Because boating opportunity is heavily influenced by boaters' access to the launching ramps and marina, the relationship of expected lake levels to the usability of these facilities is evaluated.

Table H-3.8-2 compares the reservoir elevation and usability of boat launching facilities under the existing and Action Alternative conditions. For the months of March through September, Folsom Reservoir levels would fall below the 420-foot elevation necessary to keep all boat ramps operable in 4 more months (out of 490) under the Action Alternatives condition than under the existing condition.

Table H-3.8-2 also shows that at least one low-water boat ramp would remain available on each side of Folsom Reservoir approximately the same (only one month less) under the Action Alternatives as under the existing condition.

As indicated in H-3.8-2, the Action Alternatives would not reduce the usability of the Folsom Reservoir Marina wet slips (which require a minimum 412-foot elevation) in the primary boating season when compared to the existing condition.

Overall, the decrease in boating opportunities under the Action Alternatives would be negligible when compared to the existing condition. Consequently, the overall effect of the project on Folsom Reservoir boating opportunities would be less than significant.

Impact 3.8-13: Impacts to swimming at Folsom Reservoir.

The most popular swimming months at Folsom Reservoir are May through September, when the weather is typically sunny and hot. Designated swimming beaches at Beal's Point and Granite Bay are generally usable between the elevations of 420 and 455 feet. Below 420 feet, the water declines below sandy areas and/or is too distant from parking and concessions; visitation decreases substantially when low-water conditions occur. Even with reservoir levels in the vicinity of 430 feet, the water is relatively far from parking and concessions and some special low-water facilities are necessary to adequately accommodate swimmers. Above 455 feet, the high water limits the width of the available beach area, reducing the capacity of the beaches. As a result, to evaluate the effects on swimming opportunities of the Action Alternatives, the number of months when water levels are in the usable range during the peak swimming period were examined and compared to the existing condition.

As indicated in Table H-3.8-2, the Action Alternatives would reduce the availability of swimming beaches during the months of May through September compared to the existing condition. Overall, the number of years with water levels within the usable beach range during the months of May through September decrease by two out of 350 months. The number of years with water levels within the optimum range (435 to 455 feet) would be slightly reduced. There would be two fewer months (out of 350 summer months) when water levels are within the optimum range.

Over the recreation season, the effect of the Action Alternatives would be negligible when compared to the existing condition. Therefore, the overall impact on Folsom Reservoir swimming opportunities would be less than significant.

Impact 3.8-14: Impacts to recreation at Shasta Reservoir.

When compared to the existing condition, the Action Alternatives would result in no changes in the frequency of Shasta Reservoir surface elevation within the ranges required for boating and other water-related recreation activities at Shasta Reservoir. Therefore, there would be no impact to recreation at Shasta Reservoir.

The primary season for water-dependent and water-enhanced recreation activities at Shasta Reservoir is May through September. Therefore, the potential to affect reservoir levels during these months was assessed to evaluate impacts on boating-related activities, shoreline recreation, and boat-in camping. Because boating opportunity is heavily influenced by access to launching ramps, the relationship of reservoir levels to the operability of ramps was evaluated. Also, the drawdown distance of water from the vegetated shoreline was considered as an important factor in sustaining shoreline recreation use and boat-in camping.

Table H-3.8-3 presents a summary of the relationship between certain water surface elevation thresholds and recreation facilities and uses, based on a comparison of the existing and Action Alternatives. The most important lower threshold for boating is elevation 941 feet, above which at least one public launching ramp is available on each of the three major arms of Shasta Reservoir. Also presented is the information for elevation 1,017 feet, above which all public ramps are operable. For boat-in camping and shoreline use, the key threshold is elevation 967 feet, below which substantial decreases in use typically occur, because of the influence of the distance between the water and the vegetated shoreline. Also presented is an assessment of elevation 1,007 feet, below which shoreline use typically begins to decrease because of low water levels.

The Action Alternatives would result in no change in the total number of years when all boat ramps are usable (elevation 1,017 feet) during any month of the season compared to the existing condition. The number of years when at least one public ramp is maintained on each of the reservoir arms (elevation 941 feet) also would not change under the Action Alternatives, compared to the existing condition.

With regard to Shasta Reservoir shoreline and camping facilities, repeat visitors have come to expect the level to decline as the summer progresses; therefore, they appear to exhibit some tolerance of low-water conditions. Using the 60-foot drawdown criterion where boat-in camping and shoreline use begin to decline (1,007 feet), the analysis indicates that the Action Alternatives would result in no reduction in the number of years in which Shasta Reservoir levels would be suitable. The Action Alternatives would result in a slight increase in the number of years that Shasta Reservoir levels would be at or above the 100-foot drawdown (967 feet) during May through September. Therefore, the impact on Shasta Reservoir recreation opportunities would be less than significant.

Impact 3.8-15: Impacts to recreation at Trinity Reservoir.

When compared to the existing condition, the Action Alternatives would result in no changes in the frequency of Trinity Reservoir surface elevations below the levels required for boating and other water-related recreation activities at Trinity Reservoir. Therefore, there would be no impact to recreation at Trinity Reservoir.

Similar to Shasta Reservoir, the primary recreation use season for water-dependent and water-enhanced recreation activities at Trinity Reservoir is from May through September. Therefore, the potential to affect reservoir levels during these months of the year was assessed for boating-related activities and shoreline recreation. Because boating opportunity is heavily influenced by access to launching ramps, the relationship of Trinity Reservoir levels to operability of ramps was considered. Also, the drawdown distance of water from the vegetated shoreline was evaluated as an important factor in sustaining shoreline recreation use.

As presented in Table H-3.8-4, the Action Alternatives would result in no change in the frequency of reservoir levels required to allow for boat launching from the three major public ramps during May through September. Therefore, there would be no impact on recreation at Trinity Reservoir.

Impact 3.8-16: Impacts to recreation on the upper Sacramento River.

When compared to the existing condition, the Action Alternatives would result in a greater frequency of upper Sacramento River flows above the minimum flow required for recreation. Therefore, there would not be an adverse impact associated with recreation on the upper Sacramento River.

Water-dependent recreation use on the upper Sacramento River, between Keswick Dam and the confluence of the American River, is higher in May through September than in other months of the year, coincident with the warmer summer weather. Consequently, effects of the Action Alternatives on Sacramento River flows during this period is important for evaluating recreation opportunity impacts.

A minimum recreation flow of 5,000 cfs is identified for the Sacramento River in the California Water Plan Update (DWR 1994). This is an overall standard that is not related to specific reaches of the upper Sacramento River, so it provides only general guidance in assessing recreation impacts. Definitive optimum and maximum/minimum river flows for recreation uses are not available for the upper Sacramento River, so the relative change in river flows are compared between the Action Alternatives and the existing condition to assess potential recreation impacts. If relative flows are not substantially less for the Action Alternatives compared to the existing condition, boat ramps and access points along the river between Keswick Dam and Colusa would not be adversely affected.

Figures H-3.8-1 and H-3.8-2 show probability of exceedance plots for the Sacramento River flow below Keswick Dam for May through September. These graphs demonstrate that the probability of the flow below Keswick exceeding 5,000 cfs is identical in all months. Therefore, flow conditions under the Action Alternatives result in a less-than-significant impact upon recreation opportunities in the upper Sacramento River.

Impact 3.8-17: Impacts to recreation on the lower Sacramento River.

When compared to the existing condition, the Action Alternatives would result in identical or improved flow conditions for recreation in the lower Sacramento River. Therefore, there would not be an adverse impact associated with recreation in the lower Sacramento River.

Similar to other water recreation areas of northern California, the highest recreation use period for the lower Sacramento River (between the American River confluence and the Delta) is from May to September. Under the existing condition, monthly mean flow in the Sacramento River at Freeport averages from 13,300 to 19,300 cfs during this period. As with the upper Sacramento River, although 5,000 cfs has been identified as an overall flow standard, no definitive thresholds for optimal or minimum/maximum recreation flows are available. Therefore, the relative difference between the existing condition and the Action Alternatives was evaluated.

Figures H-3.8-3 and H-3.8-4 show probability of exceedance plots for the Sacramento River flow at Freeport for May through September. These graphs demonstrate that the probability of the flow at Freeport exceeding 10,000 cfs is identical in all months. The entire flow range is virtually identical throughout the May to September period, except for August, where the Action Alternatives provides a clear benefit over the existing condition when flows are below 10,000 cfs. Therefore, there would be no impacts on recreation opportunities on the lower Sacramento River associated with the Action Alternatives.

Impact 3.8-18: Impacts to recreation at the Delta.

The Delta's hydrology is complex and influenced by other water sources, specifically tidal action, San Joaquin River inflows, and east-side tributary inflows. Consequently, differences in Delta inflow from the Sacramento River would not translate directly into Delta water recreation effects. For instance, incoming tidal action in the summer contributes approximately 70,000 cfs in the Sacramento River near Rio Vista and 58,000 cfs in the central Delta reach of the San Joaquin River (DWR 1994).

Table H-3.8-5 shows the impact of the project on Delta inflows to be about 0.1 percent. Consequently, the differences in summertime inflow to the Delta resulting from the project alternative condition would be a less-than-significant impact on Delta recreation opportunities.

When compared to the existing condition, the project alternative condition would result in no significant impact on flows entering the Delta. Therefore, this impact is considered less than significant.

Impact 3.8-19: Impacts to Oroville Reservoir or Feather River recreation.

The Action Alternatives would not result in substantial changes in storage or elevation at Oroville Reservoir, or in flow in the Feather River, relative to the existing condition. Any small changes that might occur would be considered less-than-significant impacts upon recreation resources.

Impact 3.8-20: Consistency with the American River Parkway Plan.

American River Parkway Plan Policy 3.1 on water flow anticipates that flow requirements are being researched and should be defined in the plan once the research is completed. The policy indicates that flow standards associated with the SWRCB's D-1400 (1,500 cfs for recreation) would be too low if they went into effect. This analysis indicates that the minimum flow for adequate recreation opportunity on the lower American River, based on a review of known flow criteria, would be 1,750 cfs. The low end of an optimum flow range appears to be about 3,000 cfs. Both the minimum and optimum flow criteria used in the EIS/EIR are higher than the D-1400 standard, and CVP operations associated with the Action Alternatives would not result in summertime flows being reduced below these criteria more often than under the existing condition. Therefore, the Action Alternatives would be consistent with the American River Parkway Plan, and no conflicts with environmental plans or goals of the plan would occur.

Impact 3.8-21: Consistency with state and federal Wild and Scenic River Act designations.

CVP operations associated with the Action Alternatives would not result in summertime flows being reduced below optimal and minimum flow criteria for recreation on the lower American River more often than under the existing condition. Therefore, CVP operations associated with the Action Alternatives would not diminish the recreational values of the lower American River, consistent with the state and federal recreational river designations.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the No Action/No Project Alternative in the Future (2025)

Impact 3.8-22: Impacts to water recreation activities on the Middle Fork American River.

As discussed previously (see Impact 3.8-10), PCWA would continue to release higher flow rates from Ralston Afterbay on summer weekend mornings according to its informal agreement with Middle Fork American River commercial whitewater boating companies. To meet the higher base flows necessary for the project diversion and minimum flow requirements, the duration of the higher flows suitable for rafting could be reduced. However, based on a study of the Middle Fork American River (SWRI 1998), the reduction in the duration of higher flows is likely to be negligible.

Impact 3.8-23: Impacts to lower American River recreation.

When compared to No Action/No Project Alternative, the Action Alternatives would result in essentially the same mean monthly flows on the American River below Nimbus Dam (less than one percent difference) during the May to September recreation season.

Table H-3.8-6 presents a summary of the results pertaining to recreation on the lower American River. According to Table H-3.8-6, over the course of the 70-year period of record, implementation of the future cumulative condition would result in mean monthly flows within the maximum/minimum flow range for recreation (1,750 to 6,000 cfs) slightly less often than under future no project conditions. June would experience an increase of one year within the maximum/minimum range, while August and September would each experience a decrease of one year. For the entire May through September recreation season, the decrease from No Action/No Project Alternative in the total number of months in which the flows would fall within the maximum/minimum range would be less than one percent.

The frequency of occurrence of Nimbus Dam releases within the optimal range (3,000 to 6,000 cfs) would increase or decrease depending on the month. The number of years within the optimal range would remain unchanged in May and September, would increase by one year in June, and decrease by one and two years in July and in August, respectively. The net long-term effect during the irrigation season would correspond to a decrease of less than one percent.
Based on the above assessment, when compared to the No Action/No Project Alternative, the Action Alternatives would have a less-than-significant impact on water-dependent and water-enhanced recreation use on the lower American River.

Impact 3.8-24: Impacts to boating at Folsom Reservoir.

When compared to the No Action/No Project Alternative, the Action Alternatives would result in slightly less years when the reservoir surface elevation would be above the minimum required for boaters' access to launching ramps and marinas.

Table H-3.8-7 presents the number of years in which Folsom Reservoir surface water elevation falls within the desirable ranges for recreation. By comparison with the No Action/No Project Alternative, the net long-term effect of Action Alternatives is a positive one for boating at Folsom Reservoir. Consequently, there would be no adverse impact on Folsom Reservoir boating opportunities.

Impact 3.8-25: Impacts to swimming at Folsom Reservoir.

When compared to No Action/No Project Alternative, the Action Alternatives would result in negligible changes in the frequency of reservoir surface elevations within the range required for access to swimming beaches. As shown in Table H-3.8-7, there would be no net effect on the usability of swimming beaches during the months of May to September, and a net decrease of less than one percent in the number of months in which the reservoir levels would fall within the optimal range for swimming (435 to 455 feet). Therefore, the overall impact on Folsom Reservoir swimming opportunities would be less than significant.

Impact 3.8-26: Impacts to recreation at Shasta Reservoir.

When compared to the No Action/No Project Alternative, the Action Alternatives would result in essentially the same long-term mean end-of-month surface water elevation during the May to September recreation season. In addition, over the recreation season, there would either be no net effect on the frequency of Shasta Reservoir surface elevation within the range required for boating and other water-related recreation activities at Shasta Reservoir, or a slight increase in frequency (Table H-3.8-8). Therefore, there would be a less-than-significant impact to recreation at Shasta Reservoir.

Impact 3.8-27: Impacts to recreation at Trinity Reservoir.

When compared to the No Action/No Project Alternative, the Action Alternatives would result in no reductions in the frequency of Trinity Reservoir surface elevation above the level required for boating and other water-related recreation activities at Trinity Reservoir (Table H-3.8-9). Therefore, there would be no impact to recreation at Trinity Reservoir.

Impact 3.8-28: Impacts to recreation on the upper Sacramento River.

When compared to the No Action/No Project Alternative, the Action Alternatives would result in essentially the same mean monthly flows below Keswick Dam during the May to September recreation season (Table H-3.8-10). Therefore, there would be no adverse impact associated with recreation in the upper Sacramento River.

Impact 3.8-29: Impacts to recreation on the lower Sacramento River.

When compared to the No Action/No Project Alternative, the Action Alternatives would result in essentially the same mean monthly flows in the lower Sacramento River (Table H-3.8-11). Therefore, there would be no adverse impact associated with recreation in the lower Sacramento River.

Impact 3.8-30: Impacts to recreation at the Delta.

When compared to the No Action/No Project Alternative, the Action Alternatives would result in no impact on flows entering the Delta. Therefore, there would be no adverse impact associated with recreation at the Delta.

Impact 3.8-31: Impacts to Oroville Reservoir and Feather River recreation.

The Action Alternatives would not result in substantial changes in storage or elevation at Oroville Reservoir, or in flow in the Feather River, relative to the No Action/No Project Alternative. Any small changes that might occur would be considered to represent less-than-significant impacts upon recreation resources.

Cumulative Impacts

Impact 3.8-32: Impacts to lower American River recreation.

Based on the future cumulative condition compared to the existing condition, additional diversions and potential CVP operations would result in substantial decreases in lower American River monthly mean flows during the high recreation use season. Compared to the existing conditions, the long-term average flow during the period of May through September would be approximately seven percent lower under the future cumulative condition.

Figure H-3.8-5 shows the probability of exceedance plots for lower American River flows below Nimbus Dam during May through September. Significant flow reductions are shown for July, August, and September. Table H.3-8-12 presents a summary of the number of years in which the monthly mean flows below Nimbus Dam would remain within the optimal (3,000 to 6,000 cfs) and maximum/minimum (1,750 to 6,000 cfs) ranges for river recreation under existing and cumulative conditions. Reductions in the number of years out of the 70 years modeled in which the flows in the lower American River would be within the optimal range would occur in all months of the recreation season except for June. May and August would each experience a decrease of two years, while for July and September there would be reductions of 12 and six years, respectively. For the entire May through September recreation season, the long-term decrease from existing conditions in the total number of months in which the flows would fall within the optimal range is slightly over five percent (19 out of 350).

The simulation results presented in Table H-3.8-12 show that the number of months the flows in the lower American River would be within the minimum to maximum range would be increased in June by three years. The remaining months of the recreation season would experience decreases of two years in May, four years in July, six years in August, and three years in September. This represents an overall decrease from existing conditions of approximately three percent (12 out of 350) for the May through September recreation season.

Based on the above assessment, changes in CVP operations associated with the future cumulative condition would have a significant impact on water-dependent and water-enhanced recreation use on the lower American River.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis indicates that the monthly mean flows in the lower American River during the peak recreation season would be slightly increased (approximately 1.5 percent change) under cumulative conditions (with project) relative to the future base condition (without project). CVP operations associated with implementation of the project would contribute to a small increase (five out of 350 months) in the number of times the monthly mean flows would be reduced below the minimum recreation flow threshold of 1,750 cfs below Nimbus Dam.

Table H-3.8-13 presents a summary of the number of years in which the monthly mean flows below Nimbus Dam would remain within the optimal (3,000 to 6,000 cfs) and maximum/minimum (1,750 to 6,000 cfs) ranges for river recreation under the future base and cumulative conditions. Reductions in the number of years in which the flows in the lower American River would be within the optimal range would occur in the last three months of the recreation season. July and September would each experience a decrease of two years out of the 70 years modeled, while in August there would be a reduction of one year. This represents an overall decrease from existing conditions of about one percent for the May through September recreation season.

The number of months the flows in the lower American River would be within the minimum to maximum range (1,750 to 6,000 cfs) would remain unchanged in May and September and be increased by one year out of 70 years in June. July and August would experience decreases of one and two years, respectively. For the entire May through September recreation season, the long-term decrease from existing conditions in the total number of months in which the flows would fall within the minimum to maximum range would be less than 1 percent.

Based on the above assessment, changes in CVP operations associated with the future cumulative condition would have a less-than-significant impact on water-dependent and water-enhanced recreation use on the lower American River.

Impact 3.8-33: Impacts to boating at Folsom Reservoir

Table H-3.8-14 compares the surface water elevation at Folsom Reservoir and the usability of boat launching facilities under the existing and cumulative conditions. For the months of March through September, Folsom Reservoir levels would fall below the 420-foot elevation necessary to keep all boat ramps operable in 37 more months (out of 490) under the cumulative condition than under the existing condition. This corresponds to a 7.6 percent decrease in the usability of all boat ramps.

Table H-3.8-14 shows that between July and September there is no net change in the frequency at which at least one boat ramp is available at each side of Folsom Lake. During the early months of the recreation season, the cumulative condition would result in a decrease of two years in March and a one year decrease in April, May, and June. In August and September, the cumulative condition would result in increases of four and one year, respectively, in which at least one ramp on each side of the reservoir would be usable. Over the entire boating season, there would be no net change in the number of years in which the at least one boat ramp would be usable on each side of the reservoir.

As indicated in Table H-3.8-14, the cumulative condition would reduce the usability of the Folsom Lake Marina wet slips (which require a minimum 412-foot elevation) in all months of the primary boating season when compared to the existing condition. The cumulative condition would result in an overall 7.6 percent decrease in the frequency in which the wet slips would be usable during the recreation season.

Under the set of assumptions for the future cumulative condition, the impact analysis indicates that in comparison to existing conditions surface water elevation at Folsom Reservoir would be frequently reduced. This would be a significant future impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis indicates that impacts to usability of boating facilities would be slight. Table H-3.8-15 shows that the Action Alternatives would reduce the usability of boat ramps one year out of 70 relative to the future base and cumulative condition. This represents a less-than-significant contribution to the cumulative impact to recreation at Folsom Reservoir.

Impact 3.8-34: Impacts to swimming at Folsom Reservoir.

As presented in Table H-3.8-14, the cumulative condition would impact the availability of swimming beaches during the months of May through September. The frequency in which the water levels would be within the usable beach range during the months of May through September would be reduced by seven percent (26 out of 350). The number of years with water levels within the optimum range (435 to 455 feet) would be reduced by four percent (15 out of 350 summer months).

Comparisons of simulated results for future cumulative and existing conditions show that during the recreation season Folsom Reservoir surface water elevation would fall outside the useable and optimal ranges more often for the cumulative scenario. The overall impact on Folsom Reservoir swimming opportunities would be considered significant.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis indicates that the monthly mean water surface elevation at Folsom Reservoir would be essentially the same for the peak recreation months (May to September). The results also indicate that the Action Alternatives would result in a negligible number of additional occurrences of Folsom Reservoir water level elevations dropping below the 420-foot boat ramp threshold or the 412-foot marina wet-slip threshold when compared to the future base condition (Table H-3.8-15). The usability of swimming beaches also would be only very slightly decreased (less than one percent decrease) under future conditions with or without the project. Therefore, any contribution of CVP operations associated with the implementation of the project to future potentially significant Folsom Reservoir recreation impacts would be negligible.

Impact 3.8-35: Impacts to recreation at Shasta Reservoir.

Table H-3.8-16 presents the modeling results concerning recreation at Shasta Reservoir. In comparison to the existing condition, the future cumulative condition would result in a reduction in the total number of years when all boat ramps are usable (elevation 1,017 feet), in every month of the recreation season. Over the long-term, there would be 25 fewer months (out of 350) in which the surface water elevation at Shasta would be high enough to allow all boat ramps to be used. This would correspond to a seven percent decrease in the frequency in which all boat ramps would be usable.

The number of years when at least one public ramp is maintained on each of the reservoir arms (elevation 941 feet) would also decrease under the future cumulative condition. Over the long-term, there would be 12 fewer months (out of 350) in which the surface water elevation at Shasta Reservoir would be high enough to allow the use of at least one boat ramp on each side of the lake. This would represent a decrease of three percent when compared to the existing condition.

With regard to Shasta Reservoir shoreline and camping facilities, the analysis indicates that the cumulative condition would result in an increase in the number of years in which Shasta Reservoir levels would drop below 1,007 feet. Over the long-term, there would be 27 fewer months (out of 350) in which the surface water elevation at Shasta Reservoir would be suitable to shoreline uses.

With regard to boat-in camping use, the future cumulative condition would result in an increase in the number of years in which Shasta Reservoir levels would be at or above the 100-foot drawdown (967 feet) during May through September. Over the long-term, there would be 17 fewer months (out of 350, corresponding to a five percent change) in which the surface water elevation at Shasta would be high enough to sustain boat-in camping uses.

Under the set of assumptions for future conditions, the analysis indicates that in comparison to existing conditions the long-term average surface water elevation at Shasta Reservoir would be reduced by less than one percent during the recreational use period of the year (May to September). Although the overall reduction in elevation would be small, the reductions below critical thresholds would diminish recreation opportunities at Shasta Reservoir. Therefore, this would be a potentially significant cumulative impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis indicates that CVP operations associated with implementation of the project would result in no additional occurrences of Shasta Reservoir water level elevations dropping below the 1,017-foot boat ramp threshold or the 967-foot boat-in camping use threshold when compared to the future base condition (Table H-3.8-17). Shoreline use availability would decrease in one year for the month of June, representing a less than one percent decrease over the long-term. Therefore, any contribution of CVP operations associated with the implementation of the project to future potentially significant Shasta Reservoir recreation impacts would be negligible.

Impact 3.8-36: Impacts to recreation at Trinity Reservoir.

As presented in Table H-3.8-18, the cumulative condition would result in a slight decrease in the frequency of reservoir levels sufficient to allow for boat launching from the Fairview and Main Arm boat ramps. Over the 70 years modeled, the decrease in the number of months would be six and nine months, respectively. The future cumulative condition would result in no changes in the frequency in which the Stuart Fork Arm boat ramp could be used during the May through September recreation season.

When compared to the existing condition, the future cumulative condition would result in infrequent changes in the frequency of Trinity Reservoir surface elevations below the levels required for boating and other water-related recreation activities at Trinity Reservoir. Therefore, the future cumulative impact to recreation at Trinity Reservoir would be less than significant.

Impact 3.8-37: Impacts to recreation on the upper Sacramento River.

Water-dependent recreation use on the upper Sacramento River between Keswick Dam and the confluence of the American River is generally higher in May through September than in other months of the year, coincident with the warmer summer weather. Consequently, effects of the future cumulative condition on upper Sacramento River flows during this period are important for evaluating recreation opportunity impacts.

Although the long-term average flow at Freeport would be reduced in all months relative to the existing condition, the decreases would generally be small. The greatest percent decrease in long-term average flow would occur in June (6.1 percent), when the flows are above 7,000 cfs. Figures H-3.8-6 and H-3.8-7 show the exceedance probability plots for the Sacramento River flow below Keswick Dam for May through September. These graphs demonstrate that the probability of the flow below Keswick exceeding 5,000 cfs is identical in all months except for May and September, when there is a slight decrease in the probability. Further inspection of the modeling results demonstrates that under the future cumulative condition the flow below Keswick Dam would be above 5,000 cfs in two fewer years in May and one fewer year in September, when compared to existing conditions.

When compared to the existing condition, the future cumulative condition would result in a negligible decrease in the frequency of upper Sacramento River flows below the minimum flows required for recreation. Therefore, there would be no significant adverse impact associated with recreation in the upper Sacramento River.

Impact 3.8-38: Impacts to recreation on the lower Sacramento River.

Figures H-3.8-8 and H-3.8-9 show the probability of exceedance plots for the Sacramento River flow at Freeport for May through September. These graphs demonstrate that the probability of the flow at Freeport exceeding 5,000 cfs is identical under the cumulative and existing conditions in all months.

When compared to the existing condition the future cumulative condition would result in identical frequency of upper Sacramento River flows above the minimum flow required for recreation. Therefore, there would be no impacts associated with recreation in the lower Sacramento River.

Impact 3.8-39: Impacts to recreation at the Delta.

The tidally influenced flows of the Delta are substantially more than the 13,200 to 19,200 cfs range of average inflow to the Delta from the lower Sacramento River from May to September. As a result, in-flows from the Sacramento River would not translate directly into Delta water recreation effects and any effect the lower Sacramento River flows could have on water-dependent and water-enhanced recreation would be at least moderated and, potentially, overshadowed completely, depending on the location in the Delta. Table H-3.8-19 shows that the greater decrease in average Sacramento river inflow to the Delta during the May through September period would be approximately 850 cfs. This would be an insignificant impact on Delta recreation opportunities.

Impact 3.8-40: Impacts to recreation on Oroville Reservoir.

Oroville Reservoir would experience substantial long-term average elevation reductions for most months of the year over the 70-year period of record. Long-term average Oroville Reservoir end of month elevation under the cumulative conditions would be reduced up to 18 feet during the month of September. Given the importance of water-related recreation activities in Oroville Reservoir (i.e., boating, fishing, camping, sailing), and the relatively large reduction in water surface elevation that would be experienced under the cumulative condition relative to the existing condition, impacts on recreation for the Oroville Reservoir would represent a potentially significant impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

No substantial changes in reservoir elevation would be anticipated under the cumulative condition relative to the future base. The increase in future SWP demands is the primary factor leading to cumulative effects. The Action Alternatives contribution to the cumulative condition would not be considerable.

Impact 3.8-41: Impacts to recreation of Feather River.

The Feather River would experience some substantial changes in flow for most months of the year for the 70-year period of record. Changes in long-term average monthly mean flow would range from decreases in flow of up to 14.1 percent (i.e., November) to increases in flow of up to 36.4 percent (i.e., August). Given the uncertainty associated with the potential effects that these flow reductions may have on recreation activities in the Feather River, impacts on recreation for the Feather River would represent a potentially significant impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

No substantial changes in river flow would be anticipated under the cumulative condition relative to the future base. The increase in future SWP demands is the primary factor leading to cumulative effects. The Action Alternatives contribution to the cumulative condition would not be considerable.

3.8.2.5 Environmental Protection and Mitigation Measures

Several mitigation measures have been incorporated into the Mitigation Plan to reduce the significance of potential recreation impacts associated with implementation of the Proposed Project or Upstream Diversion Alternative. These measures are presented below.

Maintain Public Recreation Trail Access During Construction

Commitment:	Provide public recreation trail access to the Project area during construction, to the extent feasible, without compromising public health and safety and Project construction progress.
Responsible Parties:	Reclamation/Construction Contractor

Location: Project area
Timing: During all phases of construction (2002 through 2004); as feasible
Monitoring: Monitor fencing and temporary markers or other posted signs used to indicate areas open for public trail use in Project vicinity during construction.
Reporting Requirements: Record trail access restrictions in daily inspector report

Description of Activities:
Reclamation will require the Construction Contractor to identify, with temporary construction fencing, flagging, and posted signs, all areas of restricted or limited public access. Additionally, Reclamation will provide public notification of such limitations through a Public Outreach and Information Program.

Success Criteria: Appropriate, safe trail access is provided, to extent feasible.

Avoid Recreation Trail Closures That Affect the Western States Endurance Run, Tevis Cup Western States Trail Ride, or the American River 50-Mile Endurance Run Events

Commitment: Project construction scheduling will avoid impacting the route or timing of the Western States Endurance Run, Tevis Cup Western States Trail Ride, and the American River 50-Mile Endurance Run annual events.
Responsible Parties: Reclamation/Construction Contractor and CDPR Event Coordinator
Location: Project area recreation trails
Timing: Once annually per event (as needed)
Monitoring: Indicate event in compliance report
Reporting Requirements: No specific reporting requirements

Description of Activities:
As part of the event permitting process, CDPR will coordinate with event sponsors and Reclamation's Construction Contractor to ensure safe passage along event routes during set-up, operation and breakdown activities through the suspension and elimination of all potentially hazardous construction associated risks during these events.

Success Criteria: Planned annual events and routes are maintained.

Auburn-to-Cool Trail

The Auburn-to-Cool Trail crossing of the dewatered channel North Fork American River will be lost once the bypass tunnel is closed and river flows returned to the natural river channel.

PCWA Commitment:
In order to mitigate PCWA's share of the recreational impact associated with bifurcation of the Auburn-to-Cool Trail, PCWA shall pay a maximum of $500,000 to be used for costs associated with the construction of a new bridge across the North Fork American River or another alternate mitigation program (e.g., the construction of new trail segments). Such money, or some lesser amount if the full amount is not required, shall be made available to CDPR only after all of the following have occurred: (1) CDPR and Reclamation have completed the environmental review necessary to implement such a Project, have chosen to proceed with such a Project, and have obtained all regulatory approvals necessary to proceed with the Project; (2) any litigation over such environmental review or regulatory approvals has been resolved in favor of CDPR and/or Reclamation or other approving agency; and (3) the American River Pump Station Project has obtained all necessary regulatory and/or discretionary approvals necessary for construction, and any litigation over any such approvals has been resolved in favor of PCWA.

PCWA will have met its obligations under this mitigation measure once it has provided payment for costs associated with construction of a bridge or alternate trail.

California Resources Agency Commitment:	The State of California has indicated that $1.0 million would be available to apply toward the design, planning and construction of crossing or alternate trail access near the Project site.
Responsible Parties:	California Resources Agency, CDPR/PCWA
Location:	To be determined by future study
Timing:	Ongoing

Description of Activities:
Various trail replacement alternatives are being considered by state and federal agencies to determine the best approach to provide trail access for multiple user groups. Feasibility studies will be performed.

Success Criteria:
Lead agencies and CDPR participate in funding and evaluation of providing alternate river crossing or trail access to replace ACT crossing.

Minimize Trail User Conflicts Due to Increased Public Access

Commitment:	Design and improve trails to accommodate designated uses and avoid conflicts between multiple user types.
Responsible Parties:	Reclamation/CDPR

Location: Project area trails
Timing: Ongoing Project operations
Monitoring: Maintain trail features and posted signs that indicate hours of operation and trail use designation; CDPR park staff and/or volunteers to assist in informing and enforcing trail uses.
Reporting Requirements: No specific reporting requirements

Description of Activities:
Reclamation will require the Construction Contractor to construct trail and access road improvements from the Auburn Dam batch plant parking area to Oregon Bar and to the North Fork American River turnaround/handicap-accessible parking area with proper width and informational/directional signage.

Through the management agreement for the Auburn SRA, Reclamation will require CDPR to monitor sign conditions, and repair or replace as needed. Additionally, CDPR staff and/or volunteers will provide enforcement of specific trail use rules and regulations in the Project area.

Success Criteria: Trail uses remain clearly demarcated and user conflicts avoided.

Minimize Littering at Public River Access Locations

Commitment: Control litter within the Project area and nearby adjacent areas.
Responsible Parties: Reclamation/CDPR
Location: Project area/Maidu Drive
Timing: Ongoing Project operations
Monitoring: Monitor adequacy of trash containers provided as part of Project; increase number, if needed
Reporting Requirements: No specific reporting requirements

Description of Activities:
Through the management agreement for Auburn SRA, Reclamation will require CDPR to provide and maintain animal-proof trash containers at several locations in the public river access areas, including the Maidu Drive entrance, Auburn Dam batch plant parking area, Oregon Bar turnaround (at Cardiac Hill trailhead), near Oregon Bar, and at the riverside turnaround/handicap-accessible parking lot. CDPR's park staff and volunteer patrols will work to enforce litter control rules.

Success Criteria: Document placement and maintenance of trash containers.

Provide Disabled Access Parking Area

Commitment: CDPR will coordinate with the lead agencies on design specifics to provide disabled river users with parking and river access.
Responsible Parties: CDPR/Reclamation

Location:	Project area
Timing:	Ongoing Project operations
Monitoring:	No specific monitoring requirements
Reporting Requirements:	No specific reporting requirements

Description of Activities:
Reclamation will require the Construction Contractor to grade and construct three handicap-accessible parking spaces adjacent to the riverside turnaround, including one van accessible space. Design/construction will include placement of base rock and vibra-packing or rolling to provide a firm compact surface.

Reclamation will require the Construction Contractor to install signs indicating “loading zone, no parking” at the turnaround and signs indicating handicap-accessible parking, as appropriate.
Reclamation will require the Construction Contractor to create a short trail meeting American Disabilities Act standards. The trail will consist of compacted gravel will lead from the handicap-accessible parking lot to a location near the river.

Success Criteria: Provision of handicap-accessible river access.

3.9 VISUAL RESOURCES

3.9.1 AFFECTED ENVIRONMENT

3.9.1.1 Regional Setting

The regional setting includes visual resources that may be indirectly affected by the Proposed Project or alternatives through reductions in flows or reservoir elevations due to changed CVP and SWP operations that result in a change in visual character of the water body. Regional water resources included in this evaluation include the Sacramento River from Trinity and Shasta reservoirs downstream to the Delta, the American River from Folsom Reservoir downstream to the mouth at the Sacramento River confluence, Oroville Reservoir, and the Feather River. The visual resources of these water bodies and waterways are described in the Cumulative Report (Appendix D of the Draft EIS/EIR).

3.9.1.2 Project Area Setting

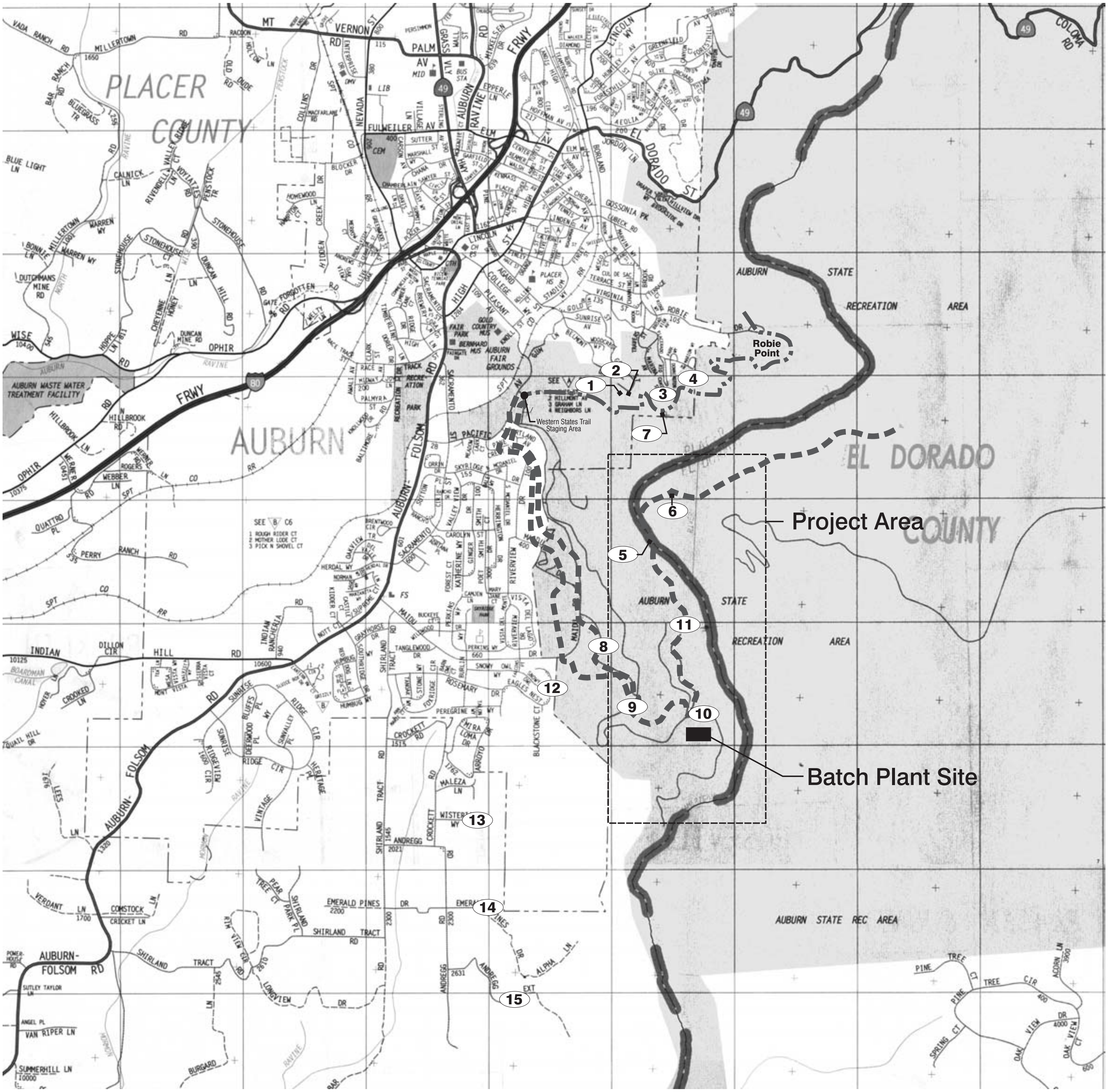
The project area represents the direct effect study area and encompasses the views/visual resources of the Middle Fork American River from below Ralston Afterbay and the North Fork American River from the confluence with the Middle Fork to just downstream of Oregon Bar (Figure 2-2). This area includes homes on the western rim of the canyon from which construction activities or project features could be visible to residents or recreationists.

North Fork American River

The Bureau of Land Management (BLM) conducted a habitat study along a five-mile segment of the North Fork American River from the bypass tunnel inlet upstream to the North Fork Debris Dam (which forms Lake Clementine). Through this study, the BLM determined this five-mile river segment is high quality foothill-canyon habitat with low habitat fragmentation due to human activities. The BLM assigned Outstandingly Remarkable Resource values to this river segment for scenic resources.

Project Area

The study area lies within Placer and El Dorado counties, with the river at the boundary of the two counties. The homes on the rim of the western side of the canyon are in Placer County, some within the Auburn city limits (**Figure 3.9-1**). (There are no homes with views of the project area on the El Dorado County side of the canyon.) CDPR maintains recreation trails that pass through or near the site. The Auburn-to-Cool Trail and the Western States Trail were selected as having representative views of the project site. Both trails are used frequently by hikers and equestrians; the Auburn-to-Cool Trail also is open to mountain bikers. (Refer to Section 3.8, Recreation, for a more detailed discussion of these trails.)



Scale 0 2000 feet

LEGEND

Auburn-to-Cool Trail
Western States Trail
1 Key Viewpoints (see key below)

Viewpoints Key

1 - Ridgetop-Gold West Viewpoint
2 - Ridgetop-Gold East Viewpoint
3 - Ridgetop-Rio Camino Viewpoint
4 - Ridgetop-Placerado Viewpoint
5 - Auburn-to-Cool Canyon Floor Viewpoint
6 - Auburn-to-Cool Cofferdam Viewpoint
7 - Western States Trail Viewpoint
8 - Foresthill Bridge Viewpoint
9 - Construction Yard Viewpoint
10 - Auburn Dam Batch Plant Plateau
11 - Auburn-to-Cool Trail
12 - Eagles Nest Viewpoint
13 - Wisteria Street Viewpoint
14 - Emerald Pines Drive Viewpoint
15 - Andregg Road Viewpoint

Figure 3.9-1 Location of Viewpoints

3.9.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.9.2.1 Methodology

Facilities-Related Analysis Approach

To evaluate impacts on the visual resources of the project study area, the size and character of the alternatives' structures and facilities were examined by consulting with the project design team. In addition, sensitive receptors were identified by reviewing aerial photographs and topographic maps, and by conducting site visits. Specific viewpoints of project components from these receptors were identified during field visits.

Sensitive Receptors/Viewpoints

Facility construction, operations, and maintenance would occur in the project area. Two categories of sensitive receptors were identified in the project area: recreationists and residents. These sensitive receptors were identified as valuing the scenic quality of their views integrally with their use of the area.

To assess the potential for visual impacts on these sensitive receptors, one or more viewpoints were selected for each receptor category to characterize views from various receptor locations. Impacts were identified based on the following criteria:

- The extent to which project components are visible from the viewpoint (e.g., duration of views from a trail, how many project components can be seen);
- The clarity of views from the viewpoint (e.g., whether the view is obstructed by trees); and
- The distance from the project site to the viewpoint.

These receptors were evaluated from the following types of viewpoints: (1) ridgetop residences on the western rim of the canyon; (2) recreationists on the Auburn-to-Cool Trail; (3) recreationists on the Western States Trail; and (4) recreationists in the Oregon Bar area. The sensitive receptors are grouped in this manner because they represent relatively distinct geographic locations with corresponding distinct visual perspective of the study area. Although subviewpoints are identified for the Auburn-to-Cool Trail and Ridgetop Homes, the views are relatively similar within each viewpoint.

These viewpoints are described below, and their locations and project component views are depicted on Figure 3.9-1

Ridgetop Homes (Viewpoints 1 to 4)

Most of the residences near the edge of the western (Placer County) side of the canyon have views of the upper half of the canyon, or of the El Dorado County side, but not the canyon floor or Placer County canyon slopes where the Proposed Project alternatives' components would be located. Homes that would have the "greatest" potential for views of the proposed facilities, referred to here as the Ridgetop Homes Viewpoints, have clearer views of the study area than most of the Ridgetop Homes.

The Ridgetop Homes Viewpoints include: Gold Street West, Gold Street East, Rio Camino, and Placerado, Viewpoints 1 through 4, respectively.

From the Ridgetop Homes Viewpoints, the canyon appears mostly natural and is generally covered with vegetation. The viewpoints generally have good views of the upper half of the canyon, but less clear views of the lower half. Some canyon wall defacing is evident (e.g., the keyway), as well as portions of the gravel deposits which fill the dewatered river stretch. The river stretch downstream of the bypass tunnel outlet is more consistently visible than the dewatered stretch, and in some cases it is not apparent that the river's course has been altered. In addition, the distance to the site lessens the unnatural-looking aspects of the canyon.

Auburn-to-Cool Trail (Viewpoints 5, 6, 8, 9, 10 and 11)

The Auburn-to-Cool Trail begins at the Auburn Overlook (for equestrians) and at Maidu Drive (for mountain bikers). It follows a construction access road down the canyon, crosses the dewatered river stretch between the tunnel outlet and the cofferdam, climbs the side of the cofferdam, and continues along Salt Creek towards Cool. The Auburn-to-Cool Trail viewpoints include the canyon floor and the cofferdam, Viewpoints 5 and 6, respectively, and four points along the trail beginning at Viewpoint 8 near Maidu Drive and descending into the canyon approximately 600 feet to Viewpoint 11.

The canyon floor is not visible from the Auburn-to-Cool Trail until just before the trail reaches the canyon floor near the bypass tunnel outlet (Viewpoint 5). From this vantage point, and also as the trail crosses the dewatered channel, most of the canyon floor and Placer County canyon side is visible. As the trail ascends the cofferdam, most of the canyon floor and Placer County canyon side remain in sight, but views of the upstream river segment replace the downstream segment.

From Viewpoints 5 and 6, the canyon appears mostly altered, and has relatively little vegetation. Viewpoints near 5 and 6 generally have good views of the lower half of the canyon, and good views—but at a greater distance and at a less natural line-of-sight—of the upper half of the canyon. For virtually the entire length of the trail on the canyon floor, the canyon wall alterations (e.g., the keyway and excavations) are very evident, as are the gravel deposits which fill the dewatered stretch. The upstream river stretch is visible as recreationists reach the cofferdam, and continues to be visible as the trail continues down Salt Creek. The dewatered river canyon segment is still visible facing west, but recreationists can see the upstream river stretch facing east. As the trail continues towards Salt Creek, the dewatered canyon segment slowly recedes from sight, and the upstream river segment remains in view. The view upstream is one of a virtually unaltered river canyon. The existing seasonal pump station and sump pond are the exception to the natural views in the upstream river channel.

From Viewpoints 8 through 11, views into the canyon are obstructed by trees and hillsides. Viewpoint 8 has a clear view of the Forresthill Bridge on the North Fork American River and a view of Auburn Dam excavation on the upper east side of the canyon, but no view directly into the canyon floor. Similar views can be seen at the construction storage yard (Viewpoint 9) and the batch plant (Viewpoint 10). At Viewpoint 11, views into the canyon are entirely blocked by vegetation.

Western States Trail (Viewpoint 7)

The trailhead for the Western States Trail is immediately north of the Auburn Dam Overlook. The trail continues along the Placer County side of the canyon at an elevation of approximately 1,100 feet. The trail crosses the river just downstream of the confluence of the North and Middle forks at the No Hands Bridge. The trail then follows the Middle Fork American River to the town of Foresthill and beyond.

As the trail descends from the Western States Trail staging area, recreationists have their best view of the canyon just past where a trail from Marina Avenue joins the main trail. This location is identified as the Western States Trail Viewpoint (Viewpoint 7).

As the trail continues to Robie Point, near a sharp westward bend of the river, recreationists occasionally have a view of the upper portion of the canyon and the upstream river stretch, but cannot see the canyon floor or the Placer County side of the canyon where the Proposed Project alternatives' components would be sited. Therefore, no additional viewpoints were selected.

From this viewpoint, there is a good view of both the upper and lower portions of the canyon. Therefore, recreationists can see both the natural-looking upper portion and the Auburn Dam construction-altered lower portion. The canyon wall excavation and spoils areas are evident, as are portions of the boulder and gravel cofferdam remnant deposits which fill the dewatered stretch. Existing seasonal pump station construction access roads that traverse the site are visible. The dewatered river stretch is as visible as the downstream stretch. Overall, the canyon appears unnatural-looking, both in general and compared to the surrounding area.

Ridgetop Homes (Viewpoints 12, 13, 14, and 15)

From the western side of the canyon extending south toward Folsom Reservoir, the homes along the ridgetop have the greatest potential to see into the canyon floor and the construction site at Oregon Bar. Viewpoint 12 is not able to view the riverbed because the Eagles Nest neighborhood sits too far back on a gently sloping ridge. Trees and the hillside are all that are visible at that site. Even further south at Viewpoint 13, trees block direct view into the canyon; although the hillside itself is not obstructing the direct view to Oregon Bar. At the top of Emerald Pines Drive (Viewpoint 14), residents have direct view of both Oregon Bar and the batch plant site looking northeast. These homes sit at the crest of a very sharply sloped hill facing northeast. Several of the homes on Andregg Road also have direct northeast-facing views of Oregon Bar and the batch plant sites at a line of sight distance of about one mile.

Other Sensitive Receptors/Viewpoints

The recreation trails in the vicinity of Oregon Bar would have views of the parking area and road and trail improvements proposed under the Proposed Project. As these facilities would be designed and operated to support existing and anticipated recreation uses in this local area, there would be no adverse effect on visual resources.

CDPR is planning to re-establish the trail along the Old Railroad Grade as a multi-use trail (Wells 1998). The trailhead would be at the Auburn Dam Overlook, and the trail would end at the confluence of the North and Middle forks. This trail would generally parallel the Western States Trail in the vicinity of the project site at a lower elevation. Therefore, the viewpoints for this trail would be very similar to those for the Western States Trail. Because this trail is not yet in place, it is not discussed further in this document.

The Auburn Dam Overlook was not considered a sensitive viewpoint for visual impacts because the canyon floor is generally not visible from this location. The only portion of the North Fork American River that is visible is downstream of the bypass tunnel outlet. None of the dewatered stretch, or the upstream river segment can be seen. Therefore, none of the Action Alternatives' structures would be visible.

Diversion-Related Analysis Approach

Increased water diversions and changes in CVP operations associated with the Proposed Project or alternatives could result in changes in river flow patterns and fluctuations in reservoir surface water elevations within the study area. Significant reductions in river flows would result in a reduced river expanse, which can contribute to the thinning of the riparian corridor, loss of valuable border zone vegetation, and subsequent degradation of wildlife habitat. In general, fluctuations in surface water elevations are considered an accepted feature of these reservoirs. However, large decreases in surface water elevations can result in significant increases in the drawdown zone around the edge of the reservoir. Because drawdown zones are typically unvegetated, decreases of greater than 10 feet are generally considered to be visually significant.

To evaluate diversion-related effects upon regional water bodies, visual impacts were analyzed based on a comparison of surface water elevations and river flows under existing and future scenarios with and without the project. Because the Action Alternatives would result in the same effect upon the regional system, they are evaluated together. Hydrologic modeling results were reviewed to determine whether reductions in reservoir elevations or river flows, if identified, would affect the visual character of the water bodies within the study area. The model simulations and comparisons are described in Section 3.3.2. Refer to the Hydrologic Modeling Technical Memorandum for additional detail (Appendix E of the Draft EIS/EIR).

3.9.2.2 Applicable Laws, Ordinances, Regulations, and Standards

The City of Auburn, the counties of Placer and El Dorado and CDPR have jurisdiction or management responsibilities over lands surrounding the project site. Visual resources-related objectives and policies expressed in the respective city and county general plans and CDPR resource management plan, are listed below (City of Auburn 1993; Placer County 1994; El Dorado County 1995; CDPR and Reclamation 1992).

City of Auburn

Policy 5.4 In making land use decisions, recognize the trail development and recreational potential of major open space features such as:

Major Ridge Tops: Ridge tops offer outstanding scenic value and have the potential to be linked to existing trails. Development should not detract from the overall viewshed quality of and from the ridge top.

Placer County

Goal 1.K: To protect the visual and scenic resources of Placer County as important quality-of-life amenities for county residents and a principal asset in the promotion of recreation and tourism.

Policy 1.K.1 The County shall require that new development in scenic areas (e.g., river canyons, lake watersheds, scenic highway corridors, ridgelines and steep slopes) is planned and designed in a manner which employs design, construction, and maintenance techniques that:

a. Incorporate design and screening measures to minimize the visibility of structures and graded areas.

b. Maintain the character and visual quality of the area.

Policy 1.K.2 The County shall require that new development in scenic areas be designed to utilize natural landforms and vegetation for screening structures, access roads, building foundations, and cut and fill slopes.

Policy 1.K.5 The County shall require that new roads, parking, and utilities be designed to minimize visual impacts. Unless limited by geological or engineering constraints, utilities should be installed underground and roadways and parking areas should be designed to fit the natural terrain.

Policy 1.K.6 The County shall require that new development on hillsides employ design, construction, and maintenance techniques that:

d. Maintain the character and visual quality of the hillside.

El Dorado County

Objective 7.6.1 Importance of Open Space

Policy 7.6.1.1 [Primary purposes of open space include:]

C. Maintaining areas of importance for outdoor recreation including areas of outstanding scenic, historic and cultural value; areas particularly suited for park and recreation purposes including those providing access to lake shores, beaches and rivers and streams; and areas which serve as links between major recreation and open space reservations including utility easements, banks of rivers and streams, trails and scenic highway corridors.

California Department of Parks and Recreation

The project area is located within the Auburn SRA, which is operated by the CDPR. The Auburn Interim Resource Management Plan (CDPR and Reclamation 1992) for the site lists general "constraints" that were considered in the planning process, which includes the following statement:

Since the biological, natural, cultural, and visual resources are valuable and integral components to the Auburn SRA and the surrounding areas, they should be protected to the extent possible when various facilities, improvements, or projects occur.

Specific management guidelines were developed in the Interim Plan to direct existing and potential land uses and activities in the Auburn SRA. Guidelines that relate to visual resources are listed below.

Design Standards of New Facilities

6. Structures should be screened from view with vegetation or other naturally occurring features whenever possible.

Scenic Viewshed

1. The viewshed is to be maintained. Development should be located outside of scenic areas, adjacent to existing structures, or along the edges of scenic areas where vistas will be less interrupted. Development should not be allowed on ridgelines.

2. Newly proposed roads, parking areas, and other developments should be evaluated to determine their effects on scenic quality. Proposals that would have an adverse impact on the viewshed should be revised or rejected.

3.9.2.3 Impact Indicators and Significance Criteria

Significance criteria were developed based on local general plan objectives and policies, the CDPR resource management plan guidelines and the CEQA Guidelines Environmental Checklist (CEQA Appendix G). Impact indicators were developed using visual component characteristics and PROSIM modeling output for river flows and reservoir surface elevation. **Table 3.9-1** presents the impact indicators and significance thresholds used to evaluate the project. Impacts to visual resources were considered less than significant if they did not violate or exceed these thresholds.

Table 3.9-1
Visual Resources Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ The contrast, including size and visual character, of project components within the visual setting of the project area.	❑ Are inconsistent with relevant city or county general plan policies or guidelines.
❑ The visibility of project components from sensitive viewpoints.	❑ Substantially change the character of the landscape/view in terms of both physical characteristics and land use types, as visible from sensitive viewpoints.
❑ Monthly mean flows (cfs) of the American, Sacramento, and Feather rivers.	❑ A decrease in flow, relative to the basis of comparison, contributing to substantial reduction in the width of the riparian corridor or loss of valuable riparian vegetation and/or habitat sufficient to adversely affect the visual character.
❑ Monthly mean surface water elevation of Folsom, Shasta, Trinity, and Oroville reservoirs.	❑ A decrease in monthly mean surface water elevation of more than 10 feet, relative to the basis of comparison, of the study area reservoirs with sufficient frequency to adversely affect the visual character.

3.9.2.4 Impact Analysis

This section presents the analysis of potential facilities- and diversion-related visual resources impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

Facilities-Related Impacts

No Action/No Project Alternative

Impact 3.9-1: Construction effects on the character of the landscape from the residential viewpoints.

No Action/No Project Alternative installation and removal would be virtually the same as under existing conditions with regard to visual impacts. There would be no substantial change in the types of construction activities at the seasonal pump station and diversion structure locations. The existing seasonal pump station and diversion structure are not visible from the residential viewpoints. Only a few road segments, which would be used for construction travel, are visible from the residences north of the project site (Viewpoints 1, 2, 3, and 4). Therefore, the only visual impact of construction activities would be the potential increased frequency of construction traffic on the road segments if the seasonal pump station is dismantled and reinstalled in years with high flows early and/or late in the operating season. Nevertheless, the limited visibility of the seasonal components would result in less-than-significant impacts to the residential viewpoints.

Impact 3.9-2: Construction effects on the character of the landscape from the Western States Trail Viewpoint.

Only a few road segments are visible from the Western States Trail Viewpoint, and for less than 100 feet along the trail. Therefore, construction activities associated with the No Action/No Project Alternative would be less than significant. For a further discussion of this impact, refer to Impact 3.9-1.

Impact 3.9-3: Operations effects on views from residential viewpoints.

The seasonal pump station and sump pond are not visible from any of the residential viewpoints; therefore, there would be no visual impact upon these receptors.

Impact 3.9-4: Operations effects on the character of the landscape from the Auburn-to-Cool Trail Viewpoints.

The seasonal pump station and sump pond are not visible from the Canyon Floor Viewpoint (5); however, they are visible from the Cofferdam Viewpoint (6). The pump station and sump pond would not change in appearance under this alternative, however, the pump station would be in place up to four additional months each year. Because materials (e.g., pipeline) related to the seasonal pump station remain at the site year-round, this would not be a substantial change in the landscape; the visual impacts would be negligible.

Impact 3.9-5: Operations effects on the character of the landscape from the Western States Trail Viewpoint.

The existing seasonal pump station and sump pond are not visible from the Western States Trail viewpoints; therefore, there would be no visual impacts.

Proposed Project

Impact 3.9-6: Construction effects on the character of the landscape from the residential viewpoints.

Overall, the visible extent of the construction activities from the Ridgetop Homes is fairly limited.

- From the Gold Street West Viewpoint, the construction staging area would not be visible, however, much of the construction vehicle traffic would be. No project facility construction sites would be visible.

- From the Gold Street East Viewpoint, the construction staging area and most of the road would not be visible, nor would the pump station and intake construction sites.

- From the Rio Camino Viewpoint, the construction staging area and much of the construction vehicle traffic would be visible.

- From the Placerado Viewpoint, some of the pump station access road would be visible from this viewpoint; therefore, construction vehicle traffic would be visible. The construction staging area and the pump station and intake facilities would not be visible.

Because only some of the construction activities would be intermittently visible from these sites and would not differ substantially from the existing or No Action/No Project Alternative annual construction activities of the seasonal pump station, the visual impacts would be less than significant.

From the Emerald Pines Drive (14) and Andregg Road (15) viewpoints (residential area south of project site), both the Oregon Bar area, including the batch plant construction site, is clearly visible. These viewpoints are shared by at least 6 homes. The proposed construction activities and associated construction traffic would be visible. Construction activities would involve the use of heavy machinery such as cement trucks and backhoes for a likely duration of up to two months. Under existing conditions the batch plant site is a disturbed and unnatural site void of natural vegetation, landscaped, and filled with mounds of gravel.

Due to the limited nature of the proposed construction activities at the Oregon Bar site, the existing disturbed condition of the batch plant site, and the limited number of residents with direct view of this construction site, visual impacts associated with the parking lot construction and access road improvements would likely be less than significant as compared to existing or No Action/No Project Alternative.

Impact 3.9-7: Construction effects on the character of the landscape of the Western States Trail Viewpoint.

The construction staging area and some of the construction vehicle traffic would be visible from this viewpoint. Views of these project construction activities would be less than clear and complete, and for a very limited stretch (approximately 100 feet) of the trail from a distance of one-quarter mile. Because of the limited visibility of project construction, and the less than substantial differences from existing condition or No Action/No Project Alternative annual construction activities, the visual construction impacts of this alternative would be less than significant.

Auburn-to-Cool Trail access would be limited during heavy construction activities; therefore, the impacts on viewpoints from the trail during construction would be considered less than significant. Recreation impacts from the trail closure are discussed in Section 3.8, Recreation.

Impact 3.9-8: Operations effects on the character of the landscape from the residential viewpoints.

Only the Placerado Viewpoint (4) would be able to see the new pump station; however, operations and maintenance traffic along several road stretches would be visible from all viewpoints. The visual impacts of the addition of the project components would be less than significant because of the limited views of the facilities from these viewpoints. The restored river channel would enhance the views of the canyon floor compared to existing or No

Action/No Project and Upstream Diversion alternative conditions for the Gold Street East, Rio Camino, and Placerado viewpoints north of the project site. The overall impact on views from these homes would be potentially beneficial.

Impact 3.9-9: Operations effects on the character of the landscape from the Western States Trail Viewpoint.

Short road segments would be visible from this viewpoint so recreationists would infrequently see operations and maintenance vehicles. Because of the limited visibility of project components, and the lack of substantial changes to the character of the landscape, the visual impacts would be less than significant.

Impact 3.9-10: Operations effects associated with use of the parking and staging facilities on the visual character of the project site.

Visual changes in the project area associated with public river access at Oregon Bar would include the presence of a staffed CDPR entrance station, parking and turnaround areas, improved roads, and recreation-related public use. Related visual impacts may include public vehicles lined up at the entrance station; however, public access would be controlled and monitored at the entrance station and limited to the number of available parking spaces. The majority of new recreationists are anticipated to be boaters who would be using the project site exclusively as a pull-out destination rather than prolonged visitation. CDPR maintenance personnel would remove trash generated by public use of the project site. Overall, residences at the Ridgetop Homes (see Figure 3.9-1) (Viewpoints 1 through 4) would have no views of the parking lot and turnaround area near the dewatered channel.

These facilities would not be visible from the Western States Trail, except for very limited stretches because views from the trail toward the canyon floor are almost completely obstructed by trees downslope of the trail. Approximately half of the river channel would be visible from this viewpoint. Restoring the river would improve the visual setting of this viewpoint; therefore, a beneficial visual impact would result under this alternative.

The Oregon Bar area, including the batch plant construction site, is clearly visible from homes south of the project site (Figure 3.9-1, Viewpoints 14 and 15). Under the existing condition, these residents view a disturbed and unnatural site at the batch plant area. The proposed parking lot would result in additional graded ground surfaces and additional recreational use of the area as compared to the existing condition or the No Action/No Project Alternative. These facilities would be "rustic" to minimize changes to the character of the area and would be consistent with the intent of river-related recreation planning goals.

Due to the disturbed nature of the site, presence of recreation already in the area and the rustic design considerations, these proposed facilities would be expected to result in a less-than-significant impact.

Upstream Diversion Alternative

Impact 3.9-11: Construction activities effects on the character of the landscape from the residential viewpoints.

As described for the Proposed Project, only some of the construction activities would be visible from the residential viewpoints north of the project site. These activities would be primarily related to construction vehicle access and storage, and would not differ substantially from the arrival of construction activities under existing or No Action/No Project Alternatives. Visual impacts due to construction also would be limited to the duration of the project construction period and would no longer occur on an annual basis. Overall, construction-related activities would result in less-than-significant visual effects.

Impact 3.9-12: Construction effects on the character of the landscape from the Western States Trail Viewpoint.

The construction staging area, pump station construction activities, and some of the construction vehicle traffic would be visible from this viewpoint. Views of these project construction activities would be less than clear and complete, and for a very limited stretch (approximately 100 feet) of the trail from a distance of one-quarter mile. Because of the limited visibility of project construction, and the less than substantial differences from existing or No Action/No Project Alternative annual construction activities, the visual impacts of this alternative would be less than significant.

Impact 3.9-13: Operation effects on the character of the landscape from the residential viewpoints.

The only project component visible from the Rio Camino Viewpoint would be the pump station, and from the Gold Street East viewpoint, only the top of the pump station. No project components would be visible from the Gold Street West and Placerado viewpoints. Operations and maintenance traffic would be visible for several road stretches from all viewpoints. Despite the generally natural views of the canyon from these viewpoints, the visual impacts of changes compared to existing or No Action/No Project Alternative operations would be less than significant because of the limited views of the project components from these viewpoints.

Impact 3.9-14: Operation effects on the character of the landscape from the Auburn-to-Cool Trail Viewpoints.

The Proposed Project features would have a less-than-significant impact because, while it would somewhat lessen the visual value of one viewpoint, it would substantially improve the visual qualities of another.

The year-round pump station would be visible from both viewpoints, and from the Cofferdam Viewpoint, the intake diversion structure also would be visible. Operations and maintenance traffic would be visible for several road stretches from both viewpoints. The pump station would be enclosed in a pump house constructed of steel panels, painted a light/neutral tone to blend with the surrounding area. Therefore, the net visual impacts of the changes would be less than significant.

Impact 3.9-15: Operation effects on the character of the landscape from the Western States Trail Viewpoint.

Only the year-round pump station would be visible from this viewpoint. Short road segments are visible from this viewpoint, so recreationists would infrequently see operations and maintenance vehicles. Because of the limited visibility of project components, and the lack of substantial changes to the character of the landscape, the visual impacts would be less than significant.

Cumulative Facilities-Related Impacts

No substantial adverse changes to the visual character of the canyon would be expected to occur with the project alternatives; Foresthill Bridge modifications would provide improvement. No significant cumulative impact would result.

Diversion-Related Impacts

The diversion-related analysis refers to certain tables and graphs prepared to provide additional representation of the modeling results and comparison of simulated conditions. These tables and figures are included in Appendix H to the Draft EIS/EIR and are labeled by the appendix letter, resource section number, and ordered as it is referenced in the impact analysis (H-3.9-1, H-3.9-2, etc.).

No Action/No Project Alternative

The increased pump station diversion under the No Action/No Project Alternative would be less than evaluated for the Action Alternatives (see below). Based on the evaluation of modeling performed for the Action Alternatives, it is expected that the No Action/No Project Alternative would not result in significant reductions of river flows or reservoir elevations such that visual resources would be adversely affected.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the Existing Condition

The Proposed Project and the Upstream Diversion Alternative would result in the same timing and quantity of increased diversions from the American River. Changes in CVP or SWP operations associated with the Action Alternatives also would be the same. Therefore, the diversion-related analysis presented below represents the potential impacts that could occur with the Action Alternatives. Visual resources in the upper American River would not be impacted by changes in MFP operations.

Impact 3.9-16: Operations effects on the visual character of Folsom Reservoir.

There were no years in the 70-year period of record in which the Action Alternatives would result in reductions of surface water elevations of greater than 10 feet. Therefore, the visual impact of the Action Alternatives' reduction in surface water elevations at Folsom Reservoir is considered less than significant.

Impact 3.9-17: Operations effects on the visual character of the lower American River.

Changes in river flow patterns would not result in a significant visual effect because (1) releases from the lower American River must maintain adequate instream flows for fishery, wildlife, recreational, and aesthetic values (based on the Hodge standard); (2) fluctuations in river flows are a common occurrence along the lower American River, and (3) Action Alternatives' diversions result in insignificant differences in lower American River flows at H Street Bridge and at the mouth compared to existing conditions.

Impact 3.9-18: Operations effects on the visual character of Trinity and Shasta reservoirs.

As with Folsom Reservoir, there were no years in the 70-year period of record in which the Action Alternatives would result in reduction of surface water elevation of greater than 10 feet. Therefore, the visual effect of the Action Alternatives' reduction in surface water elevations at Trinity and Shasta reservoirs is considered less than significant.

Impact 3.9-19: Operations effects on the visual character of the upper Sacramento River, lower Sacramento River, and Sacramento-San Joaquin Delta.

Changes in river flow patterns throughout the Sacramento River and Delta would not result in significant visual effects because (1) fluctuations in river flows are a common occurrence throughout the Sacramento River and Delta, and (2) Action Alternatives result in insignificant differences in Sacramento River flows at Keswick and Freeport compared to the existing condition.

Impact 3.9-20: Operations effects on the visual character of Oroville Reservoir and the Feather River.

The Action Alternatives would not result in substantial changes in storage or elevation at Oroville Reservoir, or in flow in the Feather River, relative to the existing condition. Any small changes that might occur would be considered less-than-significant impacts upon visual resources.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the No Action/No Project Alternative in the Future (2025)

Impact 3.9-21: Operations effects on the visual character of Folsom Reservoir.

There is one month in the 70-year period of record in which the Action Alternatives would result in a reduction of surface water elevation of greater than 10 feet compared to the No Action/No Project Alternative. This reduction would occur in the winter (February) when there is considerably less aesthetic concern of the reservoir. The visual impact of the reduction in surface water elevations at Folsom Reservoir from the Action Alternatives is considered less than significant.

Impact 3.9-22: Operations effects on the visual character of the lower American River.

Changes in river flow patterns would not result in a significant visual effect because (1) releases from the lower American River must maintain adequate instream flows for fishery, wildlife, recreational, and aesthetic values (based on the Hodge standard); (2) fluctuations in river flows are a common occurrence along the lower American River, and (3) diversions from the Action Alternatives would result in insignificant differences in lower American River flows at H Street Bridge and at the mouth compared to the No Action/No Project Alternative.

Impact 3.9-23: Operations effects on the visual character of Trinity and Shasta reservoirs.

There were no years in the 70-year period of record in which the Action Alternatives would result in reductions of surface water elevations of greater than 10 feet compared to the No Action/No Project Alternative. Therefore, the visual effect of reductions in surface water elevations at Trinity and Shasta reservoirs from the Action Alternatives is considered less than significant.

Impact 3.9-24: Operations effects on the visual character of the upper Sacramento River, lower Sacramento River, and Sacramento-San Joaquin Delta.

Changes in river flow patterns throughout the Sacramento River and Delta would not result in significant visual effects because: (1) fluctuations in river flows are a common occurrence throughout the Sacramento River and Delta, and (2) pump station project diversions and changes in CVP operations associated with the Action Alternatives result in insignificant differences in Sacramento River flows at Keswick and Freeport compared to the No Action/No Project Alternative.

Impact 3.9-25: Operations effects on the visual character of Oroville Reservoir and the Feather River.

The Action Alternatives would not result in substantial changes in storage or elevation at Oroville Reservoir, or in flow in the Feather River, relative to the No Action/No Project Alternative. Any small changes that might occur would be considered less than significant impacts upon visual resources.

Cumulative Impacts

The cumulative impact assessment is based on a comparison of anticipated future cumulative conditions (2025) to existing conditions. In instances where a potentially significant or significant cumulative effect is identified, an additional evaluation of the Action Alternatives' incremental contribution to the cumulative condition is assessed. See the Hydrologic Modeling Technical Memorandum (Appendix E of the Draft EIS/EIR) for additional detail.

Impact 3.9-26: Operations effects on the visual character of Folsom Reservoir.

Under the cumulative condition, additional diversions and potential changes in CVP operations would result in more frequent declines in the water surface elevation of Folsom Reservoir. However, over the 70-year period of record, only 9 of 840 months (one percent of the simulation) would result in reductions of Folsom Reservoir surface water elevations of greater than 10 feet compared to the existing condition. Therefore, the visual impact of the cumulative condition's reduction in surface water elevations at Folsom Reservoir would be considered less than significant.

Impact 3.9-27: Operations effects on the visual character of the lower American River.

For the cumulative condition, additional diversions and potential CVP operations would result in decreases in lower American River flows. Because discernible aesthetic impacts along river corridors are primarily associated with adverse impacts to localized vegetation, the aesthetic quality of the lower American River, under cumulative conditions, could be adversely affected. As described in Section 3.6, Terrestrial Resources, the cumulative condition would not result in a substantial decrease in flows during the growing season. Therefore, the cumulative condition impact to the visual quality of the lower American River would be less than significant.

Impact 3.9-28: Operations effects on the visual character of Trinity and Shasta reservoirs.

Under the cumulative condition, additional diversions and potential changes in CVP operations would result in more frequent drawdowns in the water surface elevation of Trinity and Shasta reservoirs. The cumulative condition would result in reductions of surface water elevations of greater than 10 feet in 11 months at Shasta Reservoir and 13 months at Trinity Reservoir out of the 840-month period of record. Therefore, compared to existing conditions, the visual effect of the cumulative condition's reduction in surface water elevations at Trinity and Shasta reservoirs would be considered less than significant.

Impact 3.9-29: Operations effects on the visual character of the upper Sacramento River, lower Sacramento River, and Sacramento-San Joaquin Delta.

As described in the Section 3.6, Terrestrial Resources, the cumulative condition would not result in a substantial decrease in flows during the growing season for the upper or lower Sacramento River. Therefore, the cumulative condition impact to the visual quality of the upper and lower Sacramento rivers would be less than significant.

Impact 3.9-30: Operations effects on the visual character of Oroville Reservoir.

Compared to the existing condition, the cumulative condition would result in substantially lower long-term average end-of-month elevation for the March through September vegetation growing period, over the 70-year period of record. Long-term end of month elevation reductions for Oroville Reservoir would range from six feet to 18 feet. During individual years, reductions of up to 76 feet in end–of-month elevation would occur. As previously discussed, in many areas along the reservoir, during periods of relatively large reductions in water surface end-of-month elevation, the bare red and gray soils that become exposed create a drawdown zone that contrast vividly with the vegetated areas above the usual high water level and the water surface below. In narrow, steeply sided arms of the lake, large drawdowns can create conditions in which it appears that the lake is set within a deep, red-sided canyon. In areas where the slopes are gradual, large reductions in water surface elevation create areas that appear to be large reddish mudflats. Given the relatively large reduction in end-of-month water surface elevation, potentially significant visual resources impacts would occur at Oroville Reservoir under the cumulative condition.

Action Alternatives' Incremental Contribution to the Cumulative Condition

No substantial changes in river flow would be anticipated under the cumulative condition relative to the future base. The increase in future SWP demands is the primary factor leading to cumulative effects. The Action Alternatives contribution to the cumulative condition would not be considerable.

Impact 3.9-31: Operations effects on the visual character the Feather River.

The largest long-term average flow reduction under the cumulative condition relative to the existing conditions would be 5.7 percent during the month of March. Conversely, long-term average flow increases under the cumulative condition relative to the existing condition would be up to 36.4 percent (i.e., August). However, because monthly mean flows for some months of the March through October growing period are already relatively low, reductions in flow may adversely affect riparian vegetation associated with the Feather River, and therefore represent a potentially significant impact to the visual quality.

Action Alternatives' Incremental Contribution to the Cumulative Condition

No substantial changes in river flow would be anticipated under the cumulative condition relative to the future base. The increase in future SWP demands is the primary factor leading to cumulative effects. The Action Alternatives contribution to the cumulative condition would not be considerable.

3.9.2.5 Environmental Protection and Mitigation Measures

Construction of the Proposed Project or Upstream Diversion Alternative would change the visual character of the project area. Design considerations to minimize visual impacts have been included in the Mitigation Plan (Appendix D to the Final EIS/EIR) as stated below.

Blend Project Features with Surrounding Landscape

Commitment:	Minimize visual quality impacts by designing Project features to blend with the surrounding landscape, to the extent feasible. Public river access features will be limited and "rustic."
Responsible Party:	Reclamation
Location:	Project area
Timing:	Project design
Monitoring:	No specific monitoring requirements
Reporting Requirements:	No specific reporting requirements

Description of Activities:
Reclamation will ensure that final project design includes measures to blend the Project features into the surrounding landscape/viewshed. Preliminary Project design elements identified to minimize visual impacts include the following:

- Pump station will be composed of light colored split-face block to avoid introducing new source of glare to area.
- Intake will be designed and constructed to look like a natural component of the river channel.
- Bypass tunnel openings will be enclosed in such a way that the closure blends with the surrounding environment.
- Trails and access roads will be constructed to blend in with surrounding landscape. Limited improvements will be made such that these features are "rustic" in nature, consistent with the Auburn Interim Resources Management Plan.
- Removal of vegetation will be minimized to extent necessary to create trails, roads and fire breaks.

Success Criteria: Completed structures/features blend with surrounding area.

Incorporation of these design considerations minimizes the potential for visual impacts to less than significant.

3.10 CULTURAL RESOURCES

3.10.1 AFFECTED ENVIRONMENT

3.10.1.1 Regional Setting

The regional setting includes cultural resources that may be indirectly affected by the Proposed Project or alternatives. The cultural resources of the regional study area water bodies and waterways (CVP and SWP system facilities) are described in the Cumulative Report (Appendix D of the Draft EIS/EIR).

3.10.1.2 Project Area Setting

The Area of Potential Effect (APE) for cultural resources within the project area represents the direct effect study area and includes the river banks of the Middle Fork American River below Ralston Afterbay, to its confluence with the North Fork American River, and the North Fork American River extending from the confluence downstream to Oregon Bar. At the project site, the APE includes the areas of anticipated construction activity associated with each alternative.

The American River canyon upstream and downstream of the Auburn Dam construction site contains both prehistoric and historic archeological sites. Prehistoric sites consist primarily of bedrock milling stations and historic sites are generally related to historic mining. Some sites occur along the river bank and others are located further upslope. No recorded resources are known to occur within the proposed construction areas for any of the alternatives.

3.10.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.10.2.1 Methodology

Facilities-Related Analysis Approach

Cultural resource records for the APE were reviewed and an on-the-ground examination of the APE was conducted. No previously recorded cultural resources were found within the APE. Field examination confirmed that all activity associated with the alternatives would fall within the footprint of Auburn Dam construction or areas previously influenced by related activity. The dam construction site is greatly altered and the area within the APE has been totally changed by dam construction and seasonal pump station installation/removal activities. No historic properties are present within the APE. The APE of the Proposed Project encompasses lands that would be developed for road improvements, a parking area at Oregon Bar, the pump station, and pipelines. The pump station and pipelines would be placed on existing cleared areas and roads. The proposed Oregon Bar parking area would be placed on an area that was cleared for storage of Auburn Dam construction materials.

Diversion-Related Analysis Approach

The impact assessment focuses primarily on fluctuations in water levels at water bodies within the regional study area. Increased fluctuations in water levels, exposure of previously inundated lands, or the inundation of previously exposed lands, may more rapidly degrade sensitive cultural sites along the perimeter of water bodies.

To evaluate diversion-related impacts to cultural resources, a comparison was made of reservoir surface water elevations and river flows under the existing condition and the Proposed Project using 70-year simulations (the Upstream Diversion Alternative would have the same diversion pattern as the Proposed Project—they are referred to as the Action Alternatives). Hydrologic modeling results were reviewed to determine whether changes in reservoir elevation or river flow, if identified, would be large enough to potentially affect the cultural resources underlying or adjacent to these water bodies. Modeling also was conducted and comparisons made for the future condition with and without the project and for the cumulative condition compared to the existing condition.

To evaluate potential impacts to cultural resources in and around the reservoirs, hydrologic modeling was performed to determine the changes in the minimum and maximum end-of-month water surface elevations for the conditions being compared (see Appendix E of the Draft EIS/EIR). If the reservoir's water surface elevation rises above the existing condition maximum water elevation, cultural resources previously untouched by water could be inundated. Conversely, a water surface elevation below the reservoir's minimum level could expose cultural resources that were previously submerged. Additionally, and perhaps more significantly, if the Proposed Project or alternatives would result in a shift in the zone of fluctuation, cultural resources located within the zone also could be potentially affected through increased exposure to erosion, hydrologic sorting caused by wave action, and breakdown of organic matter through repeated wetting and drying. Any changes in water levels caused by increased diversions or other changes in operation of the CVP system, have the potential to impact important or unevaluated cultural resources within a particular reservoir basin. It also is the case, however, that many of the cultural deposits in the upper part of a reservoir have been scoured down to bare granitic sand and bedrock.

Many of the recorded cultural resources within the study area have been inundated by earlier projects; a large number of these lie submerged under Folsom Reservoir. Studies of reservoir impacts to cultural sites have shown that the greatest impacts are from wave action, which erodes the deposit and moves artifacts, and from cycles of inundation and drawdown, which also cause erosion and movement, in addition to repeated wetting and drying of the deposit (Foster et al. 1977; Foster and Bingham 1978; Henn and Sundahl 1986; Lenihan et al. 1981; Stoddard and Fredrickson 1978; Ware 1989). These same studies suggest that sites that lie permanently submerged, for example, within the deep pool of a reservoir, suffer much less damage than those within the drawdown zone. For sites that already are submerged, continued submergence does not constitute an effect. However, inundation to sites that lie above the present waterline (and that have not been subject to inundation before) potentially would be an adverse effect. Additional wave impact on already eroded ground may be insignificant. Conversely, sites below this zone have suffered much less from seasonal water-level fluctuations, and new impacts to these sites probably would be more significant in terms of data loss.

In order to estimate the magnitude and frequency of bank exposure and bank inundation along rivers in the study area, the maximum and minimum monthly flows over the 70-year period were compared.

3.10.2.2 Applicable Laws, Ordinances, Regulations and Standards

Cultural resources in California are regulated by the State Historic Preservation Office (SHPO) which was established by the National Historic Preservation Act of 1966. This office is responsible for administering preservation programs established by state and federal law, including the National Historic Preservation Act, the Archeological and Historic Preservation Act (P.L. 93-291), the American Indian Religious Freedom Act (P.L. 95-34), and the Archeological Resources Protection Act (P.L. 96-95). As required by Section 106 of the National Historic Preservation Act and CEQA, the SHPO, in conjunction with state and federal agencies, identifies resources that may be eligible for inclusion in the National Register of Historic Places. If a historic site may be affected by a project, the SHPO must review project impacts to that site and mitigation measures to reduce the significance of the impact. During this process, SHPO's Native American Coordinator ensures that Native American concerns for archaeological sites and other cultural properties also are considered.

3.10.2.3 Impact Indicators and Significance Criteria

Indicators of potential impacts were developed by evaluating the project scope, site conditions, and impact issues identified by the public. Applicable laws, ordinances, regulations, and standards and CEQA Guidelines also were consulted. Significance criteria were developed from the indicators to measure the impacts expected to occur from the Proposed Project and alternatives.

CEQA requires that *important* cultural resources be protected. The CEQA Guidelines define an important resource as one listed on, or eligible for listing on, the California Register of Historical Resources (PRC Section 5024).

In addition to CEQA compliance, any project that involves federal undertakings, lands, funds, or permits must comply with Section 106 of the National Historic Preservation Act (NHPA). This Act defines important (significant) resources as those listed on, or eligible for listing on, the National Register of Historic Places. National Register criteria are very similar to those for the State Register, defining an important cultural resource as one that is associated with important persons or events, or that embodies high artistic or architectural values, or that has scientific value (36 CFR 60.6). State Historic Landmarks, and any cultural resource that has been determined eligible to the National Register, automatically qualify for the State Register. Where a cultural resource has not been evaluated for its importance, it is treated as potentially important until an evaluation can be done. For this project, Reclamation, as the federal lead agency, has responsibility for project compliance with the NHPA.

Table 3.10-1 lists the impact indicators and significance criteria used in the evaluation of potential effects on cultural resources.

Table 3.10-1
Cultural Resources Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ Important cultural resource sites or historic properties within the APE.	❑ Disturbance or damage of known or unknown cultural resources.
❑ Maximum, minimum and average end-of-month water surface elevation fluctuations and annual frequency of water level fluctuations for Folsom, Shasta, Trinity, and Oroville reservoirs.	❑ Substantial elevation or lowering water level fluctuation zone, relative to the basis of comparison, which would result in increased inundation of previously exposed areas or exposure of previously inundated lands with sufficient frequency to adversely affect sensitive cultural resources.
❑ Maximum and minimum monthly mean river flows on the American, Sacramento, and Feather rivers.	❑ Substantial increase in maximum monthly mean river flows or decrease in minimum monthly mean river flows, relative to the basis of comparison, which would result in increased inundation of previously exposed areas or exposure of previously inundated lands with sufficient frequency to adversely affect sensitive cultural resources.

3.10.2.4 Impact Analysis

This section presents the analysis of potential facilities- and diversion-related cultural resources impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

Facilities-Related Impacts

No Action/No Project Alternative

Impact 3.10-1: Effect of No Action/No Project Alternative on cultural resources in the project area.

Continued installation and operation of the seasonal pump station facilities would occur in areas already disturbed by Auburn Dam-related construction activities and by past seasonal pump station-related earthwork. No known cultural resources would be disturbed by these activities. The potential to discover unknown resources would not differ from existing conditions. Therefore, the No Action/No Project Alternative would represent a less-than-significant impact upon these resources.

Proposed Project

Impact 3.10-2: Effect of Proposed Project construction activities on cultural resources in the project area.

There are no previously recorded cultural resources within the APE for the Proposed Project. The field examination confirmed that the project area falls within the Auburn Dam construction site area, which has been totally altered by dam construction activities and by the previous placement of the seasonal pump station facilities. No historic properties are present within the APE; therefore, the Proposed Project would have no effect on historic properties. Because of the disturbed nature of the APE, there is little likelihood that construction would result in the discovery of buried cultural resources (J. West, Reclamation, pers. comm. 2001). Therefore, the construction of the Proposed Project would have a less-than-significant impact (no effect) on cultural resources

Impact 3.10-3: Operations effects associated with the use of the public river access on cultural resources in the project area.

As explained above, the APE contains no previously recorded cultural resources nor historic properties. The Auburn Dam construction site is greatly altered and there is little likelihood that increased public use associated with the public river access sites would result in the discovery of buried cultural resources. Therefore, operation of the Proposed Project would have a less-than-significant impact on cultural resources.

Upstream Diversion Alternative

Impact 3.10-4: Effect of Upstream Diversion Alternative on cultural resources in the project area.

As for the Proposed Project, the APE for the Upstream Diversion Alternative has been altered and disturbed by past construction and earthwork associated with Auburn Dam and seasonal pump station installation. The Upstream Diversion Alternative, therefore, would have a less-than-significant impact to cultural resources.

Cumulative Facilities-Related Impacts

The potential for facilities-related cultural resources impacts is considered to be of site-specific nature. The Proposed Project would not be expected to disturb any known cultural resources, and proper protection measures would be in place in the event an unknown resource becomes discovered during construction. Because of the site-specific conditions, the Proposed Project would not result in a considerable contribution to cumulative impacts upon cultural resources.

Diversion-Related Impacts

No Action/No Project Alternative Compared to the Existing Condition

The increased pump station diversion under the No Action/No Project Alternative would be less than evaluated for the Action Alternatives (see below). Based on the evaluation of modeling performed for the Action Alternatives, it is expected that the No Action/No Project Alternative would not result in changes in river flows or reservoir elevations for water bodies in the study area that would contribute to a significant effect upon cultural resources.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the Existing Condition

The Proposed Project and the Upstream Diversion Alternative would result in the same timing and quantity of increased diversions from the American River. Changes in CVP and SWP operations associated with the Action Alternatives also generally would be the same. Therefore, the diversion-related analysis presented below represents the potential impacts that could occur with the Action Alternatives.

Impact 3.10-5: Effect of changes in flows of the upper American River.

Flows of the upper American River from Ralston Afterbay releases to the project site would be similar to the existing condition for much of the year. Flows under the Action Alternatives would be slightly lower in spring months (i.e., April and May) than under existing conditions, but would not drop below minimum flow levels. During summer low flow months, the Action Alternatives' flows would remain above the existing condition minimum flows.

Below the diversion, the Proposed Project would result in lower monthly mean flows relative to the existing condition. However, minimum flows would not fall below those of existing conditions. Additionally, as for upstream of the diversion, under low-flow conditions, river flows would remain above the existing condition minimum flow levels.

These changes in flow would not result in increased exposure of buried cultural resources. Therefore, potential impacts to cultural resources along the upper American River from changes in river flows would be less than significant.

Impact 3.10-6: Effect of changes in water surface elevation at Folsom Reservoir.

The modeling results indicate that the Action Alternatives would not result in a higher maximum water surface elevation at Folsom Reservoir during the 70-year simulation, compared to the existing condition. With regard to maximum drawdown, the comparison of the minimum end-of-month water surface elevations indicates that the minimum elevation would be lower under the Action Alternatives than under the existing condition in December, January and February. However, these lower elevations would be during winter months when the reservoir is at a relatively high elevation. In the months with the lowest minimum elevation (i.e., July through November), the minimum elevations would be increased. Thus, impacts on cultural resources at Folsom Reservoir from changes in maximum and minimum water levels would be less than significant.

Impact 3.10-7: Effect of changes in flows of the lower American River.

For the lower American River, the maximum and minimum monthly mean flows over the 70-year simulation were compared between the existing condition and the Action Alternatives. In order to estimate the magnitude and frequency of bank exposure and bank inundation along the lower American River, two locations were assessed: Nimbus Dam and the river mouth (confluence with the Sacramento River).

A stage/discharge relationship has not been developed for the entire reach of the lower American River. For this reason, it is difficult to quantify precisely the potential for exposure or inundation of cultural resources along the banks of the lower American River. Of course, higher water surface elevation occurs under higher flows and lower water elevations occur under lower flows. A comparison of flows under the existing condition and the Action Alternatives provides an estimate of the relative changes in river stage that could result.

Because no significant sites are expected to have survived within the riverbed itself near Nimbus Dam, lower flows would not expose previously submerged (and intact) cultural resources. It is possible that historic-era (post-1869) shipwrecks lie beneath the silty river bottom near the mouth, and that very low river flows could expose these resources. However, the magnitude of the changes predicted under the Action Alternatives is so small that this is highly unlikely. Also, known resources along the riverbank (two historic levees, a portion of the Natomas East Main Drainage Canal and prehistoric mound CA-SAC-26) lie outside the present river channel, and decreases in river flows would have no impact on these resources. Therefore, lower flows are not a concern with regard to cultural resources.

The Action Alternatives would result in maximum monthly mean river flows downstream of Nimbus Dam and at the mouth that would be virtually identical to those under the existing condition. Therefore, the impacts to cultural resources along the American River from changes in river flows would be less than significant.

Impact 3.10-8: Effect of changes in water surface elevation at Shasta Reservoir.

The modeling results indicate that the Action Alternatives would not result in a higher maximum elevation over the 70-year simulation, compared to the existing condition. With regard to maximum drawdown, the comparison of the minimum end-of-month elevation indicates that water surface elevation would be slightly lower (by less than four feet) during the winter and spring when the reservoir is typically at a higher elevation and slightly higher in the summer when the reservoir is typically at a lower elevation. Thus, impacts on cultural resources from changes in minimum and maximum water levels at Shasta Reservoir would be less than significant.

Impact 3.10-9: Effect of water surface elevation at Trinity Reservoir.

The modeling results indicate that the Action Alternatives would not result in any significant difference in Trinity Reservoir water surface elevation compared to the existing condition. Therefore, no impacts to cultural resources would be expected to occur within Trinity Reservoir.

Impact 3.10-10: Effect of changes in flows of the upper and lower Sacramento River/Delta.

The Action Alternatives would result in maximum and minimum monthly mean flows on the Sacramento River from Keswick Reservoir and at Freeport that are virtually identical to those under the existing condition. These flow results indicate that no new areas of the riverbank would be inundated or exposed. Therefore, the impacts to cultural resources along the upper and lower Sacramento River from changes in river flows would be less than significant.

Impact 3.10-11: Impacts to Oroville Reservoir or Feather River cultural resources.

The Action Alternatives would not result in substantial changes in minimum or maximum storage or elevation at Oroville Reservoir, or in minimum or maximum flow in the Feather River, relative to the existing condition. Any small changes that might occur would be considered to represent less-than-significant impacts upon cultural resources.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the No Action/No Project Alternative in the Future (2025)

Impact 3.10-12: Effect of changes in flows of the upper American River.

Flows of the upper American River from Ralston Afterbay releases to the project site would be similar to the No Action/No Project Alternative for much of the year. Flows under the Action Alternatives would be slightly lower in spring months (April and May) than under existing conditions, but would not drop below minimum flow levels. During summer low flow months, the Action Alternatives would remain above the No Action/No Project Alternative minimum flow level due to the release of replacement water.

Below the diversion, the Action Alternatives would result in lower monthly mean flows relative to the No Action/No Project Alternative. However, minimum flows would not fall below those of the No Action/No Project Alternative. Additionally, as for upstream of the diversion, under low-flow conditions, river flows would be higher than the existing condition minimum flows.

These changes in flow would not result in increased exposure of buried cultural resources. Therefore, potential impacts to cultural resources along the upper American River from changes in river flows would be less than significant.

Impact 3.10-13: Effect of changes in water surface elevation at Folsom Reservoir.

The modeling results indicate that the Action Alternatives would not result in a higher maximum elevation during the 70-year simulation, compared to the No Action/No Project Alternative. With regard to maximum drawdown, the comparison of the minimum end-of-month water surface elevation indicates that in December, January and February, the minimum elevation would be lower under the Action Alternatives than under the No Action/No Project Alternative. However, the decrease in elevation would be during winter months when the reservoir is at a relatively high elevation. In the months with the lowest minimum elevation (July through November), the minimum elevation would be increased. Thus, impacts on cultural resources from changes in maximum and minimum water levels at Folsom Reservoir would be less than significant.

Impact 3.10-14: Effect of changes in flows of the lower American River.

Changes in minimum monthly mean flows would not be expected to affect cultural resources (see Impact 3.10-7). The maximum monthly mean river flows downstream of Nimbus Dam, and at the mouth of the lower American River, under the Action Alternatives, compared to the No

Action/No Project Alternative, would result in a less than 3 percent increase in flow in August, September and December, when flows are not typically at their peak. Therefore, the impacts to cultural resources along the river from changes in river flow would be less than significant.

Impact 3.10-15: Effect of changes in water surface elevation at Shasta Reservoir.

The modeling results indicate that the Action Alternatives would not result in a higher maximum elevation over the 70-year period of record compared with the No Action/No Project Alternative. With regard to maximum drawdown, the comparison of the minimum end-of-month elevation indicates that water surface elevation would be lower for 10 of the 12 months ranging from one to five feet. Because the differences are relatively small, impacts on cultural resources from changes in extreme water levels would be less than significant.

Impact 3.10-16: Effect of changes in water surface elevation at Trinity Reservoir.

The modeling results indicate that the Action Alternatives would not result in a higher maximum elevation over the 70-year period of record, compared with the No Action/No Project Alternative. With regard to drawdown, the comparison of the minimum end-of-month elevations indicates that water surface elevations would be lower in December through June, when the reservoir is typically at a higher elevation. In the months with the lowest minimum elevation (July through November), the minimum elevation would be increased. Therefore, no impacts to cultural resources within Trinity Reservoir would be expected to occur.

Impact 3.10-17: Effect of changes in flows of the upper and lower Sacramento River.

The Action Alternatives would result in maximum monthly mean river flows from Keswick Reservoir and at Freeport that are virtually identical to those under the No Action/No Project Alternative. Overall, impacts to cultural resources along the upper and lower Sacramento River would be expected to be less than significant.

Impact 3.10-18: Impacts to Oroville Reservoir or Feather River cultural resources.

The Action Alternatives would not result in substantial changes in minimum or maximum storage or elevation at Oroville Reservoir, or in minimum or maximum flow in the Feather River, relative to the No Action/No Project Alternative. Any small changes that might occur would be considered to represent less-than-significant impacts upon cultural resources.

Cumulative Impacts

Impact 3.10-19: Effect of changes in flows of the upper American River.

Cumulative condition flows of the upper American River from Ralston Afterbay releases to the project site would be similar to the existing condition for October through March. Mean monthly flows under the cumulative condition would be slightly lower in spring months (April and May) than under existing conditions, but would not be expected to drop below existing minimum flow levels. During summer low flow months, the cumulative condition would result in flows above the existing condition minimum low flows.

Below the diversion, the cumulative condition would result in lower monthly mean flows relative to the existing condition. However, cumulative condition minimum flows would not be expected to fall below those of the existing condition. Additionally, as for upstream of the diversion, under low-flow conditions, flows would remain higher than the existing condition minimum flows.

These changes in flow would not result in increased exposure of buried cultural resources. Therefore, potential cumulative impacts to cultural resources along the upper American River from changes in river flows would be less than significant.

Impact 3.10-20: Effect of changes in water surface elevation at Folsom Reservoir.

The modeling results indicate that the cumulative condition would not result in a higher maximum elevation during the 70-year period simulation compared to the existing condition. With regard to maximum drawdown, the comparison of the minimum end-of-month water surface elevation indicates that in two of the summer/fall months where elevation is typically low (July through November), the minimum elevation would be lower under the cumulative condition than under the existing condition. The reductions in these months, September and November, would be only two feet and three feet, respectively. Therefore, impacts on cultural resources from cumulative changes in maximum and minimum water levels would be less than significant.

Impact 3.10-21: Effect of changes in flows of the lower American River.

The cumulative condition would result in maximum monthly mean river flows downstream of Nimbus Dam and at the mouth of the lower American River that are essentially identical to or slightly less than the existing condition. Therefore, the impacts to cultural resources along the lower American River from changes in river flows would be less than significant.

Impact 3.10-22: Effect of changes in water surface elevation at Shasta Reservoir.

The modeling results indicate that the cumulative condition would not result in a higher maximum elevation over the 70-year simulation compared to the existing condition. With regard to maximum drawdown, the comparison of the minimum end-of-month elevations indicates that for each month water surface elevation would be lower, ranging from eight to 45 feet. This is a potentially significant impact to cultural resources at Shasta Reservoir.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The project's incremental contribution to the minimum end-of-month water surface elevation during the 70-year simulation would be reductions ranging from one to six feet msl in each month except June and November. In particular, the decreases of six feet in September and six feet in October reduce the reservoir elevation to 837 and 834 feet in September and October, respectively. (The end-of-month minimum elevation would be 840 feet without the project [future conditions with PCWA diversions at 8,500 AF].) These reductions represent a potentially significant impact and represent a considerable contribution to the cumulative condition. The cumulative effects of minimum elevations during greater than the normal range of reservoir drawdown at Lake Shasta could have an adverse effect on historically significant prehistoric and historic archaeological sites above the existing effects. Sites would be subject to adverse effects of erosion, cycles of wetting and drying, recreation, and vandalism.

The reductions of end-of-month minimum elevations described above occur, in the 70-year simulation in 1934 at the end of a severe six-year drought. These reductions reflect the cumulative impact of this multi-year drought. In addition, the modeling simulated operational considerations such that reservoir drawdown effects were shifted from Folsom Reservoir to Shasta Reservoir so that minimum releases could be maintained from Folsom Reservoir. A portion of this reduction is an indirect response to changed conditions (e.g., AFRP modifications) resulting from the Proposed Project.

To reduce the potential for significant adverse effects to cultural resources at Shasta Reservoir, due to the increased potential for reservoir elevation to fall below normal minimum end-of-month elevations, Reclamation would enter into a Programmatic Agreement with the State Historic Preservation Officer, Advisory Council on Historic Preservation and any other interested parties or tribes. The Programmatic Agreement would be developed in compliance with Section 106 of the National Historic Preservation Act and would specify when and how measures would be used to assess the effects of reservoir drawdown upon cultural resources. The agreement would identify measures to reduce impacts upon these resources to levels considered less than significant.

Impact 3.10-23: Effect of water surface elevation at Trinity Reservoir.

The modeling results indicate that the cumulative condition would not result in any difference in Trinity Reservoir maximum water surface elevation compared to the existing condition. Minimum end-of-month elevations show decreases in April, May and June when the elevation is generally higher. Therefore, no impacts to cultural resources within Trinity Reservoir would be expected to occur.

Impact 3.10-24: Effect of changes in flows of the upper Sacramento River.

The cumulative condition would result in maximum monthly mean river releases on the Sacramento River from Keswick Reservoir that are higher than those under the existing condition in June and July when maximum flows are considerably less than peak winter flows. The cumulative condition would result in minimum monthly mean river flows on the Sacramento River below Keswick Reservoir that are lower than those under the existing condition in April and May (when flows are generally high), and in September, but by less than two percent. Therefore, impacts to cultural resources along the upper Sacramento River from differences in river flows would be less than significant.

Impact 3.10-25: Effect of changes in flows of the lower Sacramento River/Delta.

The cumulative condition would result in maximum monthly mean river flows in the lower Sacramento River at Freeport that are lower than or virtually identical to those under the existing condition. The cumulative condition would result in minimum monthly mean river flows in the lower Sacramento River at Freeport that are lower than those under the existing condition in June through December and in March. In particular, October and November would see a 70-year minimum flow that is 10 to 13 percent less under the cumulative condition. However, since no significant sites are expected to have survived intact within the riverbed itself, impacts to cultural resources on this stretch of the Sacramento River are expected to be less than significant.

Impact 3.10-26: Effects of water surface elevation at Oroville Reservoir

Compared to the existing condition, the cumulative condition would result in substantially lower long-term average end-of-month storage over the 70-year period of record. Long-term end of month elevation reductions for Oroville Reservoir would range from six feet to 18 feet. During individual years, reductions of up to 76 feet in end–of-month elevation would occur. Given the relatively large reduction in end-of-month water surface elevation, the potentially significant impacts to the cultural resources of the Oroville Reservoir would occur under the cumulative condition.

Action Alternatives' Incremental Contribution to the Cumulative Condition

No substantial changes in reservoir elevation would be anticipated under the cumulative condition relative to the future base. The increase in future SWP demands is the primary factor leading to cumulative effects. The Action Alternatives' contribution to the cumulative condition would not be considerable.

Impact 3.10-27: Effects of changes in flow on the Feather River

The largest long-term average flow reduction under the cumulative condition relative to the existing conditions would be 5.7 percent during the month of March. Conversely, long-term average flow increases under the cumulative condition relative to the existing condition would be up to 36.4 percent (i.e., August). These relatively sharp flow fluctuations may represent a potentially significant impact to the cultural resources of the Feather River.

Action Alternatives' Incremental Contribution to the Cumulative Condition

No substantial changes in reservoir elevation would be anticipated under the cumulative condition relative to the future base. The increase in future SWP demands is the primary factor leading to cumulative effects. The Action Alternatives' contribution to the cumulative condition would not be considerable.

3.10.2.5 Environmental Protection and Mitigation Measures

Construction of the pump station facilities, under all alternatives, would occur in areas already highly disturbed by past construction activities associated with Auburn Dam, therefore, it is considered highly unlikely that any buried resources remain within the construction area. However, the following measures have been incorporated into the Mitigation Plan (Appendix D to the Final EIS/EIR) and would be included as part of the construction specifications for the selected alternative to protect any cultural resources.

Stop Construction Activities if Cultural Resources or Human Remains are Uncovered

Commitment:	Protect any undiscovered prehistoric (e.g., arrowheads, mortar, human bones) or historic artifacts (e.g., glass, ceramics, metal, nails) according to CEQA Guidelines and Reclamation's Directives and Standards, LND 07-01. Notify authorities and follow procedures according to Reclamation's Directives and Standards, LND 07-01.
Responsible Parties:	Reclamation/Construction Contractor
Location:	Entire Project construction area
Timing:	During all phases of construction (2002 through 2004)
Monitoring:	No specific monitoring requirement
Reporting Requirements:	The discoverer of human remains must contact Reclamation's Regional Director/designee (contract officer's representative) immediately by telephone or in person, followed by written confirmation of the discovery within 48 hours.

Description of Activities:
If previously unidentified cultural resources are encountered during Project construction, Reclamation will require the Construction Contractor to stop construction work within 20 meters of the material(s) and the contract officer's representative will be sought immediately and will contact Reclamation's Regional Archaeologist/designee. If human remains are uncovered the Construction Contractor will notify Reclamation immediately.

Success Criteria:
Through communication with construction personnel, provide procedure to respond to uncovering of any discovered prehistoric or historic artifacts.

Develop and Implement Programmatic Agreement with State Historic Preservation Officer Regarding Potential Indirect Impacts at Shasta Reservoir

Commitment:	Reclamation will develop a Programmatic Agreement with SHPO that defines what action(s) will be taken, if needed.
Responsible Party:	Reclamation
Location:	Shasta Reservoir
Timing:	Project operation

The monitoring and reporting requirements would be determined in the Programmatic Agreement between Reclamation and SHPO. Additionally the specific description of the activities would be described in the Programmatic Agreement.

Success Criteria:
Protection of cultural resources at Shasta Reservoir, as needed based on water year conditions.

3.11 POWER SUPPLY

3.11.1 AFFECTED ENVIRONMENT

Hydropower generation at CVP facilities is an important resource for contributing to the reliability of the electrical power system in California. Impacts to CVP hydropower operations can result from increased water diversions that result in both lower reservoir levels and less water flow through turbines. In addition to potential impacts to electric system reliability, loss of hydropower capacity and generation also can result in indirect environmental impacts by necessitating increased power generation using means that are less environmentally sensitive.

Central Valley Project Hydropower System

The CVP hydropower system consists of nine power plants and two pump-generating plants (**Table 3.11-1**). This system is fully integrated into the Northern California Power System and provides a significant portion of the hydropower available for use in northern and central California. The installed power capacity of the system is 2,085,350 kilowatts (kW). By comparison, the combined capacity of the 368 operational hydropower plants in California is 12,866,000 kW and PG&E is the area's major power supplier with a generating capacity from all sources of over 20,000,000 kW.

Table 3.11-1
Power Resources of the Central Valley Project

Unit	Maximum Generating Capacity (kW)
Sacramento River Service Area	
Carr [a]	184,000
Lewiston	350
Keswick	105,000
Shasta [b]	625,000
Spring Creek	200,000
Trinity	140,000
Subtotal	**1,254,350**
American River Service Area	
Folsom	215,000
Nimbus	17,000
Subtotal	**232,000**
Delta Export and San Joaquin Valley	
New Melones	383,000
O'Neill [c]	14,000
San Luis [c,d]	202,000
Subtotal	**599,000**
TOTAL	**2,085,350**

[a] Limited by tunnel restrictions.
[b] With rewinds as of summer 2000.
[c] Pump-generating plant.
[d] Operated by DWR for Reclamation; eight 53,000 kW units for a total installed capacity of 424,000 kW, of which Reclamation's share is 202,000 kW.
Source: WAPA 2000

Once a strong influence on CVP operations, power operations are now secondary to other considerations. In part, this subordination is caused by the elevation of environmental needs to a higher standing, but changes in contractual relationships also have reduced the priority of power.

Power produced by the CVP hydropower system is used first for meeting CVP project water pumping loads, which is deemed "project use power," at CVP pumping facilities **(Table 3.11-2)**. Power surplus to project use is "commercial power" and is marketed by the Western Area Power Administration (WAPA) under long-term firm contracts to municipal and government entities (preference customers) at cost-based rates pursuant to Reclamation Law. In an average year, 4,600 gigawatthours (GWh) of energy and 1,700,000 kW of capacity are marketed to preference customers at rates that recover full cost of production and repayment obligations of CVP project investment with interest. Energy surplus to CVP project use and preference customer power needs is "banked" under WAPA-PG&E Contract 2948A, to be repaid when needed by WAPA and its customers. The contractual agreements between WAPA and its customers terminate in 2004, and it is unlikely that the contract will be renewed. WAPA is currently in the process of determining how it will market the CVP hydropower resources surplus to CVP project use power needs once the contract has expired.

Table 3.11-2
Major Pumping Plants in the CVP

Unit	Capacity (cfs)	Average Annual Energy Use (kilowatthours (kWh))
American River Service Area		
Folsom Pumping Plant	350	1,041,000
Delta Export and San Joaquin Valley		
Contra Costa Canal	410	18,908,000
Dos Amigos [a]	13,200	180,146,000 [b]
O'Neill	4,200	87,185,000
San Luis [a]	11,000	306,225,000 [b]
Tracy	4,600	620,712,000

[a] Joint state-federal facility.
[b] Federal energy use.
Source: Corps 1992

Folsom Dam and Reservoir

The Folsom Power Plant has three generating units, with a total release capacity of approximately 8,600 cfs. By design, the facility is operated as a peaking facility. Peaking plants schedule the daily water release volume during the peak electrical demand hours to maximize generation at the time of greatest need. At other hours during the day there may be little or no release (and no generation) from the plant.

To avoid fluctuations in flow in the lower American River, Nimbus Dam and Reservoir is operated as a regulating facility. While the water surface elevation in Nimbus Reservoir fluctuates, releases to the lower American River are kept constant. The Nimbus Power Plant consists of two generating units with a release capacity of approximately 5,100 cfs. Electric generation from this facility is continuous throughout the day.

Pumping Plants on Folsom Reservoir

There are two pumping plants located on Folsom reservoir: the Folsom Pumping Plant, located at Folsom Dam, and the El Dorado Irrigation District (EID) Pumping Plant. The Folsom Pumping Plant serves the City of Folsom, Folsom Prison, the City of Roseville, and the San Juan Water District. These entities take delivery of their water at different elevations. At times when the reservoir is high, gravity flow is possible and pumping is not required. The elevation at which pumping is required depends on the amount of water being pumped. Higher flow rates, typical of summer months, require greater pumping head, therefore the lower limit of gravity flow is higher in the summer months. **Table 3.11-3** summarizes information about how the pumping plants at Folsom Reservoir respond at various reservoir elevations.

Table 3.11-3
Folsom Reservoir Water Surface Elevation Pumping Conditions

Surface Elevations (feet msl)	Storage [a] (AF)	Pumping Condition
433	640,800	Lower limit of gravity flow to City of Roseville and San Juan Water District during irrigation season (April - October).
425	569,900	Lower limit of gravity flow to City of Roseville and SJWD during non-irrigation season.
414	480,200	Lower limit of gravity flow to City of Folsom and Folsom Prison.
356	158,900	EID pumps begin to develop vortex problems.
340	111,900	Potential vortex at dam intake, depending on volume of pumping.
335	100,000	Folsom Pumping Plant limited to 70 cfs.
325	79,200	Lower limit of EID pumps and Folsom Pumping Plant; pumps on barges required to pump water to existing intakes.
315	62,100	Elevation of Folsom Dam water intake; tap penstocks.
307	50,400	Elevation of power penstocks; portable pumps placed on a barge to supply pipeline intake.

[a] Reclamation Folsom Reservoir 1993 Area Capacity Tables.
Source: Corps 1992

State Water Project Facilities

Oroville Reservoir

DWR stores winter and spring runoff in Oroville Reservoir for release to the Feather River, as necessary for project purposes (i.e., water supply, power generation, flood protection, fish and wildlife enhancement, and recreation). Typically, power is generated when water releases are being made for these other purposes, when deliveries are being made to local irrigation districts through the Afterbay, or when pump-back operations are in effect. On a weekly basis, releases are scheduled to accommodate water supply requirements, water quality and quantity requirements in the Delta, instream flow requirements in the Feather River, power requirements, and minimum flood control space. The weekly plan is updated as needed to respond to changing conditions. The Thermalito Dam Pool and the Thermalito Forebay and Afterbay are too small for seasonal storage so they are used only in weekly and daily operations planning. Hourly releases through the Edward Hyatt and Thermalito Pumping Generating plants are scheduled on an hourly basis to maximize the amount of energy produced when power values are highest. Because the downstream water supply is not dependent on hourly releases and pumping of SWP water can be scheduled at off-peak times, hourly operations are primarily dictated by electrical energy prices and ancillary service requirements such as spinning reserve, the supplemental energy market, and voltage regulation. Storage in Thermalito Forebay and Afterbay is used to maximize the value of project energy and maintain uniform flows in the Feather River downstream of the Oroville facilities. The Thermalito Afterbay also provides storage for pump-back operations. The pump-back operations are designed to use water in excess of what is required for downstream flow requirements for pumping back into the Thermalito Forebay and then into Oroville Reservoir in off-peak energy hours for re-release during peak hours when power rates again increase. Because the power plants are operated to maximize weekday generation when power prices are highest, there is usually higher storage in the Afterbay by the end of the week. During the weekend, water from the Afterbay is lowered to prepare for a similar operation the following week.

3.11.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.11.2.1 Methodology

The monthly gross CVP electrical generation and dependable capacity for the various conditions simulated in this study were estimated using PROSIM. Differences in energy and capacity between the conditions were then evaluated to assess impacts. Also evaluated were differences in the amount of energy needed to pump water at the Folsom Pumping Plant and the EID Pumping Plant.

Hydropower Analysis Framework

Increased water diversions leave less water in the rivers, resulting in less water flow for hydropower generation. Increased diversions also reduce the volume of water for filling reservoirs, resulting in reduced hydraulic head on hydropower turbines and, consequently, less power generation. Other changes in the pattern of CVP reservoir operation can affect CVP hydropower generation and dependable capacity.

Reductions in generation and capacity would not represent direct environmental effects, but may have economic consequences for CVP power users in the form of increased capacity/energy purchases to support loads. It is possible that thermal generation resources, which emit air pollutants, would supply some portion of the replacement power. Estimating the impact associated with the replacement energy would be speculative and is beyond the ability to predict, given the interconnection of electric utility generation in the western United States.

Pumping Power Analysis Framework

Pumping energy requirements also are affected by total reservoir storage, since less storage means that water must be lifted a greater height from the reservoir surface. Reductions in Folsom Reservoir elevations caused by the Proposed Project or alternatives would increase energy requirements for pumping water at the Folsom and EID pumping plants. These impacts, like those for hydropower, would not be expected to cause direct environmental effects, but would have economic consequences and may cause indirect effects by requiring additional energy generation.

Energy usage at the pumping plants was estimated based on the amount of acre-feet pumped, the feet of lift required from the reservoir surface to the delivery elevation and the average plant efficiency. New, variable -speed pumps were made operational at the Folsom Pumping Plant in fall of 2000. Because of this, the absolute magnitude of future impacts at the Folsom Pumping Plant may be less than estimated herein, however the percentage impact shown should not be affected by the change in plant facilities.

Note that the Folsom and EID pumping plants serve local water purveyors and increased water deliveries by these purveyors will increase the energy requirement at the respective pumping plant irrespective of any impact caused by the Proposed Project being analyzed.

State Water Project Hydropower and Pumping Power (Oroville Facilities)

Impacts to hydropower generation of Oroville Reservoir would be significant if generation or dependable capacity were substantially reduced by the cumulative condition relative to the existing condition. Impacts to pumping power could result from changes in the elevation of water stored at Oroville Reservoir. Such impacts would be considered significant if pumping energy requirements for purveyors at Oroville Reservoir were to increase substantially.

3.11.2.2 Impact Indicators and Significance Criteria

CEQA Guidelines do not provide guidance related to changes in hydropower capacity or pumping power costs. Significance criteria have been tailored specifically to address these issues.

Hydropower

Hydropower impacts may result from reduction in generation or dependable capacity. Reduction in CVP generation could be a cost impact either because WAPA would be precluded from selling excess energy or might be required to purchase additional energy for its customers. Similarly, if dependable capacity was reduced as a result of the Proposed Project or alternatives, then a cost impact could be incurred. This analysis assumed that impacts would be significant if hydropower generation or dependable capacity were substantially reduced by the Proposed Project or alternatives.

Gross hydropower generation, that is, the amount before project use, is evaluated in this report. The values shown are reduced for transmission loss to represent the energy generation available at the load center near Tracy. The values shown herein include generation from New Melones Dam.

This EIS/EIR includes evaluation of dependable hydropower capacity. This differs from many earlier environmental documents that only looked at the instantaneous hydropower capacity, that is, the hydropower capacity corresponding to the current reservoir elevation. In response to concern by WAPA about the availability of electrical power in California, this analysis evaluates the amount of hydropower capacity available over a specified, minimum period of time. This capacity is referred to as dependable capacity and is defined as the monthly generation divided by the hours specified in Table 1 of Contract 2948 between the CVP and PG&E (but not more than the instantaneous capacity). Similar to generation, the dependable capacity presented in this report is gross before project use, includes capacity at New Melones Dam, and is adjusted for transmission to reflect capacity at the load center near Tracy.

Pumping Power

Impacts to pumping power could result from changes in the elevation of water stored in Folsom Reservoir. Such impacts would be considered significant if pumping energy requirements for purveyors at Folsom Reservoir were to increase substantially.

3.11.2.3 Impact Analysis

This section presents the analysis of potential diversion-related power supply impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

Diversion-Related Impacts

The diversion-related analysis refers to certain tables and graphs prepared to provide additional representation of the modeling results and comparison of simulated conditions. These tables and figures are included in Appendix H to the Draft EIS/EIR and are labeled by the appendix letter, resource section number, and ordered as it is referenced in the impact analysis (H-3.11-1, H-3.11-2, etc.).

No Action/No Project Alternative Compared to the Existing Condition

The increased pump station diversion under the No Action/No Project Alternative would be less than evaluated for the Action Alternatives (see below). Based on the evaluation of modeling performed for the Action Alternatives, it is expected that the No Action/No Project Alternative would not result in significant effects on gross hydropower generation, gross hydropower dependable capacity or upon pumping energy requirements.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the Existing Condition

The Proposed Project and the Upstream Diversion Alternative would result in the same timing and quantity of increased diversions from the American River. Changes in CVP or SWP operations associated with the Action Alternatives also would be the same. Therefore, the diversion-related analysis presented below represents the potential impacts that could occur with the "Action Alternatives."

Impact 3.11-1: Effects on gross hydropower generation.

Table H-3.11-1 summarizes the gross hydropower generation, in GWh, generated at CVP facilities under the existing and Action Alternatives conditions, as well as the difference between those two conditions. These values are gross before CVP project use, include generation at New Melones Dam, and are adjusted for transmission loss to be the amount available at Tracy. As shown in Table H-3.11-1, the impact on annual generation is estimated to average reduction by 8 GWh, or less than 0.2 percent. This would be considered a less-than-significant impact.

Impact 3.11-2: Effects on gross hydropower dependable capacity.

The difference in the amount of dependable capacity generated by CVP facilities under the existing condition and Action Alternatives is shown in Figures H-3.11-1, H.3.11-2, and H-3.11-3. Negative values indicate there would be less dependable capacity under the Action Alternatives (project condition) relative to the No Action/No Project Alternative. Note that over the long-term, the negative values, or impacts, are to an extent offset by positive values.

Table H-3.11-2 summarizes key data from these figures. Shown is the median difference and the 90 percent exceedance difference in dependable capacity between the two simulations. The 90 percent exceedance value indicates that 90 percent of the time the impact will be smaller or negative, i.e., a benefit. The median difference in dependable capacity between simulations is largest in September, at 2 MW. This is less than one percent of the 832 MW of total dependable capacity in September under the existing condition. The 90 percent exceedance in dependable capacity between the existing and Action Alternatives conditions is largest in February, at 14 MW. This is less than one percent of the 1720 MW of dependable capacity in February, under the existing condition. (The CVP dependable capacity data is included in Appendix I of the Draft EIS/EIR.)

Overall, the effect of the Action Alternatives on dependable capacity would be considered a less-than-significant impact.

Impact 3.11-3: Effects on pumping energy requirements.

The Folsom and EID pumping plants lift water from Folsom Reservoir to treatment plants for treatment and distribution to water users. The Action Alternatives would result in lower water elevations in Folsom Reservoir which creates need for greater amounts of energy to accomplish the required pumping. The increased energy requirement under the Action Alternatives compared to the existing condition is only 1.4 percent greater at the Folsom Pumping Plant and 0.1 percent greater at the EID Pumping Plant. These increased energy requirements are not considered substantial; therefore, it is considered a less-than-significant impact.

Impact 3.11-4: Effects on Oroville Reservoir water elevation that could affect power.

No substantial changes in reservoir elevation would be anticipated under the Action Alternatives relative to the existing condition. Any small changes in elevation would be considered to represent less-than-significant impacts.

Proposed Project and Upstream Diversion Alternative (Action Alternatives) Compared to the No Action/No Project Alternative in the Future (2025)

Impact 3.11-5: Effects on gross hydropower generation.

Impact of the Action Alternatives under the future condition on CVP gross generation was estimated to be 7 GWh. This represents less than 0.2 percent loss of generation compared to the No Action/No Project Alternative. This would be a less-than-significant impact.

Impact 3.11-6: Effects on gross hydropower dependable capacity.

The difference in amount of dependable capacity generated by CVP facilities under the No Action/No Project Alternative and Action Alternatives is summarized in Table H-3.11.3. Shown is the median difference and the 90 percent exceedance difference in dependable capacity between the No Action/No Project Alternative and Action Alternatives conditions. The median difference in dependable capacity would be 1 MW or less. The 90 percent exceedance in dependable capacity would be greatest in November, at 33 MW. This represents only two percent of the total dependable capacity in November compared to the No Action/No Project Alternative.

Overall, the effect of the Action Alternatives on dependable capacity compared to the No Action/No Project Alternative under future system conditions would be considered a less-than-significant impact.

Impact 3.11-7: Effects on pumping energy requirements.

The Action Alternatives would result in slightly lower future water elevations in Folsom Reservoir, creating a need for greater amounts of energy at the Folsom and EID pumping plants compared to the No Action/No Project Alternative. The increased energy requirement would be 0.7 percent greater at the Folsom Pumping Plant and less than 0.1 percent greater at the EID Pumping Plant. This would be considered a less-than-significant impact.

Impact 3.11-8: Effects on Oroville Reservoir water elevation that could affect power.

No substantial changes in reservoir elevation would be anticipated under the Action Alternatives relative to the No Action/No Project Alternative. Any small changes in elevation would be considered to represent less-than-significant impacts.

Cumulative Impacts

Impact 3.11-9: Effects on gross hydropower generation.

Table H-3.11-4 summarizes the gross hydropower generated at CVP facilities under the cumulative and existing conditions, as well as the difference between those two conditions. As shown in Table H-3.11-4, the impact on annual generation is estimated to an average reduction of 356 GWh. This represents a seven percent loss of generation. This represents a significant economic cumulative impact.

The time-series of generation impacts due to the cumulative condition as compared to the existing condition is shown in Figure H-3.11-4. Figure H-3.11-5 provides an exceedance curve of generation impacts.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental analysis shows the Action Alternatives would result in a 9 GWh per year reduction in generation on average. That represents less than 0.2 percent of the generation and this would be considered a less-than-significant contribution to the cumulative condition.

Impact 3.11-10: Effects on gross hydropower dependable capacity.

Figures H-3.11-6 and H-3.11-7 show the difference in dependable capacity between the existing and cumulative conditions. Negative values indicate the extent to which dependable capacity under the cumulative condition would be less than under the existing conditions. Impacts would be largest in August through November.

Table H-3.11-5 shows the median and 90 percent exceedance of the difference in dependable capacity between the existing and cumulative conditions. This shows October to have the largest median impact, at 94 MW (Table H-3.11-6). This represents seven percent of the median total dependable capacity under existing conditions. The largest 90 percent exceedance impact is in August, at 371 MW. This represents 24 percent of the total dependable capacity in August under existing conditions. Overall, this is a significant cumulative impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental analysis shows, however, that the Action Alternatives would have a very small contribution to the cumulative condition. The month with the largest median impact would be September, at 2 MW. This represents less than one percent of the total. The largest difference at the 90 percent exceedance level would be 33 MW in November, representing two percent of the total dependable capacity. This would be considered a less-than-significant contribution to the cumulative condition.

Impact 3.11-11: Effects on pumping energy requirements.

The Action Alternatives result in lower water elevations in Folsom Reservoir which creates need for greater amounts of energy to accomplish the required pumping at Folsom and EID pumping plants. A more significant effect derives from the fact that far more water is delivered by the respective water purveyors through these pumps in the cumulative condition as compared to the existing condition. The energy requirement under the cumulative condition is more than doubled at the Folsom Pumping Plant and six-fold greater at the EID Pumping Plant. This is a significant cumulative economic impact which is borne by the water users who benefit from the pumping.

Action Alternatives' Incremental Contribution to the Cumulative Condition

The incremental contribution analysis shows that the Action Alternative-induced impacts on pumping energy requirements are small: a 1.8 percent increase in requirement at the Folsom Pumping Plant and a 0.1 percent increase in requirement at the EID Pumping Plant. This would be considered a less-than-significant contribution to the cumulative condition.

Impact 3.11-12: Effects on Oroville Reservoir water elevation and power supply.

The cumulative condition would result in a reduction in the long-term water elevation of Oroville Reservoir of up to 18 feet and a long-term average reduction in storage of up to 8.5 percent. Given the uncertainties associated with the effects that increased SWP demands, reflected in the cumulative condition, would have on Oroville Reservoir to facilities' hydropower dependable capacity and pumping energy requirements, this would be considered a potentially significant impact.

Action Alternatives' Incremental Contribution to the Cumulative Condition

No substantial changes in reservoir elevation would be anticipated under the cumulative condition relative to the future base. The increase in future SWP demands is the primary factor leading to cumulative effects. The Action Alternatives' contribution to the cumulative condition would not be considerable.

3.11.2.4 Environmental Protection and Mitigation Measures

The Proposed Project and alternatives would not result in significant impacts upon CVP electric generation capacity, energy requirements for pumping from Folsom Reservoir, or electrical energy generation or capacity or energy requirements for pumping. Additionally, the Proposed Project or alternatives would not result in a significant contribution to the cumulative condition. Therefore, no environmental protection or mitigation measures are proposed.

3.12 LAND USE

The Proposed Project or alternatives would have localized direct effects within the project study area. These effects are limited to facilities-related activities in the project area, including construction, operations and maintenance. The description of the affected environment and the evaluation of impacts, therefore, address only facilities-related effects within the project area. A discussion of growth-inducement within the PCWA service area also is included.

3.12.1 AFFECTED ENVIRONMENT

3.12.1.1 Project Area Setting

The project area represents the direct effect study area and includes the lands immediately adjacent to the Middle Fork American River from below Ralston Afterbay to its confluence with the North Fork American River and from the confluence to Oregon Bar.

Middle Fork American River

The Middle Fork American River forms the U.S. Forest Service (USFS) boundary between the El Dorado National Forest and the Tahoe National Forest. Land surrounding the Middle Fork are managed by the USFS as multiple use lands, which includes natural resource recreation, extraction, management, restoration, and conservation land use activities. The Tahoe National Forest provides land management direction under the policies and guidelines of the *Tahoe National Forest Land and Resource Management Plan* implemented in 1990. The El Dorado National Forest provides land management direction under the policies and guidelines of the *El Dorado National Forest Land and Resource Management Plan* implemented in 1988. Below Ralston Afterbay, in addition to USFS lands along the Middle Fork American River, land use and regulatory jurisdictions include Reclamation, BLM, CDPR, the City of Auburn, and some private landholders. CDPR manages whitewater outfitter guide activities on National Forest System land through agreement with USFS and Reclamation agreement.

North Fork American River

Below the confluence of the Middle Fork and North Fork, Reclamation has land use jurisdiction over the majority of land along the North Fork American River down to Folsom Reservoir, with some smaller fragmented parcels of land managed by BLM. CDPR manages recreational uses of Reclamation lands below the confluence of the Middle and North Fork American River with the Auburn SRA.

Project Area

Land uses of the project area primarily consist of open space and activities related to Reclamation's installation and removal of the seasonal pump station facilities. The former Auburn Dam construction roads are used for access to the water facilities. Water-based recreation is not permitted in the project area; however, the Auburn-to-Cool and Western States trails traverse the site, which provide horseback riding, hiking, and biking uses.

3.12.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.12.2.1 Methodology

The anticipated construction, operation, and maintenance impacts of project facilities on land uses in the project area were evaluated with regard to the type and intensity of existing and planned land uses at and near the project site, including consistency with relevant local and regional planning and land use policies.

3.12.2.2 Applicable Laws, Ordinances, Regulations, and Standards

Broad management guidelines for the public use of Auburn Dam project lands were established under P.L. 89-161, the enabling legislation for the construction of Auburn Dam. Specific management direction for the Auburn SRA is provided in the General Plan for the Auburn Reservoir Project and Folsom SRA, completed in 1978 and updated in 1990.

3.12.2.3 Impact Indicators and Significance Criteria

Impact indicators and significance criteria were determined from city, county, and agency land use general plans for the project area. The Environmental Checklist of the State CEQA Guidelines provides general guidance in the identification of circumstances that may result in a significant effect on the environment related to land use. **Table 3.12-1** Presents the impact indicators and significance criteria for impacts on land use.

Table 3.12-1
Land Use Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ Land use designations	❑ Alteration of the existing or planned designated land uses of an area.
❑ Compatibility with surrounding land uses and regional character	❑ Change of the type or intensity of land uses resulting in incompatibility with existing surrounding land uses or incompatibility with the regional character.
❑ Number of affected businesses, homes, or people.	❑ Displacement of a large number of business, homes, or people that would be inconsistent with local plans for the area.
❑ Local and regional planning objectives; project planning objectives	❑ Conflict with adopted environmental plans and goals of local jurisdictions, as stated in their general, community, or other planning policy materials.

3.12.2.4 Impact Analysis

This section presents the analysis of potential facilities-related land use impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

<u>Facilities-Related Impacts</u>

No Action/No Project Alternative

Impact 3.12-1: Change in designation, type, or intensity of land uses at the project site.

The No Action/No Project Alternative would not require any changes in designated land uses at the project site, and would not affect the type or intensity of activities. No businesses, homes or individuals would be displaced by continuation of the seasonal pump station practices. This alternative, therefore, would represent a less-than-significant change from existing conditions.

Impact 3.12-2: Conflict with local or regional planning policies, goals, or objectives.

Continued installation of the seasonal pump station would not permit restoration of the river channel or associated increased public use of the area. Additionally, the bypass tunnel would remain operational and would continue to pose a public safety hazard. This alternative results in potential inconsistencies with Reclamation and CDPR long-range planning goals for the Auburn SRA and would be in direct conflict with direction provided by the State Attorney General's office to close the bypass tunnel. Because there would be no feasible means of mitigating or eliminating these issues under the No Action/No Project Alternative, these issues represent significant unavoidable impacts.

Proposed Project

Impact 3.12-3: Change in designation, type, or intensity of land uses at the project site.

The type of land uses at the project site (water supply utility, recreation, open space) generally would remain the same as under the existing condition and the No Action/No Project Alternative. Land use designations would not change although the intensity and activity associated with these uses would change. Operation and maintenance of the pump station would result in activity year-round, rather than seasonally. Public access and recreational use of the restored river channel also would result in increased seasonal use of the area. These changes would be compatible and consistent with existing surrounding land uses (recreation activities and rural residential) as well as with the regional characteristics. No businesses, homes, or individuals would be displaced. The anticipated increased utility-related and public activities at the site therefore represent a less than significant land use impact.

Impact 3.12-4: Conflict with local or regional planning policies, goals, or objectives.

Development of the year-round pump station would not result in a conflict or inconsistency with Reclamation policies governing land use at the project site. Reclamation and PCWA would execute and operate under a contract governing ownership and other responsibilities for the pump station, public access, and other activities to take place within the project area (Appendix B of the Final EIS/EIR). This would be considered a less-than-significant impact.

Closure of the bypass tunnel would eliminate the potential conflict with the State Attorney General's office direction to close the tunnel. Restoration of the river channel would be consistent with Reclamation and CDPR long-range planning goals of enhancing recreation opportunities in the Auburn SRA.

Upstream Diversion Alternative

Impact 3.12-5: Change in designation, type, or intensity of land uses at the project site.

The Upstream Diversion Alternative would result in the same water supply utility-related activities as under the Proposed Project, including operational and maintenance site visits. These activities would not require a change in land use designations. No business, homes, or individuals would be displaced. These activities represent a less-than-significant change in land use type or intensity compared to the existing condition or No Action/No Project Alternative.

Impact 3.12-6: Conflict with local or regional planning policies, goals, or objectives.

Facility ownership and responsibilities would be agreed upon under contract between Reclamation and PCWA. Development of the Upstream Diversion Alternative would not permit restoration of the river channel or associated increased public use of the area. Additionally, the bypass tunnel would remain operational and would continue to pose a public safety hazard. This alternative would result in potential inconsistencies with Reclamation and CDPR long-range planning goals for the Auburn SRA and would be in direct conflict with direction provided by the State Attorney General's office that Reclamation close the bypass tunnel. Because there would be no feasible means of mitigating or eliminating these issues under the Upstream Diversion Alternative, these issues represent significant unavoidable impacts.

Cumulative Impacts

The Proposed Project and other future actions, specifically potential expansion of the pump station and future planning for increased recreational activity within the Auburn SRA, would result in a change in the intensity of water supply utility and public recreation use of the North Fork American River. These activities would not require a change in land use designation or zoning, although, certain ownership and management responsibilities between Reclamation and PCWA and Reclamation and CDPR require contractual agreement. These activities would be considered consistent with long-term planning goals of the agencies and would not result in policy conflicts. These activities would not be anticipated to result in adverse cumulative land use impacts within the study area.

Discussion of Growth-Inducement Issues Within the PCWA Service Area

Rapid growth has occurred in Placer County since the mid-1980s and growth demands have pushed the limits of PCWA's existing water supply delivery means from both the Drum-Spaulding Project and the MFP seasonal pump station. Further growth and development have been approved through local planning process (i.e., different City and County general plans).

PCWA's need for a larger pump station and the added capacity associated with it does not increase the quantity of PCWA's existing water entitlement. The proposed larger pump station facility would only enable PCWA to withdraw the quantity of water to which it is rightly entitled under the law, in accordance with its FERC license and two water rights permits granted by the SWRCB.

It is the responsibility of planning agencies to foresee future needs and try to develop land use development alternatives that will meet impending demands while being environmentally sound and beneficial to the overall needs of the community. PCWA does not possess land use regulating authority; however, it is PCWA's mandate to meet water demand within its service area. Provisions in existing state and county planning efforts running through 2030 have anticipated what future water supply demands will be under mid-range growth and build-out projections, and have established alternative water sources within the Central Valley as well as other combinations of efforts including reduction over time in the amount of MFP water supplied to SSWD.

PCWA's legal duties arise in part from the Placer County Water Agency Act, which is found in Section 81-1, et seq., of the appendices to the California Water Code. Section 81-4 of that enabling legislation gives PCWA the power "to do **any and every lawful act** necessary in order that sufficient water may be available for any present or future beneficial use or uses of the lands or inhabitants within the agency, including, but not limited, to, irrigation, domestic, fire protection, municipal, commercial, industrial and all other beneficial uses and purposes." (Emphasis added.) Section 81-4.3 gives PCWA the authority to appropriate and acquire water and...[to] utilize...water for any purpose useful to the agency." Section 81-6 gives PCWA the authority to cooperate and contract with Reclamation with respect to the "construction of works" for "water supply" and other purposes.

PCWA also is subject to the Urban Water Management Planning Act (Water Code, Section 10610 et. seq.) as amended in 2001 in response to the Legislature's concern that California's water supply agencies might not be engaged in adequate long-term planning. That Act requires PCWA, as an "urban water supplier," to maintain an "urban water management plan" that must identify existing water supply and demand, and must identify any new water sources required to satisfy demand as projected at least 20 years into the future. The projected 20-year water supply must account for "average, single-dry, and multiple-dry water years."

In predicting 20-year water demands, PCWA, like other urban water agencies, must rely on "data from the state, regional, or local service agency population projections[.]" Thus, to the extent that Placer County and its incorporated cities (e.g., Roseville, Rocklin, Lincoln, Auburn and Loomis) anticipate large population increases in their adopted general plans, PCWA is required to identify water sources necessary to serve such planned development, and is not in a position to refuse to comply with that legal obligation as a means of reducing the "growth-inducing" effects of obtaining new water supplies.

The PCWA Surface Water Supply Update for Western Placer County (PCWA 2001) contains an evaluation of the build-out demands under the existing general plans of the cities and the county within its present service area, based on a mid-range estimate of probable growth rates (PCWA 2001). The existing general plans permit development as indicated by the plans, without future evaluation. The Surface Water Supply Update indicates that the build-out demands that are documented in those plans extend to 2030 and require and additional 70,000 AF of water to be supplied by PCWA. These water demand projections assume PCWA's continued implementation and support for water use efficiency measures, as state on page 1-6 of the Draft EIS/EIR.

PCWA's Surface Water Supply Update report, which shows PCWA's long-term need for the construction of new diversion, treatment, transmission and distribution infrastructure facilities, from both the American and Sacramento rivers, of equal capacity to PCWA's existing water supply entitlements in order to meet the future demands of Placer County. Ultimately, the size of these facilities may be smaller in their final phases as PCWA moves forward with planned conservation and water use efficiency measures and others move forward with planned reclamation projects. However, nothing except a building moratorium in Placer County will allay the need to construction the American River Pump Station now.

It is unlikely that a precedent will be set allowing further construction of larger pump stations along the Middle Fork of the American River in the future, because this would require an increase in PCWA's overall water entitlements from a river whose water is already in high demand and highly regulated. Any future request for an increase in water rights allocations or alterations to annual use patterns from existing sources would require extensive and long-term adjudication affecting a multitude of numerous planning policies and regulatory actions. This would include new water rights permits, which would be opposed by downstream users, Reclamation, the Water Forum, and other environmental groups.

3.12.2.5 Environmental Protection and Mitigation Measures

No environmental protection or mitigation measures are proposed.

3.13 GEOLOGY AND SOILS

The Proposed Project or alternatives would have localized direct effects within the project study area. These effects are limited to facilities-related activities in the project area, including construction, operations and maintenance. The description of the affected environment and the evaluation of impacts, therefore, address only facilities-related effects within the project area.

3.13.1 AFFECTED ENVIRONMENT

3.13.1.1 Project Area Setting

The project study area for geology and soils is defined as the immediate vicinity of the pump station and river restoration project where these activities may contribute to changes in local geologic or soil resources.

Geology

The project area lies in the north-central portion of the western slope of the Sierra Nevada. Much of the western slope in this area is an even, west-sloping erosion surface dissected by youthful V-shaped canyons formed by westward and southward flowing rivers. The project site is located near the western edge of the Sierra Foothills in a wide, V-shaped canyon cut by the North Fork American River and falls within the older of two major lithologic groups termed the Foresthill melange-ophiolite belt. Bordering the east and west boundaries of this belt are a series of younger rocks considered to be island-arc volcanic and sedimentary rocks (MW et al. 1998).

The major rock type in the project area is amphibolite (or hornblende) schist. Amphibolite is produced by the change in structure of igneous rocks rich in iron and magnesium (ferromagnesian minerals). Schist is a metamorphic crystalline rock that is characterized by the presence of layers between which the rock may be broken. Hornblende, in particular, is a complex rock composed of silicate with a glassy luster found in the shades of dark green to black. Interlayered within the amphibolite are beds of metamorphosed, quartz-rich sedimentary marine rocks (shale and siltstone) and chlorite-rich interlayers, locally called chlorite schist. Also present are layers of serpentine rock composed essentially of serpentine mineral derived from the metamorphism of olivine peridotite. Associated with the serpentine rocks are chrysotile (asbestos) and talc-chlorite formed at lower temperatures by metamorphic fluids. The chrysotile and talc-chlorite zones (termed "T-zones") are typically weak rocks that are susceptible to erosion and deformation (MW et al. 1998).

Seismic Conditions

The closest known active fault mapped by the California Division of Mines and Geology (CDMG) is the Bear Mountain Fault. Two branches of the Bear Mountain Fault System pass upstream and downstream of the project area. The Pilot Hill lineament crosses the North Fork American River a short distance downstream of the project site, while the Salt Creek lineament crosses the river a short distance to the north of the dam site (MARK 1997). The Placer County and El Dorado County general plans describe this area as "low severity for seismic events" (Placer County 1994; El Dorado County 1995).

Soils

Soil types within the study area include the Andregg series, Auburn-Sobrante-Rock outcrop complex, Riverwash, and Sierra sandy loam.

The Andregg series consists of moderately deep, well drained soils underlain by weathered granitic bedrock. This coarse sandy loam soil occurs in upland, rocky areas on 30 to 50 percent slopes (Rodgers 1980).

There are three variations of the Auburn-Sobrante-Rock outcrop complex in the project area, all characteristic of metamorphic rock foothills. The variation found on undulating to hilly rock side slopes of about 2 to 30 percent slope is about 45 percent Auburn soil, 30 percent Sobrante soil, and 12 percent metamorphic Rock outcrop. On steep rocky canyons of 50 to 70 percent slop, soil type is about 30 percent Auburn soil, 25 percent Sobrante soil, and 20 percent metamorphic rock outcrop.

The Riverwash soil type occurs in and along the North Fork American River channel. This soil consists of highly stratified stony and bouldery sand that is typically barren (Rodgers 1980).

The Sierra sandy loam soil type occurs on 15 to 30 percent slopes in the project area. This is a deep, hilly, well drained soil underlain by weathered granitic rock. The erosion hazard for this soil type is high (Rodgers 1980).

Although the Western Placer County Soil Survey identifies these soil types at the project area, extensive anthropogenic disturbances have occurred to these soil types due to past construction activities associated with the Auburn Dam. Extensive grading and blasting of canyon slopes, stockpiling of spoil materials, breaching of the cofferdam, and construction of dirt roads have resulted in many active erosion sites and deposition of materials within the American River canyon and throughout the project site.

Effects of Constructing the Auburn Dam Foundation and the Cofferdam Breach

Construction of the Auburn Dam foundation in the 1970s resulted in massive changes to the project study area. Two substantial modifications to the river canyon included installation of the bypass tunnel and construction of the earth-filled cofferdam. The bypass tunnel and cofferdam were used to dewater the dam construction zone. Additionally, canyon walls were cut and substantially modified to construct extensive foundations for the arch dam, power plant, tailrace, and service spillway stilling basin and tributary creek canyons upstream and downstream of the site were filled with large volumes of excavated bedrock (Reclamation 1996).

In 1986, several years after suspension of dam construction, a major flood overtopped and eroded away the northwest section of the cofferdam. An extremely large volume of water impounded behind the cofferdam poured through the failing section in a short period of time, with the instantaneous flow reaching several hundred thousand cfs according to one estimation (Reclamation 1996). An immense volume of dam-derived sediment filled the canyon floor up to 23 feet deep downstream of the breach and extending thousands of feet downstream. Large quantities of finer sediment were deposited further downstream and into Folsom Reservoir. Due to the instability of the river bed and presence of cofferdam materials, each new flood event reconfigures the canyon floor and river channel (Reclamation 1996).

The aftermath of the arch dam foundation excavation and the cofferdam failure in the American River has left the area highly disturbed with rill and sheet erosion on natural and man-made slopes, landslide debris flows, an unstable river channel filled with cofferdam remnants, and sparse vegetative cover (both riparian and non-riparian). An estimated two million cubic yards of soil and rock debris from the cofferdam embankment now fills the dewatered river channel and downstream channel to depths ranging from 20 to 100 feet (Reclamation 1996).

Geologic and Soil Hazards

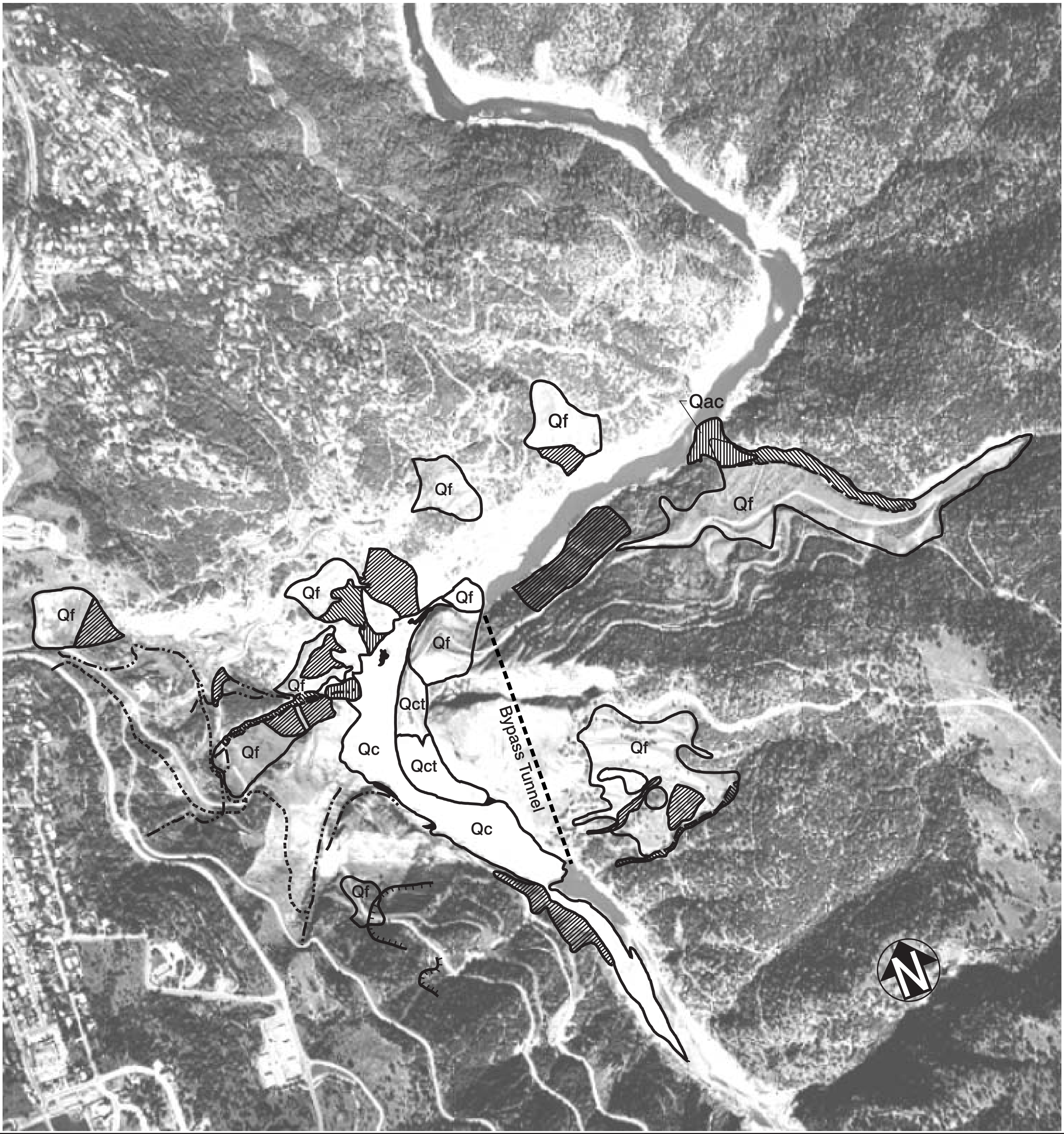
Geologic hazards generally include ground-shaking, fault rupture, liquefaction, settlement, subsidence, expansive soils, and erosion.

The river canyon slopes of the project site are characterized as steep and relatively unstable due to natural and anthropogenic factors. Mass wasting processes are responsible for fairly substantial depositions of colluvium along the base of steep slopes. Conversely, anthropogenic factors (i.e., construction of roads, construction of waste-rock embankments, spoiling of materials, blasting and grading of canyon slopes) have accelerated erosional forces along river canyon slopes. Additionally, saturated spoil materials and runoff from dirt roads have resulted in slope failures and surface erosion throughout the project site. Geologic and soil hazards in order of increasing severity, include sheet erosion, rill erosion, gully erosion, and landslides (MW et al. 1998).

Active Erosion Areas

Active erosion areas on the canyon walls in the pump station facility project area include steep natural slopes, manmade valley-fill embankments, and the north abutment (i.e., cut-slope) for the cofferdam. These active erosion sites are shown on **Figure 3.13-1** and described below. The Oregon Bar vicinity was not mapped during the preliminary geotechnical investigations, however, detailed geotechnical mapping would be conducted as part of final design efforts. This mapping and investigation would be performed for the entire study area of the selected alternative to obtain site-specific information. The information would be used to determine the final location and design parameters for each of the project features.

Sheet erosion and rill erosion occur on many slopes in the project study area. Two areas of active sheet and rill erosion exist upstream of the bypass tunnel; one a few hundred feet northwest of Tamaroo Bar and one beginning about 350 feet northeast of the bypass tunnel inlet, as shown in Figure 3.13-1. Two valley-fill embankments at the bend in the dewatered river channel have undergone sheet and rill erosion, due largely to the 1986 cofferdam failure which undercut the embankment toes. The north abutment (i.e., cut-slope) for the cofferdam, located



LEGEND

Scale: 1" = approximately 1,500'

Qls	Landslide
Qf	Valley-fill embankment
Qc	Debris from cofferdam failure
Qct	Remnant or debris from cofferdam failure (terrace)
Qac	Alluvial cone deposit
	Sheet and rill erosion
	Gully erosion
	Gravitational rock creep
	Existing drainage
	Proposed runoff diversion
	Ponded water

Source: MWE 1998a

Figure 3.13-1 Project Study Area Geology

northwest and across the canyon from the cofferdam remnant, also was undercut by the failure of the cofferdam in 1986, resulting in significant upslope failure above the crest elevation of the former cofferdam (MW et al. 1998).

Several sites with gully erosion exist within the project area. The most significant gully erosion site is on the north side of the Salt Creek boat ramp embankment. A large debris flow of eroded embankment materials has accumulated as an alluvial cone at the toe of the embankment and has restricted the flow of the American River upstream from the bypass tunnel inlet. Field review and aerial photographic examination of the embankment area indicate the gully and cone deposit may be unstable and susceptible to continued excessive erosion (MW et al. 1998).

The second-most significant gully erosion has occurred on a valley-fill embankment located on the west side and just upstream of the bend in the dewatered river channel and immediately south of the Auburn Ravine Tunnel portal. A large alluvial cone deposit on the canyon floor resulted from the gully erosion. Severe sheet and rill erosion of topsoil also has occurred on the lower half of this embankment. The severe gully, rill, and sheet erosion were probably caused most directly by heavy rainfall run-off. This gully and cone deposit may be unstable and susceptible to continued excessive erosion.

Access roads to the seasonal pump station facilities cross erosion-prone areas. Each year, portions of the roadways erode and have to be re-built at the start of the season when the pumps are re-installed.

Active Landslide Sites

Active landslides within the project study area occur upstream from the proposed construction area. Three active canyon wall landslides and associated alluvial cone deposits exist at Tamaroo Bar and two smaller landslides are just upstream from Tamaroo Bar. The landslide and alluvial-cone deposit at Tamaroo Bar is the largest natural erosion and debris site within the project study area. The cone deposit has encroached onto the American River channel and restricts the streamflow during base flow or low flow conditions. Continued debris and cone deposition at Tamaroo Bar could result in the formation of a natural dam or contribute to turbid streamflow from this point downstream (MW et al. 1998).

3.13.1.2 Applicable Laws, Ordinances, Regulations, and Standards

Geology and soils resources are governed by the U.S. Geological Survey, California Department of Mines, and the U.S. Department of Agriculture, Soil Conservation Service.

3.13.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.13.2.1 Methodology

PCWA and Reclamation commissioned geotechnical studies to evaluate the potential geology and soils impacts of constructing the Proposed Project. These studies include geotechnical site surveys conducted by The MARK Group (MARK 1997) and a diversion and channel stabilization design study prepared by McLaughlin Water Engineers, Ltd. (MW et al. 1998). The purposes of these reports were: (1) to assess the feasibility of constructing the Proposed Project features in consideration of potential soils- and geology-related site limitations; and (2) to recommend appropriate construction methods to overcome any limitations in order to ensure the safety and long-term reliability of the improvements. These studies and the Placer County and El Dorado County general plans were examined to identify local geology and soil conditions or limitations that may be affected by or affect construction of the Proposed Project or alternatives.

3.13.2.2 Impact Indicators and Significance Criteria

There are no formal, specific regulations for evaluating the impacts of geology and soils. The impact indicators and significance criteria developed for this analysis and presented in **Table 3.13-1** are therefore based on the CEQA Guidelines Environmental Checklist Form and the Guidelines for Geologic/Seismic Considerations in Environmental Impact Reports (CDMG 1982).

Table 3.13-1
Geology and Soils Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ Amount of change in slope stability/geologic substructure.	❑ Substantially increase or exacerbate unstable earth conditions, including unstable slopes, or substantial changes in geologic substructures, relative to the basis of comparison, that could affect human safety.
❑ The number of people and facilities in the project area directly exposed to geologic hazards.	❑ Increase the exposure of people or property to major geologic hazards, including unstable slopes, ground failure, liquefaction, lateral spreading, or seismic-induced hazards, relative to the basis of comparison, that could affect human safety or structures..

3.13.2.3 Impact Analysis

This section presents the analysis of potential facilities-related geology and soils impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

<u>Facilities-Related Impacts</u>

No Action/No Project Alternative

Impact 3.13-1: Substantial change in slope stability or geologic substructures due to construction, operation, or maintenance of the seasonal pump station.

The extended diversion season anticipated under the No Action/No Project Alternative would not result in a substantial change in the construction, operation, or maintenance activities that affect geologic or soils resource conditions in the project area (Reclamation 2000). Reclamation would continue annual installation construction activities including sump pond dredging and access road routing and stabilization. These activities would not disturb surface soils or subsurface geologic structures any more than under current conditions. Therefore, the No Action/No Project Alternative would have a less-than-significant effect upon geologic and soils resources.

Impact 3.13-2: Increased exposure of people or property to major geologic hazards due to construction, operation, or maintenance of the seasonal pump station.

The No Action/No Project Alternative would not be expected to result in the increased exposure of people or property to major geologic hazards. Under this alternative, public use of the river would remain restricted to horseback riding, hiking, and biking on selected trails. No additional public use of the area would be permitted.

In the case of a nearby substantial seismic event (i.e., 5.0 or greater on the Richter scale), settlement of soils such as alluvium, artificial fill, and dredge spoil piles could occur within the project area. In such an event, earth movement may result in some damage to the pump station, intake transmission pipeline, or roadways. However, this alternative would not result in an increased risk of human harm or property damage compared to existing conditions. Therefore, potential impacts would be considered less than significant.

Proposed Project

Impact 3.13-3: Change in slope stability or geologic substructures due to construction, operation, or maintenance of the Proposed Project.

Construction activities for the Proposed Project will require extensive site grading, excavation, and blasting to restore the river channel and to level land (bedrock) for the Proposed Project structures. These activities, although occurring on lands already substantially disturbed by Auburn Dam construction and cofferdam failure, will modify existing ground surfaces and potentially result in the creation of additional areas of slope instability and increased erosion potential.

In all areas where project features will be developed, the canyon slopes will be stabilized to the extent necessary to ensure secure placement of and access to project facilities. The stability of project area slopes will be considered during the final design and determination of facility placement. Slopes supporting project facilities will be engineered and constructed to meet federal, state, and local design considerations, including surface and subsurface drainage considerations. The final design and appropriate site-specific construction methods will be documented in a Final Geotechnical Investigation. Additionally, a geotechnical engineer will be retained to monitor earthwork activities and ensure that recommended site-specific construction methods are implemented.

Cofferdam debris to be removed from the historic river channel as part of restoration would be used to fill holes and build riverbank benches. Although resulting in further modification of existing site conditions, these changes are considered beneficial aspects of the project design.

Overall, changes to existing soil and geologic resource structures in the project area would be considered less than significant, and potentially beneficial.

Impact 3.13-4: Increased exposure of people or property to major geologic hazards.

When necessary, the project area would be closed to all public access during construction, thereby minimizing potential exposure of the general public to unstable slope conditions or other geologic hazards that may temporarily exist during construction. See Public Health and Worker Safety (Section 3.17) for further discussion of worker safety considerations.

Project facilities would be designed in accordance with Uniform Building Codes (UBC), where applicable, including seismic considerations, to minimize the potential for damage or human injury in the event of an earthquake.

Restoration of the river channel would result in increased public passage through the project area, potentially increasing the exposure of the public to existing geologic hazards. However, all areas disturbed during construction would be compacted and stabilized, either mechanically (i.e., engineered slopes) and/or through planting of erosion-control groundcover, prior to opening the area for public use. Public use of the restored river channel and local access sites potentially would result in increased public exposure to the erosion and landslide areas upstream of the immediate project site (i.e., Salt Creek, Tamaroo Bar and further upstream). Additionally, development of a parking area at the Auburn Dam batch plant site would result in increased exposure of recreationists to the disturbed slope immediately south of the site. The potential for impacts to recreationists in these areas would be minimized by placement of warning signs indicating the nature of the hazard and directing hikers and others using the area to remain on designated trails. The hiking trail that will extend from the parking flat down to the Oregon Bar turnaround shall be designed and constructed consistent with state standards. These precautions are considered feasible means of reducing this impact to less than significant.

Upstream Diversion Alternative

Impact 3.13-5: Change in slope stability or geologic substructures due to construction, operation or maintenance.

The Upstream Diversion Alternative does not include restoration of the river channel, and therefore, results in substantially less ground-disturbing activity. As with the Proposed Project (see Impact 3.13-3), site development would be in accordance with appropriate federal, state, and local regulations, and include measures to stabilize slopes to protect project facilities and public safety. The geology and soils impact would be less than significant.

Impact 3.13-6: Increased exposure of people or property to major geologic hazards.

Under the Upstream Diversion Alternative, no increase in public passage through the site is anticipated. The project would be designed to meet all applicable seismic codes to minimize potential for increased damage or exposure to earthquake-related hazards. This impact is therefore considered less than significant.

Cumulative Facilities-Related Impacts

Impact 3.13-7: Change in slope stability or geologic substructures.

Other reasonably foreseeable actions, including the near-term improvements to the Foresthill Bridge and the longer-term potential for expansion of the pump station facilities potentially would change slope stability of the North Fork American River canyon. These projects would require site-specific evaluation of geologic conditions (geotechnical reports) relative to the proposed activity and would be required to implement stabilization measures. Because the Proposed Project and Upstream Diversion Alternative construction plans would implement measures to mitigate site-specific impacts, and other local projects would contain and mitigate for geology and soils impacts onsite, cumulative effects would not be significant and the effects of the Proposed Project or Upstream Diversion Alternative would not be cumulatively considerable.

Impact 3.13-8: Increased exposure of people or property to major geologic hazards.

As described under Impact 3.13-7, mitigation of geology and soils impacts would occur on a project-specific basis to ensure stabilization of individual site conditions. Future projects within the American River canyon also would have to consider the potential for the action to result in increased public exposure to such hazards. Because other projects would have to account for such impacts and provide site-specific mitigation through evaluation and coordination with resource agencies, and because the Proposed Project and Upstream Diversion Alternative incorporate environmental protection measures to mitigate for this impact, the proposed alternatives would not result in a considerable contribution to the cumulative condition.

3.13.2.4 Environmental Protection and Mitigation Measures

The No Action/No Project Alternative would not be expected to result in significant geology and soils impacts.

The environmental protection and mitigation measures recommended in the Draft EIS/EIR were incorporated into the Public Health and Worker Safety mitigation elements in this Final EIS/EIR (see Section 3.17) as the slope stability issues addressed were determined to relate to public and worker safety.

3.14 TRANSPORTATION AND CIRCULATION

The Proposed Project or alternatives would have localized direct effects within the project study area. These effects are limited to facilities-related activities in the project area, including construction, operations and maintenance. The description of the affected environment and the evaluation of impacts, therefore, address only facilities-related effects within the project area.

3.14.1 AFFECTED ENVIRONMENT

3.14.1.1 Project Area Setting

The Proposed Project or alternatives would have direct effects on the local road network that provides access to the project site. The project study area for the evaluation of transportation issues includes the primary and secondary access roads to the project site.

The primary freeway through the City of Auburn is Interstate 80, which provides access southwest toward Sacramento and northeast toward Reno. Interstate 80 is located between two and three miles northwest of the project site. Highway 49, another major roadway close to the project site, connects Auburn to Placerville and crosses the American River approximately four miles upstream of the project area.

Local access to the project site is through the City of Auburn. Auburn-Folsom Road is a major arterial in the Auburn area and provides access from Interstate 80 and Highway 49 to Maidu Drive and Pacific Avenue. Auburn-Folsom Road provides access from residential areas to the downtown commercial and business district of the City of Auburn. Maidu Drive and Pacific Avenue are local collector streets providing access to local residential area roads as well as to the unimproved access routes to the project site. These roads are shown on **Figure 3.14-1**.

The City of Auburn recently estimated average daily traffic volumes on certain city roadways. Counts on Auburn-Folsom Road north of Maidu Drive measured approximately 11,520 vehicles per day. This roadway was determined to operate at a level of service (LOS) B (generally free to maneuver and select speed). Traffic measurements at the unsignalized intersection of Auburn-Folsom Road and Maidu Road were approximately 9,908 vehicles per day and indicate an LOS A (free to maneuver and select speed) (R. Coke, pers. comm. 2001).

Since preparation of the Draft EIS/EIR, Maidu Drive daily traffic volume and peak hour traffic through key intersections was compiled from data available from the City of Auburn (December 2001/January 2002). Daily traffic volume counts provided by the City of Auburn indicate that Maidu Drive carries about 457 vehicles per day in the area between Burlin Way and Falcons Point Drive and 297 vehicles per day east of Falcons Point. The volume rises to 3,098 near the Shirland Tract Road/Maidu Drive intersection. New traffic counts were made at the Maidu Drive/Burlin Way intersection (February 2002). These counts indicate that the highest traffic volume occurs during the morning peak hour when 641 vehicles passed through the intersection (i.e., between 7:15 a.m. and 8:15 a.m.). These volumes include travel to and from the Skyridge

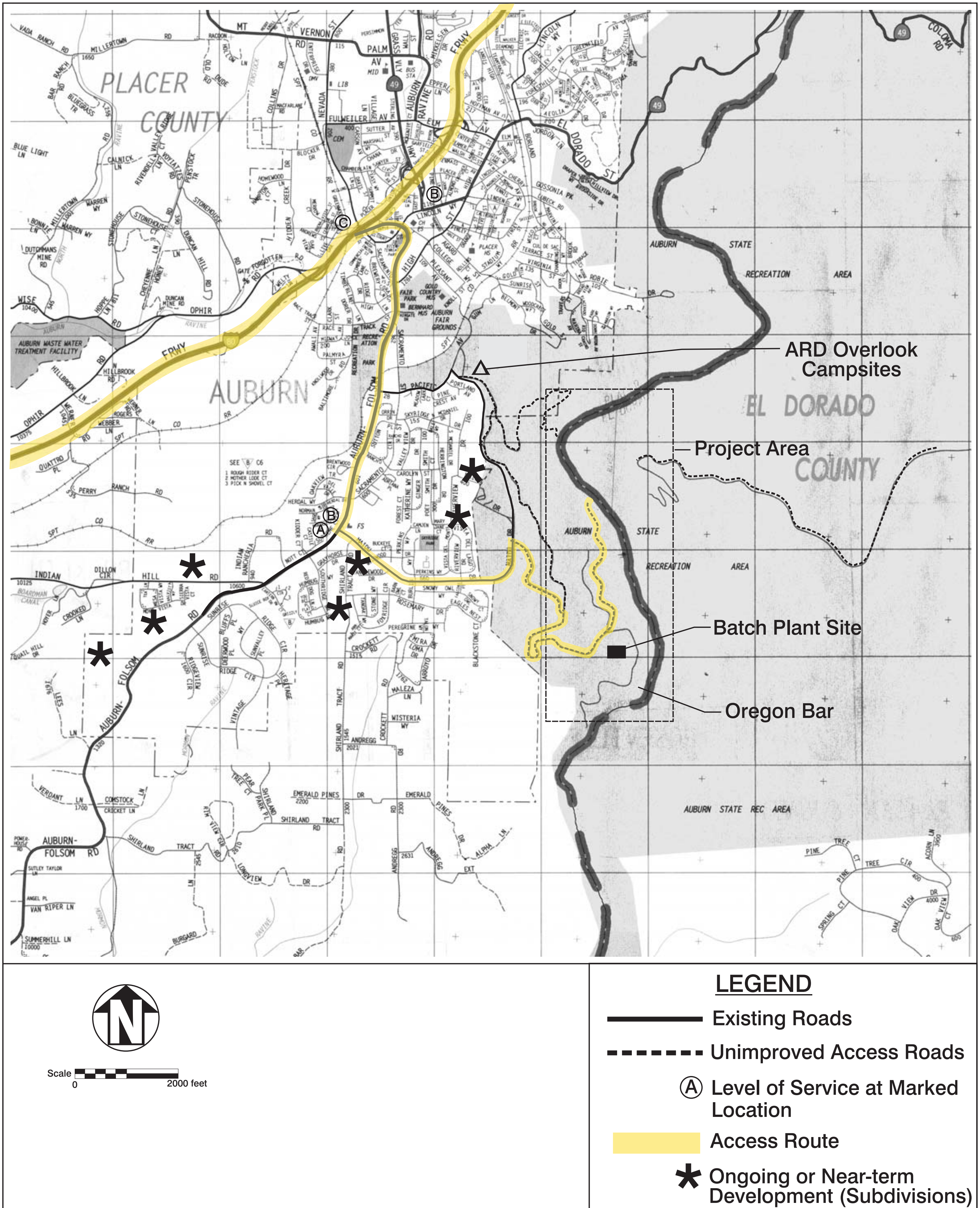


Figure 3.14-1 Access Roads to Project Site

Elementary School, located on Perkins Road, approximately one-tenth of a mile from the Maidu Drive/Burlin Way intersection. Unpublished traffic counts for Pacific Avenue were reported at 900 ADT.

Existing Seasonal Pump Station

Under existing conditions, up to 15 workers (30 trips) travel to the pump station site for seasonal installation and removal activities. These workers generally travel along Interstate 80, Highway 49, Auburn-Folsom Road, and use either the Maidu Drive or Pacific Avenue entrances. This travel results in 30 daily trips during the two to four weeks of construction. Operation of the seasonal pump station requires one daily site visit (two trips), using the same roads.

Level of Service Analysis

The quality of traffic flow and its relationship to adopted standards is evaluated based on level of service. LOS is a qualitative measure of traffic operations whereby a letter grade, A through F, is assigned to a roadway segment or intersection. LOS A is indicative of good traffic flow with little or no delay, while LOS F is indicative of "at-capacity" conditions with significant congestion and delay. The City of Auburn has established LOS D as the minimum acceptable LOS beyond which mitigation measures would be warranted to reduce the level of a project's impact upon LOS. The analysis of the Proposed Project determined LOS using the procedures of the 2000 Highway Capacity Manual.

The existing levels of service at the Maidu Drive/Burlin Way intersection for the peak travel hours (morning, afternoon and evening) and peak 15-minute intervals are shown in **Table 3.14-1**.

Table 3.14-1
Existing Condition Traffic LOS Evaluation

	a.m. Peak Hour [a]		Afternoon [a]		p.m. Peak Hour	
Maidu Drive Condition	Average Delay (Seconds)	LOS	Average Delay (Seconds)	LOS	Average Delay (Seconds)	LOS
Existing (Non-summer) - Overall Hour	14.8	B	10.0	B	7.6	A
Existing (Non-summer)	21.5	C	10.6	B	n.a.	n.a.

[a] Conditions occurring during the peak 15 minutes before or after school, except where "overall hour" is noted.

As indicated by these results, the greatest delay occurs during the morning peak hour reflecting commuter and school-related travel. Overall, LOS B is maintained, although LOS drops to C during the peak 15-minute period when school arrivals occur (7:15 a.m. to 8:00 a.m.). Afternoon and evening hours are rated LOS B and LOS A, respectively, with the delay being several seconds less than in the morning peak hour.

3.14.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.14.2.1 Methodology

Circulation is described in terms of peak hour LOS. The LOS designation indicates specific driving conditions ranging from LOS A (free to maneuver and select speed), the most optimal driving condition, to LOS F (roads and intersections operating below capacity), the least optimal driving condition. Driving conditions influencing LOS designations include speed, traffic interruptions, ease of traffic flow, freedom to maneuver, driver safety, and travel times.

Construction of the Proposed Project or Upstream Diversion Alternative would increase traffic trips on local area roadways. A "trip" is defined as traveling one-way to or from the project site, with the origination and destination points for each trip located outside the City of Auburn. For example, one trip would be defined as traveling from Interstate 80 to the project site. A separate trip would be from the project site to Interstate 80.

Methods used to assess impact significance included review and application of relevant laws, ordinances, regulations, and standards, as well as identification of anticipated traffic increases due to implementation of the alternatives. The existing average daily traffic volumes on City of Auburn and regional roadways were compared to anticipated average daily traffic volumes during construction and operation of the alternatives. Anticipated daily traffic was determined based on the number of workers and deliveries expected at the site. This methodology provides a quantitative measure of the potential traffic impacts and is considered to represent a conservative, or "worst-case" analysis as the traffic estimates used represent peak construction or operations activity levels, rather than average. The projected changes in traffic levels were reviewed for the alternatives to determine if the resulting traffic levels would violate City of Auburn LOS standards.

Additionally, a supplemental traffic study was performed to assess potential construction and project operation traffic effects upon the Maidu Drive/Burlin Way intersection. The study focused on obtaining updated average daily traffic counts, performed an evaluation of LOS for existing, project and cumulative conditions, and assessed the potential requirement to provide additional traffic control measures as part of the Proposed Project or Upstream Diversion Alternative, including assessment of pedestrian activity at the Maidu Drive/Burlin Way intersection. Pedestrian counts were made and compared to the California Department of Transportation (CALTRANS) Traffic Manual standards to determine the need for school pedestrian crossing improvements. The findings of this study have been incorporated into the impact analysis discussions.

The supplemental Traffic Study collected additional traffic data by monitoring morning, afternoon and evening peak hour travel along Maidu Drive, with an emphasis on the Maidu Drive/Burlin Way intersection. The study found that the morning peak hour (i.e., between 7:15 a.m. and 8:15 a.m.) has the highest traffic count, with a total of 641 vehicles passing through the Maidu Drive/Burlin Way intersection. Using this data, in combination with the City of Auburn traffic counts, the Traffic Study evaluated existing LOS conditions and determined the potential impacts upon traffic congestion (LOS) and pedestrian safety associated with construction and operation of the Proposed Project. Additionally, the Traffic Study evaluated future cumulative conditions based on build-out of planned development projects in the Maidu Drive area.

To evaluate the potential impacts of the Proposed Project upon the Maidu Drive/Burlin Way LOS, anticipated levels of construction and operations traffic were added to the existing condition. The study focuses on the critical time periods when LOS is influenced by commuter and school-related travel (morning, afternoon, and evening peak hours). These conditions occur on weekdays during the school year. Weekend and summer travel on Maidu Drive would be expected to be less than during these critical "peak hour" timeframes, therefore, specific evaluation of weekend or summer days was not considered necessary. The evaluation of Proposed Project impacts, therefore, can be considered to represent the peak or "worst-case" conditions that could be encountered. Overall, traffic levels would be less than indicated by the evaluation because (1) construction-related travel would not occur during peak commuter or school-related travel periods; and (2) peak public river access travel generally would occur on weekends and during summer months, when school is not in session.

3.14.2.2 Applicable Laws, Ordinances, Regulations, and Standards

Roadways adjacent to the project area are maintained and regulated by the City of Auburn and CALTRANS. The City of Auburn manages transportation routes within the city limits, including Maidu Drive, Pacific Avenue, and Auburn-Folsom Road. As stated in its General Plan, the City of Auburn has a policy to maintain a minimum peak hour LOS D (substantially restricted ability to maneuver and select speed; queues at intersections) at all city-maintained roadways and intersections. Highway 49 and Interstate 80, while within the City of Auburn, are maintained by CALTRANS. Roadways within the project site (beyond Maidu Drive and Pacific Avenue) are closed for public use. These roads are maintained by Reclamation as needed to provide access to the seasonal pump station facilities. Under the Proposed Project, future roadway maintenance and public use would be managed and regulated by PCWA and CDPR.

3.14.2.3 Impact Indicators and Significance Criteria

Table 3.14-2 lists the impact indicators and significance criteria used in the transportation and circulation analysis.

Table 3.14-2
Transportation and Circulation Impact Indicators and Significance Criteria

Impact Indicator	Significance Criteria
❑ Average daily traffic volumes.	❑ A substantial increase in average daily traffic volumes such that road capacity becomes adversely affected.
❑ Roadway levels of service.	❑ A decrease in the roadway operating level to below LOS D within the City of Auburn, as determined in relation to the existing traffic load and capacity of the street system.
❑ Conflict with existing/local drivers.	❑ An increase in traffic such that driver conflicts posing safety hazards may occur more frequently relative to the basis of comparison.

3.14.2.4 Impact Analysis

This section presents the analysis of potential facilities-related transportation and circulation impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

Facilities-Related Impacts

No Action/No Project Alternative

Impact 3.14-1: Increase in traffic levels on Interstate 80, Highway 49, Auburn-Folsom Road, Pacific Avenue, and Maidu Drive due to construction and operation of the No Action/No Project Alternative.

The No Action/Project Alternative would not change the number of project-related trips made to the site or within the study area. Therefore, impacts to transportation or circulation from construction and operation of this alternative would be less than significant.

Proposed Project and Upstream Diversion Alternative (Action Alternatives)

Although fewer pieces of heavy construction equipment would be used under the Upstream Diversion Alternative (refer to Table 2-5), the type and duration of impacts generated by construction and operation trips generally would be the same for the Proposed Project and Upstream Diversion Alternative (referred to as the Action Alternatives), therefore, these issues are discussed together. It is assumed that either alternative would involve a maximum of 50 workers at the site during peak construction activity.

Impact 3.14-2: Increase in traffic levels on Interstate 80, Highway 49, Auburn-Folsom Road, Pacific Avenue, and Maidu Drive due to construction and operation of a year-round pump station facility.

Construction

Traffic levels on Interstate 80, Highway 49, and Auburn-Folsom Road, would increase due to construction-related transport of personnel, equipment, and materials to the project site. On average, there would be 30 to 35 construction workers in the project area daily with up to 50 workers at the site during peak construction. These workers would generate a maximum of up to 100 daily trips. Additionally, there would be a maximum of 23 supply deliveries to the project site during peak activity, resulting in 46 trips. Using the combined peak trip estimate of 146 trips, the Action Alternatives would generate up to an additional 116 trips per day over existing conditions. This represents a 1.4 percent increase on Auburn-Folsom road near Maidu Drive, a 0.9 percent increase on Highway 49, and a 0.2 increase on Interstate 80. The increase in traffic volumes would not be expected to change the LOS of these roadways or impair roadway capacity relative to the existing condition and represents a less-than-significant impact.

Reclamation built Maidu Drive in the early 1960s to serve as a construction haul and access route for the Auburn Dam Project. As such, Maidu Drive was built to accommodate heavy loads and high capacity. Within the City of Auburn, Maid Drive serves as a collector road that connects to and receives traffic from neighborhood streets within the subdivisions along Maidu Drive. Maidu Drive is configured with one lane of traffic in each direction; each lane is 12-1/2 feet wide. The roadway shoulders are five feet wide; no parking is permitted along the shoulder. By comparison, other newer two-lane neighborhood streets typically have nine-foot wide lanes with eight-foot wide shoulders to accommodate streetside parking that commonly occurs in front of residences. Such roads also typically have curbs, gutters and sidewalks. There are no homes fronting to Maidu Drive along the segment from the Auburn-Folsom Road intersection with Maidu Drive to the Proposed Project entrance area.

Although the project is not expected to result in a substantial increase in traffic volume or roadway capacity, construction trips could potentially conflict with residential and commercial vehicular, bus, or bicycle traffic along Auburn-Folsom Boulevard or Maidu Drive, potentially posing safety hazards.

Proposed Project Construction Traffic

On average, construction of the Proposed Project would result in 30 to 35 construction workers at the project site daily, with up to 50 construction workers on site during peak construction. Using the peak condition, up to 100 daily trips would result from travel by these workers. Additionally, there would be a maximum of 23 daily supply deliveries to the site during peak construction, resulting in up to 46 additional trips to the site. Combined, the sum of construction worker and delivery trips could total up to 146 new trips per day, during peak construction. This represents up to 116 more trips than under the existing condition (30 daily trips are made during the two to four-week installation and removal activities for the seasonal pump station each year). On average, the total number of daily trips associated with Proposed Project construction and the increase relative to existing conditions would be less. These impacts all would be of relatively short-term duration, and would no longer occur after construction activities are completed.

While Maidu Drive itself has the capacity to accommodate this construction-related traffic volume increase, the local impact to the Maidu Drive/Burlin Way intersection will be linked to the actual hours of travel to and from the project site. Trips generated during the peak 15 minutes before school begins have the potential to increase delays and contribute to the perception of safety problems.

Hours of certain construction activities for the Proposed Project could extend from 7:00 a.m. to 6:00 p.m. (based on noise-level restrictions). Assuming these hours represent the typical construction work day, construction contractor personnel work trips would be outside of the peak a.m. and p.m. travel periods.

The Traffic Study evaluated two construction trip scenarios: (1) all construction personnel arrive and pass through the Maidu Drive/Burlin Way intersection within the morning peak hour, with one-quarter of these trips occurring during the critical 15 minutes before school; and (2) a worst-case representation where all construction arrival trips pass through the Maidu Drive/Burlin Way intersection within the critical 15 minutes before school. Both analysis scenarios also assumed that deliveries of project construction supplies would be spread uniformly throughout the construction day, with four to eight trips occurring during any one hour. The distribution of peak construction-related trips is presented in **Table 3.14-3**.

Table 3.14-3
Project Construction Trip Generation Assumptions

	Time Period						
		a.m. Peak Hour		Afternoon		p.m. Peak Hour	
	Daily [a]	In	Out	In	Out	In	Out
Anticipated Construction Trips	146	54	4	4	4	4	54

[a] Number of trips represents peak construction activity; on average, the total number of daily trips would be less than evaluated.

The results of the LOS evaluations for the critical 15 minutes before school for these two scenarios are shown in **Table 3.14-4**.

Table 3.14-4
Proposed Project - Construction Traffic LOS Evaluation

	a.m. Peak Hour [a]		Afternoon [a]		p.m. Peak Hour	
Maidu Drive Condition	Average Delay (Seconds)	LOS	Average Delay (Seconds)	LOS	Average Delay (Seconds)	LOS
Existing (Non-summer)	21.5	C	10.6	B	n.a.	n.a.
Existing (Non-summer) Plus Proposed Project Construction Traffic	32.9	D	11.3	B	7.9	A
Existing (Non-summer) Plus "Worst Case" Proposed Project Construction Traffic [b]	92.0	F	n.a.	n.a.	8.9	A

[a] Conditions occurring during the peak 15 minutes before or after school, except where "overall hour" is noted.
[b] "Worst Case" would include all overlapping traffic including peak river access use in combination with commuter and school-related traffic.

Under the first scenario, the addition of up to one-quarter of the construction trips during the critical 15 minutes before school begins could result in an additional delay of 11.4 seconds and a reduction of LOS from C to D. Based on application of the City of Auburn LOS standard, this change in LOS would not be considered a significant impact, and would not warrant implementation of mitigation measures. The "worst-case," or second scenario, where all construction trips arrive and pass through the Maidu Drive/Burlin Way intersection during the critical 15 minutes before school, would result in significant traffic impacts. The average delay would increase by up to 70.5 seconds (compared to existing condition) and result in LOS F conditions. This change from the existing condition would represent a significant impact requiring mitigation. The results show that afternoon or evening Proposed Project construction-related trips would not affect existing LOS ratings.

The Proposed Project construction-related travel conditions would result in lesser impacts than either of the two scenarios represented for the following reasons: (1) the majority of the construction contractor personnel would arrive at the project site prior to the 7:00 a.m. start of the work day; and (2) on average, only 30 to 35 construction personnel would travel to the project site, not 50. Additionally, Reclamation will require the construction contractor to limit employee trips and supply deliveries along Maidu Drive during the morning hours before school. Reclamation will require the construction contractor to prepare a Construction Traffic Management Plan including the following element:

Require construction personnel and supply deliveries to limit use of Maidu Drive during the peak school-related travel times, including: morning school drop-off (approximately 7:15 a.m. to 8:15 a.m.) and afternoon school pick-up (2:30 p.m. to 3:30 p.m.) throughout the school year.

Overall, the Proposed Project construction-related traffic would not result in significant impacts upon Maidu Drive traffic conditions.

Proposed Project Operation and Public River Access Traffic

As reported in the Draft EIS/EIR, PCWA anticipates that operations and maintenance personnel will make up to four visits (eight trips) to the project site each day. In addition to these trips, it is estimated that use of the public river access areas would generate up to 206 trips to the project area on a peak day. Combined, the total number of Proposed Project trips would be 214. This estimate is revised from the Draft EIS/EIR assumption of 210 trips based on the reduction in number of spaces at the riverside parking area, described earlier, and on the use of a higher rate of turnover at the 50-car parking lot (2 cars per space on a peak day based on anticipated hours of operation). The trip generation assumptions are shown in **Table 3.14-5.**

Table 3.14-5
Project Operation Trip Generation Assumptions

Condition	Time Period						
	Daily	a.m. Peak Hour		Afternoon		p.m. Peak Hour	
		In	Out	In	Out	In	Out
Anticipated Project Operation Trips	218 [a]	12	12	12	12	12	12

[a] The Traffic Study was completed before the lead agencies revised project trip counts, therefore, the assumption was 218 trips; based on the revised count of 214, however, the evaluation of 218 trips remains conservative.

Peak use of the river access features is anticipated to occur infrequently, typically on weekends or holidays during summer months. Additionally, based on the anticipated hours when vehicular access to the project site would be permitted, river access-related travel would not coincide with peak morning hour commuter and school-related trips. The Traffic Study evaluation of Proposed Project impacts on traffic and LOS at the Maidu Drive/Burlin Way intersection therefore also may be considered a "worst-case" assessment because it assumes up to 24 trips would occur during the peak 15 minutes before school during the morning peak hour. The results of the LOS evaluation are shown in **Table 3.14-6**.

Table 3.14-6
Proposed Project Operations Traffic LOS Evaluation

Maidu Drive Condition	a.m. Peak Hour [a]		Afternoon [a]		p.m. Peak Hour	
	Average Delay (Seconds)	LOS	Average Delay (Seconds)	LOS	Average Delay (Seconds)	LOS
Existing (Non-summer)	21.5	C	10.6	B	n.a.	n.a.
Existing Plus Project Operations and Public River Access Traffic [b]	25.5	D	11.1	B	7.9	A

[a] Conditions occurring during the peak 15 minutes before or after school, except where "overall hour" is noted.
[b] Public river access traffic projected during periods of peak use under the maximum use conditions.

As indicated by the analysis, even if Proposed Project operation and river access trips were to occur during the morning peak 15 minutes before school, the change in average delay and LOS would represent a less-than-significant impact, according to City of Auburn standards. No mitigation would be required. The afternoon and evening peak hour delay and LOS conditions would not be adversely affected. Further, if the 24 trips assumed to occur in the morning peak hour were shifted to the afternoon and evening peak hours, the LOS likely would not change. Even if it did, however, it would not drop below the City's standard of LOS D and would not require mitigation. Overall, the Proposed Project traffic impacts would be less than represented by these results because (1) typical use of the river access area would generate less traffic than assumed for peak holiday and summer weekend use; (2) peak use periods would not coincide with commuter and school-related trips; and (3) river access trips would not occur during the morning peak hour. Additionally, the lead agencies will pay a traffic mitigation fee to the City of Auburn, as required for other development projects that generate additional traffic on City streets.

Spillover Traffic Onto Adjoining Neighborhood Streets

There would be potential for an increase in traffic on neighborhood side streets such as Riverview Drive, Falcons Point, Sacramento Street, and Snowy Owl Way as a result of the increased traffic associated with public access to the area.

The addition of these trips to these roads, which currently have low traffic volumes, would not be considered a significant impact. Additionally, due to the distance from the river and proposed parking areas, it is highly unlikely that river users would choose to park their vehicles along these roads and walk the distance (over one-half mile and steep terrain) to the public river use areas.

Skyridge Elementary School

Skyridge Elementary School is located on Perkins Way, approximately one-tenth of a mile from Maidu Drive/Burlin Way. The entrance to the school site is directly off of Perkins Way. The school campus is setback approximately 300 feet from the roadway and enclosed behind a 6-foot high wooden fence. The school buildings and playground areas are not easily viewed from Perkins Way. The driveway to the school immediately enters the parking area and bus loading/unloading lanes. The buildings are set further back on the property and face the parking area. It is school policy that all visitors to the campus check-in at the front office and obtain a badge to be kept visible while on school premises. Visitors are to check-out and return the badge as they leave the site.

The school year is traditional, with classes in session from late August through mid-June and a four-week summer session that generally runs from mid-June to mid-July. Student enrollment in February 2002 was about 623 students. Students are typically on campus and in class Monday through Friday between 8:00 a.m. and 2:15 p.m. School buses drop-off students at 7:30 a.m. and pick-up students at 2:30 p.m. An adult supervisor and three students provide safety patrol duties at the school entrance for 1/2-hour in the morning before school and 1/2-hour in the afternoon as school is let-out. This service is only provided during the regular school year and not during summer school.

Traffic conditions at the Maidu Drive/Burlin Way intersection during morning peak hours as children are driven to school and people leave their homes to go to work potentially could affect pedestrians. Currently, Skyridge Elementary School does not retain paid or volunteer crossing guards at any intersection in the vicinity of the school. As part of the study conducted for the project, traffic engineers evaluated the extent to which current pedestrian activity at the Maidu Drive/Burlin Way intersection warrants school pedestrian crossing improvements according to CALTRANS Traffic Manual, Chapter 10 guidelines. On-site pedestrian counts were taken during morning school arrival and afternoon school departure hours. These counts indicated approximately 15 pedestrians using the intersection and crossing Maidu Drive in the morning and 10 pedestrians in the afternoon. The CALTRANS Traffic Manual identifies traffic control strategies (i.e., traffic signals, crossing guards, etc.) and provides recommendations for minimum pedestrian and vehicular volumes that would justify each action. In this case, the observed pedestrian volumes are below the minimum thresholds determined to warrant actions such as adult crossing guards (30 pedestrians), warning beacons (40 pedestrians), or traffic signals (70 pedestrians).

Overall, given the relatively secluded location of the school and the limited access, it is unlikely that recreation users traveling along Maidu Drive would notice the presence of the school. Additionally, there are no signs posted near the intersection of Maidu Drive and Burlin Way that indicate the location of the school.

Daily school hours and operations do not coincide with anticipated periods of peak use of the river access facilities. During the week, most river users would access the recreation facilities in the late afternoon or evening and would not interfere with school ingress and egress times. As stated previously, it is expected that peak use of the river access facilities would occur on weekends and holidays during the summer months when the school is not in operation or only open in a limited capacity. The Upstream Diversion Alternative would not result in increased public river access traffic. The impact would also be less than significant.

Cumulative Impacts

Near-term and future residential development in the study area would increase the volume of traffic on Maidu Drive and through the Maidu Drive/Burlin Way intersection. Future cumulative background traffic volumes at the study intersection were developed based on a list of approved/pending projects identified by the City of Auburn.

The City is currently considering the Canyon Rim Estates Subdivision Project in the area south of Maidu Drive. This 23-unit project would have access via Burlin Way and would generate about 17 a.m. and 23 p.m. peak hour trips. The traffic study prepared for the Canyon Rim Project identified other in-fill development that would occur at Shirland Tract Road. Some of the trips generated by that development would use the Maidu Drive/Burlin Way intersection to reach Skyridge Elementary School.

The cumulative level of service analysis assumes completion of the Proposed Project and peak use of the public river access facilities plus development of residential subdivisions in the Maidu/Skyridge area. This evaluation represents a "worst case" cumulative condition because it assumes concurrent use of the intersection by commuters, parents with elementary school students and recreationists. However, the public river access facilities are unlikely to be fully utilized except during the summer or on weekends, generally outside of peak commuter or school travel hours. Therefore, for this condition, the actual future roadway LOS impact would be less than represented by this evaluation. The results of the cumulative LOS analysis are shown in **Table 3.14-7**.

Table 3.14-7
Cumulative Condition Traffic LOS Evaluation

Maidu Drive Condition	a.m. Peak Hour [a]		Afternoon [a]		p.m. Peak Hour	
	Average Delay (Seconds)	LOS	Average Delay (Seconds)	LOS	Average Delay (Seconds)	LOS
Existing (Non-summer)	21.5	C	10.6	B		
Cumulative Background Conditions	39.0	E	11.7	B	7.7	A
Cumulative Plus Proposed Project Traffic [b]	42.7	E	12.3	B	8.0	A
Cumulative Plus Proposed Project Traffic - Overall Hour [b]	18.4	C	n.a		n.a.	n.a.

[a] Conditions occurring during the peak 15 minutes before or after school, except where "overall hour" is noted.
[b] "Worst Case" assumes all traffic trips occur concurrently including peak river access use and project operations trips in combination with commuter and school-related traffic arising from the future proposed subdivisions.

Cumulative conditions without the Proposed Project would result in increased delay and lower LOS ratings during the morning peak 15 minutes before school. LOS potentially would drop to a rating of E with an increase in average delay of 17.5 seconds. Future development projects within the city are required to pay traffic mitigation fees applied toward the implementation of traffic safety and control measures to minimize effects upon LOS. In fact, the city is planning to install a traffic signal at the intersection of Auburn-Folsom Road/Maidu Drive later this year. Operation of this signal potentially would result in a better LOS than estimated by this analysis for future conditions.

The addition of Proposed Project traffic to the cumulative background condition increases the average delay during the morning peak 15 minutes before school by up to 3.7 seconds, but does not cause the estimated LOS to worsen. Because it is unlikely for the cumulative trips to be concentrated solely within this 15-minute period, consideration of the cumulative "overall hour" LOS also is presented. The overall hour average delay increases by up to 3.6 seconds and the

LOS rating would change from the existing LOS B to LOS C. This overall rating would not be considered a significant impact, based on City of Auburn standards.

Additionally, because the river access area would not be open for vehicular access during this hour (7:15 a.m. to 8:15 a.m.), the potential contribution of the Proposed Project to the cumulative condition would be less than represented by these results. The Proposed Project's incremental contribution to these conditions would not be considered cumulatively considerable.

Afternoon and evening periods would not be adversely affected under the cumulative condition.

3.14.2.5 Environmental Protection and Mitigation Measures

The Mitigation Plan (Appendix D to the Final EIS/EIR) includes several measures designed to avoid and minimize potential traffic-related impacts of project construction and operation. These measures are presented below.

Develop and Implement a Construction Traffic Management Plan (Traffic Plan)

Commitment:	Prepare and implement a Traffic Plan to promote efficient and safe access to the Project site and reduce Project traffic impacts on local roadways. Ensure coordination with local emergency service providers to avoid impacts on emergency access.
Responsible Parties:	Reclamation/Construction Contractor
Location:	Project area/adjacent roadways
Timing:	Prior to and throughout all phases of construction
Monitoring Type:	On-Site Monitor regularly determine compliance with plan
Reporting Requirements:	No specific reporting requirement

Description of Activities:
Reclamation will require the Construction Contractor to prepare a Traffic Plan. The Traffic Plan shall include the following elements:

- ❑ Identify the ability of access routes to accommodate anticipated level of construction vehicle and truck traffic. Factors would include road width, surface conditions, and vertical clearance.
- ❑ Require construction personnel and supply deliveries to limit use of Maidu Drive during the peak school-related travel times, including: morning school drop-off (approximately 7:15 a.m. to 8:15 a.m.) and afternoon school pick-up (2:30 p.m. to 3:30 p.m.) throughout the school year.
- ❑ Identify and secure easements necessary for roads and staging areas, including consideration of improvement and maintenance costs, construction traffic signs, restoration activities, and damage provisions, as applicable.

- Encourage Construction Contractor to have construction personnel carpool and/or provide vanpool or bus transport during peak work periods to minimize fuel consumption and reduce total number of vehicle trips.

- Ensure the safety of all people (local residents) potentially affected by construction traffic by making them aware of construction activities. Affected residents would be informed about the expected changes in traffic levels, and reasonable accommodations to help ensure safety (e.g., temporary fencing and slower construction speed limits may be appropriate).

- Coordinate with the City of Auburn to determine the location and timing of other construction activities. The coordination and planning will determine that sufficient public notice and roadway hazard warning systems (signage/detours) are in place for the entire construction period.

- Provide notification to local emergency service providers (police, sheriff, fire, ambulance services) on a regular basis regarding the timing, location, and duration of construction activities.

Success Criteria:
Traffic Plan implementation minimizes potential congestion or other safety concerns in study area.

Provide Information Regarding New Public River Access

Commitment:	Provide local residents and anticipated recreation user groups with information that will inform interested parties of changes in use at the Project area. Promote courteous use of Project area.
Responsible Parties:	Reclamation/CDPR
Location:	Project study area/City of Auburn – local neighborhood
Timing:	Prior to and during operation of public river access features
Monitoring:	No specific monitoring requirements
Reporting Requirements:	No specific reporting requirements

Description of Activities:
Reclamation will require CDPR to implement a Public Information Program prior to opening the river access sites for public use which will include distribution of materials that detail the location, access routes, capacity and hours of operation. Distribute to local residents and recreation organizations.

CDPR will limit the hours of operation of the public river access features. Generally, hours of operation will correspond to upstream river flow releases that provide suitable boating flow through the Project area. Vehicular access outside of these hours will not be permitted and will be prevented by the locked entrance gate. CDPR staff will ensure that the parking area and access roads are clear of vehicles prior to gate closure.

CDPR will not permit overnight parking or camping within the area. CDPR, if needed, will post signs along Auburn-Folsom Road on either side of the Maidu Drive intersection to indicate whether the river access parking lot is full as a means of minimizing unnecessary traffic travel along Maidu Drive.

PCWA will pay the City of Auburn a traffic impact mitigation fee commensurate with those collected from a residential development generating the same level of traffic. These fees will be applied to traffic control strategies deemed appropriate and necessary by the City of Auburn.

Success Criteria:
Through the management agreement for Auburn SRA, Reclamation will require CDPR to document completion of all activities. PCWA to record payment of mitigation fees to City of Auburn.

3.15 AIR QUALITY

3.15.1 AFFECTED ENVIRONMENT

3.15.1.1 Regional Setting

The project area is located in the Sacramento Valley Air Basin (SVAB) within the northern portion of the Central Valley. Weather patterns throughout the SVAB are affected by the topography of the area, which is characterized by the broad Central Valley floor with the Tehachapi Mountains in the south, the Cascade Range in the north, the Sierra Nevada Mountains in the east, and the Coast Range in the west. These mountains act as air current barriers, preventing dissipation of air pollutants outside of the valley and buffering the SVAB from marine weather systems originating over the Pacific Ocean. Nonetheless, the SVAB is noticeably affected by marine influences with moderate climate extremes (Sacramento County 1993).

Air Quality Regulating Agencies

Air quality within California is regulated by the California Air Resources Board (CARB) through local Air Pollution Control Districts (APCD) and Air Quality Management Districts (AQMD). The project area is located primarily in Placer County, however, lands east of the American River lie within El Dorado County. The Placer County and El Dorado County APCDs are responsible for maintaining and improving air quality throughout Placer and El Dorado counties. They also work cooperatively with the Sacramento Metropolitan AQMD, and the Yolo-Solano APCD to alleviate air quality problems in the SVAB.

Air Pollutants of Concern

Sulfur dioxide, nitrogen dioxide, and carbon monoxide levels within the SVAB are within acceptable ranges, as defined by state and federal air quality standards. Ozone and particulate matter up to 10 microns in size (PM_{10}) are the focus of this analysis as the area is designated non-attainment for these pollutants.

Ozone is the most significant air quality problem in the SVAB (Sacramento County 1993). Ozone is produced in the atmosphere by a series of photochemical reactions involving its precursors, nitrogen oxides (NO_X) and reactive organic gases (ROG). High temperatures, low wind speed, shallow air mixing, wind patterns that fail to disperse ozone precursors, and little or no cloud cover contribute to the formation of ozone. Once formed, ozone can be dispersed and becomes a regional, rather than a local, air pollution problem. Because of wind patterns, regional ozone concentrations are highest in northern Sacramento County and southwestern Placer County. Ozone is a strong irritant that can constrict the airways, forcing the respiratory system to work harder to provide oxygen. When inhaled, ground-level ozone concentrations can potentially irritate the respiratory system, reduce lung function and aggravate asthma.

Particulate matter is produced by a variety of sources within the SVAB, including activities that result in the creation of fugitive dust (e.g., earth-moving during construction and the entrainment of dust in the air by motor vehicles) and the burning of fossil fuels. Particulate matter can produce haze, reduce visibility, and result in respiratory irritation. A series of scientific studies has linked particulate matter, especially fine particles, with a variety of significant health problems such as: (1) aggravated asthma, heart, or lung disease; (2) acute respiratory symptoms, including severe chest pain, gasping, and aggravated coughing; (3) decreased lung function which can be experienced as shortness of breath.

The largest single source of air pollutants within the SVAB is automobile exhaust. However, agriculture and construction (especially for PM_{10}) also contribute to air pollution in the area (Sacramento County 1993).

3.15.1.2 Project Area Setting

Air Pollutants of Concern

Placer and El Dorado counties currently exceed the state and federal standards for ozone and state standards for PM_{10}. While there are no existing state standards for $PM_{2.5}$ emissions, monitoring has not been done within either county to ascertain whether the federal standard has been exceeded. The air pollutants of greatest concern in the project area and evaluated in the impact analysis include the ozone precursors NO_X and ROG, and PM_{10}.

Air Quality Monitoring

Ozone, particulate matter, and other air pollutants are monitored for compliance with state and federal standards at stations in the cities of Auburn and Rocklin in Placer County. Ozone levels also are monitored at a station in Cool in El Dorado County. The monitoring station in Auburn records gaseous data, the station in Rocklin monitors both gaseous and particulate pollutants, and the station in Cool monitors only ozone. The 1995 through 1999 reported air pollutant exceedances of state and federal standards for the Auburn, Rocklin and Cool stations are provided in **Table 3.15-1**.

Sensitive Receptors

The air quality impact analysis focuses on the potential effects of construction and operation upon sensitive receptors within the project study area. A sensitive receptor distance of one-half mile is used, although both the Placer County and El Dorado County APCDs suggest an approximately one-quarter mile distance for identification of sensitive receptors for air pollutant emissions. Several sensitive receptors exist within the one-half mile range within Placer County; however, none were identified within the El Dorado County portion of the study area. Therefore, the focus of the analysis is within Placer County.

Sensitive receptors in the project vicinity include residents, recreationists, and one school. Skyridge Elementary School is located on Perkins Way, approximately three-quarters of one mile from the project area. This school has an enrollment of approximately 730 children, ranging in age from 5 to 12 years. Residences on Maidu Drive, Pacific Avenue, Robie Drive,

Table 3.15-1
Air Pollutant Data Summary for Auburn, Cool and Rocklin
(1995 - 1999)

Pollutant	1995			1996			1997			1998			1999		
	Auburn	Cool	Rocklin	Auburn	Cool	Rocklin	Auburn	Cool	Rocklin	Auburn	Cool	Rocklin	Auburn	Cool	Rocklin
Ozone															
Highest 1-hour parts per million (ppm)	0.15	--	0.15	0.13	0.14	0.13	0.11	0.15	0.11	0.14	0.16	0.14	0.14	--	0.13
Number of days 1-hour concentration >0.09 ppm [a]	26	--	25	22	35	30	4	12	9	15	30	16	24	--	17
Number of days 1-hour concentration >0.12 ppm [b]	2	--	3	1	2	1	0	1	0	5	5	3	2	--	3
Number of days 1-hour concentration >0.15 ppm [c]	2	--	1	0	--	0	0	--	0	0	--	0	0	--	0
Particulate Matter															
Highest 24-hour ppm	50	--	55	--	--	34	54	--	43	--	--	70	--	--	75
Number of days 1-hour concentration >50 $\mu g/m^3$	0	--	0	--	--	0	0	--	0	--	--	0	--	--	0
Number of days 1-hour concentration >150 $\mu g/m^3$ [b]	0	--	0	--	--	0	0	--	0	--	--	0	--	--	0

[a] State Standard
[b] Federal Standard
[c] Defined as a Health Advisory Episode Level in the California Air Pollution Emergency Plan
Notes: > = greater than, ppm = parts per million, $\mu g/m^3$ = micrograms per cubic meter, -- = data not available
Source: CARB, Summary of Air Quality Data 1996 - 2000; D. Oda, pers. comm. 2000

Placerado Avenue, and Marina Avenue, as well as smaller roads branching off of those streets, are within a one-half mile radius of the project study area with the nearest home located less than one-half mile from the project site. Portions of the Western States Trail and Auburn-to-Cool Trail pass through the project area.

Seasonal Pump Station Construction and Operation

Current installation and removal of the seasonal pump station generates ROG, NOx, and PM_{10} through construction activities and use of construction equipment. Typically, the equipment used includes a backhoe, a loader, two cranes, and one truck. The equipment is used approximately 20 hours a week for a four to eight-week period for installation and a four-week period for removal. During installation and removal, approximately 17 pounds of ROG, 173 pounds of NO_X, and 19 pounds of PM_{10} are generated weekly. In one quarter (three months), pollutant generation could be approximately 136 pounds of ROG, 1,384 pounds of NO_X, and 153 pounds of PM_{10}.

In years with significant flood events (as in 1997), seasonal pump station installation requires additional construction activities such as rebuilding the pipeline bed, repairing the pump station pad, and re-stabilizing access roads. In these years the increased use of construction vehicles result in higher generation of air pollutants.

During the diversion season, one daily site inspection of the project site is made. In one quarter, 60 trips would occur resulting in the emission of 25 pounds of NO_X, 34 pounds of ROG, and 2 pounds of PM_{10}.

3.15.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.15.2.1 Methodology

Effects on air quality within the project area were evaluated by comparing expected changes in pollutant emissions that would result from each of the alternatives and considering whether these changes could violate state or federal ambient air quality standards. These efforts included contact with CARB, and the Placer and El Dorado county APCDs to identify key air quality issues associated with construction and operation of the Proposed Project and alternatives.

The construction emission assessments were conducted using the Placer County APCD construction estimation worksheets to determine the relationship of construction activities, including site grading, to the APCD's short-term construction significance criteria. The extent of construction activities was based on review of preliminary design documentation (MW et al. 1998). At the time of the assessment, El Dorado County APCD indicated that use of the Placer County worksheets would provide adequate evaluation of potential construction emissions. Potential construction-generated emissions of ozone precursors NO_x and ROG and PM_{10} were projected for each alternative.

The assessment of project operation-related air pollutant emissions was performed using the recently released El Dorado County APCD Guide to Air Quality Assessment. The Placer

County APCD indicated that use of this manual would satisfy their needs for the project assessment. The evaluation of potential air quality emission impacts uses peak operations trips for each alternative, and is therefore considered a conservative estimation.

3.15.2.2 Applicable Laws, Ordinances, Regulations, and Standards

Air quality in California is subject to both federal and state clean air legislation. The federal Clean Air Act of 1977, as amended, authorizes the U.S. Environmental Protection Agency (EPA) to establish federal air quality standards to protect public health. The California Clean Air Act of 1989 establishes state air quality standards, which for the most part, are more stringent than federal standards. Federal and state ambient air quality standards for ozone and particulate matter are presented in **Table 3.15-2**.

Table 3.15-2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standards	State Standards
Ozone (O_3)[a]	1-hour 8-hour	0.12 ppm 150 µg/m	0.09 ppm 50 µg/m
Particulate Matter (PM_{10})[b]	1-hour annual	N/A 50 µg/m	0.25 ppm 30 µg/m
Particulate Matter ($PM_{2.5}$)	24-hour annual	65 µg/m 15 µg/m	No Separate State Standard

Notes: The national PM_{10} and $PM_{2.5}$ annual average standards are based upon the arithmetic mean fall measurements; ppm = parts per million; µg/m^3 = micrograms per cubic meter;
Source: CARB 1995

[a] Federal ozone standards before 1997 mandated that the 3-year average of the fourth-highest daily maximum 8-hour average of continuous ambient air monitoring data over each year must not exceed 0.08 ppm. This standard has been revised (July 1997) and now requires that the daily maximum 1-hour average concentration measured by a continuous ambient air monitor must not exceed 0.12 ppm more than once per year, averaged over 3 consecutive years (EPA 2002).

[b] Federal standards for particulate matter up to 10 microns (PM_{10}) before 1997 mandated that the 99th percentile of the distribution of the 24-hour concentrations for a period of 1 year, averaged over 3 years, must not exceed 150 µg/m^3 at each monitor within an area. This standard has been revised (July 1997) and now requires that the concentration of samples taken for 24-hour periods at each monitor within an area must not exceed 150 µg/m^3 more than once per year, averaged over 3 years (EPA 2002).

Ambient air quality standards establish maximum allowable levels of air pollutants. For example, the state standards for ozone are: concentrations averaged over one hour cannot be greater than 0.09 ppm, and concentrations averaged over eight hours cannot exceed 50 µg/m^3.

Placer and El Dorado County Air Pollution Control Districts

Due to the location of the project site in both Placer and El Dorado counties, the project alternatives are subject to the Placer and El Dorado County APCD rules. These rules include:

- The Placer County APCD Short-Term Construction Significance Threshold which defines pollutant emission thresholds and describes measures to reduce pollutant emissions;

- The El Dorado County APCD Fugitive Dust Regulation which prohibits the transport, handling, or storage of fine matter without necessary precautions and identifies precautions to reduce particulate matter generation; and
- The El Dorado County APCD New Source Review Rule which defines thresholds of air pollutant emissions and implementation measures to reduce air pollutant emissions.
- The El Dorado County APCD Ordinance Number 4548, Naturally Occurring Asbestos and Dust Protection Ordinance

Additionally, the El Dorado County APCD requested consideration of the following CARB control measure:

- CARB Asbestos Air Toxics Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations

3.15.2.3 Impact Indicators and Significance Criteria

Table 3.15-3 presents the impact indicators and significance criteria used in the air quality impact analysis.

Table 3.15-3
Air Quality Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
Pounds of ozone precursors (NO_x and ROG) generated by construction equipment and vehicles.	Emit more than 7,500 pounds per quarter of ozone precursors (NO_x and ROG). [a]
Pounds of PM_{10} generated by construction equipment and vehicles.	Emit more than 7,500 pounds per quarter of PM_{10}. [a]
Pounds of ozone precursors (NO_x and ROG) generated by project operation trips.	Emit more than 82 lbs/day of ozone precursors (NO_x and ROG).[b]
Pounds of PM_{10} generated by project operation trips.	Emit more than 275 lbs/day of PM_{10}.
Exposure of sensitive receptors to air pollutants.	Expose sensitive receptors to significant amounts of air pollutants, as defined by the above thresholds.

[a] Placer County APCD Short-Term Construction Significance Threshold
[b] El Dorado County APCD Guide to Air Quality Assessment, February 2002

3.15.2.4 Impact Analysis

This section presents the analysis of potential facilities-related air quality impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

Facilities-Related Impacts

No Action/No Project Alternative

Under the No Action/No Project Alternative, the ozone precursors and particulate matter generated during installation and removal and maintenance trips of the seasonal pump station would not be expected to change from the existing condition. Therefore, no air quality impacts would result from this alternative, relative to the existing condition.

Proposed Project

Impact 3.15-1: Increased ozone precursor concentrations associated with construction and operation of the Proposed Project.

Construction

Construction vehicles and equipment, and construction employee commute vehicles could emit exhaust at the construction site, thereby contributing to ozone precursor emissions in the region. These emissions vary depending on the equipment type, duration of use, and number of trips. Estimates of construction-generated ROG and NO_x were prepared to assess the potential for the project to exceed local APCD's quarterly emission thresholds. **Table 3.15-4** presents the construction equipment estimated to be used each quarter, the number of hours of operation, and estimated ozone precursor emissions for the Proposed Project.

Table 3.15-4
Estimated Quarterly ROG and NO_x Emissions During Construction of the Proposed Project

Equipment Type	Hours Operating Per Quarter	ROG Emission Factor (pounds/hour)	ROG Emitted Per Quarter (pounds)	NO_x Emission Factor (pounds/hour)	NO_x Emitted Per Quarter (pounds)
Scraper	2,495	0.282	703.59	3.840	9,580.80
Motor Grader (Diesel)	500	0.040	20.00	0.713	356.50
Wheeled Loader	320	0.250	80.00	1.890	604.80
Off-Highway Truck	2,740	0.192	526.08	4.166	11,414.84
Roller	240	0.067	16.08	0.862	206.88
Miscellaneous (Gas)	1,680	0.560	940.80	0.412	692.16
Miscellaneous (Diesel)*	2,280	0.152	346.56	1.691	3,855.48
Total Quarterly Emissions			**2,633.11**		**26,711.46**

* Includes pavers, excavators, compactors, and dozers.
Source: M. Matson, pers. comm. 1998

Based on the estimates presented in Table 3.15-4, up to approximately 2,633 pounds of ROG would be emitted quarterly over the course of project construction. This level is below the 7,500 pound per quarter emission threshold and is therefore considered a less-than-significant impact.

Emissions of NOx, estimated at up to approximately 26,711 pounds per quarter (Table 3.15-4), substantially would exceed the 7,500 pounds per quarter emission threshold. Project construction would therefore potentially result in a significant air quality impact. In instances such as this, the Placer County APCD requires that project proponents implement all feasible emission-control and reduction measures as is practicable. The emission-reduction measures, suggested by Placer County APCD, and incorporated into the Mitigation Plan for the Proposed Project (Appendix D to the Final EIS/EIR) are identified in Section 3.15.2.5, Environmental Protection and Mitigation Measures.

The construction activity management techniques identified in the Mitigation Plan would be implemented to help reduce ozone precursor emissions toward compliance with the 7,500 pounds per quarter-year emission threshold for NO_x. The construction contractor will coordinate weekly construction activities and the number and timing of construction equipment used within the 7,500 pounds per quarter-year emission threshold. Through the weekly emission monitoring, construction contractors could keep a running quarterly total of construction ozone precursor emissions and schedule construction equipment use as necessary to comply with the ozone precursor emission threshold. The lead agencies would coordinate with the Placer County and El Dorado County APCDs to develop a monitoring and reporting program determined suitable for the alternative selected.

In addition to the emission-reduction measures included in the Mitigation Plan, Best Available Control Technology (BACT) for diesel-fueled construction equipment would be implemented where feasible (D. Vintze, pers. comm. 1998). The strategies include injection timing retard of two degrees, installation of high-pressure injectors, and the use of reformulated diesel fuel, and would be implemented as a package on each piece of equipment needing to be modified to reduce construction emissions. (Contracts would specify this type of requirement or consideration would be given to firms that have already modified their equipment.)

Proper application of these measures significantly reduces emissions (approximately 50 percent NO_x reduction, 15 percent ROG reduction) while improving overall performance of the modified equipment. However, it requires moderate adjustments to the affected equipment by a knowledgeable diesel mechanic. Due to the nature and expense of these modifications, it is recommended that the number and type of equipment requiring this modification be based on the overall projected level of construction emissions (D. Vintze, pers. comm. 1998).

Implementation of all feasible emission-control and reduction measures would minimize construction emission impacts to less than significant for ROG. NOx emissions would be substantially reduced by implementation of all feasible emission-reduction and construction management techniques. However, due to uncertainties regarding the ability of these measures to reduce NOx emissions below the quarterly emissions threshold, there may be exceedances at some time during construction. Although temporary, this impact would be significant and unavoidable.

Operation

Operation of the Proposed Project includes public trips to the river access areas plus PCWA personnel's daily operations and maintenance visits to the site. The proposed public river access features would generate a relatively limited level of activity within the project area, when compared to other river access areas within the Auburn SRA. However, in response to public comments regarding river access feature design, the lead agencies and CDPR reduced the total number of parking spaces that would be provided in the project area (from 70 to 53) by reducing the riverside parking lot (formerly 20 spaces) to provide only a turnaround area and 3 handicap accessible spaces. Please see Master Response 3.1.6, Public River Access Features for additional description.

Additionally, project-related vehicular air emission estimates for pollutants of concern were re-evaluated using updated methodologies recommended and provided by the Placer County and El Dorado County APCDs. The assessment of project-related trips and air quality emissions is based on the combined total level of travel on a peak river access use day. On a peak day, the lead agencies and CDPR estimate that the 50-space parking lot would fill twice (3 handicap spaces once), resulting in a total of 206 trips (trip is one-way travel). Additionally, PCWA personnel would make up to 8 operations and maintenance trips (4 site visits) per day. The total peak day travel to the site would be 214 trips. This value was used to re-assess vehicular air emissions for a peak, or "worst-case" condition. The El Dorado County APCD threshold of significance for ROG and NO_x emissions is 82 pounds per day (lb/day); Placer County's threshold is 85 lb/day. El Dorado County APCD evaluates PM_{10} emissions on the likelihood such emissions would cause or contribute significantly to a violation of the applicable state or national ambient air quality standards. Placer County uses a threshold of 275 lb/day. The results for ROG, NO_x and PM_{10} emission assessment are displayed in **Table 3.15-5**.

Table 3.15-5
Estimated Daily Air Emissions for 2005, 2010 and 2015
Associated With Peak Public River Access Trips [a]
to the American River Near Auburn

	Air Pollutant (pounds per day)		
Analysis Year	**ROG**	**NOx**	**PM_{10}**
2005	5.5	4.13	0.25
2010	3.42	2.41	0.241
2015	2.2	1.43	0.254

Source: El Dorado County APCD - CEQA Guide, First Edition, February 2002
[a] The 214 trips are determined by adding the 8 daily project operations trips to the peak 206 river access trips.

As indicated by the results, ROG and NO_x emissions would be well below the more restrictive El Dorado County APCD 82 lbs/day significance threshold for all years evaluated. The estimated peak day or "worst-case" PM_{10} emission levels also would be quite low, well below the Placer County threshold, and would not result in or contribute significantly to a violation of applicable air quality standards. Generally, because peak travel conditions would only occur on a limited number of days of the year, the expected daily project-related air pollutant emissions would be less than indicated by these results.

PCWA personnel would make up to four daily trips to the site to conduct operations and maintenance activities. On a quarterly basis, these vehicle trips would generate approximately 135 pounds of ROG and 100 pounds of NO_x. Based on the emissions thresholds, these emissions would result in a less-than-significant air quality impact.

Impact 3.15-2: Increased PM_{10} emissions associated with construction and operation of the Proposed Project.

<u>Construction</u>

Construction of the Proposed Project would involve earth-moving activities, which would generate fugitive dust and increase PM_{10} concentrations. The extent of fugitive dust generation would depend on the type and duration of construction activities, as well as wind conditions. **Table 3.15-6** provides an estimate of PM_{10} that would be generated by construction equipment under the Mid-Channel Alternative.

As illustrated in Table 3.15-6, construction activities (not including blasting) would generate approximately 2,118 pounds of PM_{10} per quarter. Blasting activities and other earth-moving activities also would increase fugitive dust generation, but such emissions would be limited and intermittent based on specific construction activity. Most blasting would be necessary to fracture rock for pump station and pipeline construction. Blasting would occur up to three times daily over a four- to five-month period, depending on excavation conditions. Because blasting would occur on a limited basis, it would not be expected to contribute substantial amounts of PM_{10} or contribute significantly to a PM_{10} threshold violation (D. Vintze, pers. comm. 1998).

Table 3.15-6
Estimated Quarterly PM_{10} Emissions During Construction of the Proposed Project

Equipment Type	Hours Operating Per Quarter	PM_{10} Emission Factor (pounds/hour)	PM_{10} Emitted Per Quarter (pounds)
Scraper	2,495	0.406	1,012.97
Motor Grader (Diesel)	500	0.061	30.50
Wheeled Loader	320	0.172	55.04
Off-Highway Truck	2,740	0.256	701.44
Roller	240	0.050	12.00
Miscellaneous (Gas)	1,680	0.026	43.68
Miscellaneous (Diesel)*	2,280	0.139	316.92
Total Estimated Quarterly Emissions			**2,117.51**

* Includes pavers, excavators, compactors, and dozers.
Source: M. Matson, pers. comm. 1998

To further reduce PM_{10} emissions, measures, recommended by the Placer County APCD, have been incorporated into the Proposed Project construction management plan (see Section 3.15.2.5, Environmental Protection and Mitigation Measures).

Additional construction activity management techniques would be implemented to reduce emissions if monitoring indicates a need for additional emission suppression. Measures, to be coordinated with Placer County and El Dorado County APCDs, include: reducing the number of pieces used simultaneously; increasing distance between emission sources; reducing or changing hours of construction; and scheduling activities during off-peak hours, if needed.

The construction contractor would provide documentation of mitigation compliance with the air pollution control measures that the Placer County and/or El Dorado County APCDs determine appropriate to apply to the selected alternative. The specific construction management techniques selected to reduce the level of emissions would be determined based on specific construction activity, equipment, and through consultation with the APCDs. These measures would be sufficient to minimize PM_{10} emissions to levels considered less than significant.

Operation

Please refer to discussion of Proposed Project operations PM_{10} emissions under Impact 3.15-1.

Impact 3.15-3: Exposure of sensitive receptors to significant amounts of air pollutants.

With the exception of NOx emissions generated during construction, Proposed Project construction and operation air pollutant emissions would remain below the local APCD's significance thresholds. See discussion under Impacts 3.15-1 and 3.15-2.

The short-term but potentially significant NOx emissions due to project construction would be substantially reduced through implementation of environmental protection measures. Sensitive receptors in the study area would not be exposed to air pollutant emissions that exceed the significance thresholds. Therefore, this impact would be considered less than significant.

Upstream Diversion Alternative

Impact 3.15-4: Increased ozone precursor concentrations associated with construction and operation of the Upstream Diversion Alternative.

Construction

Table 3.15-7 presents the equipment anticipated to be used each quarter, the number of hours of operation, and the estimated ozone precursor emissions for construction of the Upstream Diversion Alternative.

Based on the calculations presented in Table 3.15-7, approximately 892 pounds of ROG and 6,122 pounds of NO_X would be generated quarterly during project construction. These anticipated ozone precursor emission levels do not exceed the 7,500 pounds per quarter emission standard of the Placer and El Dorado County APCDs. Therefore, construction-related ozone precursor generation would be a less-than-significant impact for the Upstream Diversion Alternative.

Table 3.15-7
Estimated Quarterly ROG and NO_x Emissions During Construction of the Upstream Diversion Alternative

Equipment Type	Hours Operating Per Quarter	ROG Emission Factor (pounds/ hour)	ROG Emitted Per Quarter (pounds)	NO_x Emission Factor (pounds/hour)	NO_x Emitted Per Quarter (pounds)
Scraper	840	0.282	236.88	3.840	3225.60
Motor Grader (Diesel)	240	0.040	9.60	0.713	171.12
Wheeled Loader	80	0.250	20.0	1.890	151.20
Off-Highway Truck	144	0.192	27.65	4.166	599.90
Roller	240	0.067	16.08	0.862	206.88
Miscellaneous (Gas)	808	0.560	452.48	0.412	332.90
Miscellaneous (Diesel)[a]	848	0.152	128.90	1.691	1433.97
Total Estimated Quarterly Emissions			**891.59**		**6,121.7**

[a] Includes pavers, excavators, compactors, and dozers.
Source: M. Matson, pers. comm. 1998

<u>*Operation*</u>

Upstream Diversion Alternative operations and maintenance activities would generate substantially fewer trips than the Proposed Project; therefore, impacts would be less than estimated for the Proposed Project. Overall, no potentially significant impacts to air quality would be expected to result during pump station project operation or maintenance under the Upstream Diversion Alternative.

Impact 3.15-5: Increased PM_{10} emissions associated with construction and operation of the Upstream Diversion Alternative.

<u>*Construction*</u>

Table 3.15-8 provides an estimate of PM_{10} that would be generated by construction equipment under the Upstream Diversion Alternative. As shown in the table, construction activities (not including blasting) would generate approximately 557 pounds of PM_{10} per quarter. Blasting associated with pump station and pipeline placement would be as described for the Proposed Project (see Impact 3.15-2).

Table 3.15-8 Estimated Quarterly PM_{10} Emissions During Construction of the Upstream Diversion Alternative			
Equipment Type	**Hours Operating Per Quarter**	**PM_{10} Emission Factor (pounds/hour)**	**PM_{10} Emitted Per Quarter (pounds)**
Scraper	840	0.406	341.04
Motor Grader (Diesel)	240	0.061	14.64
Wheeled Loader	80	0.172	13.76
Off-Highway Truck	144	0.256	36.86
Roller	240	0.050	12.00
Miscellaneous (Gas)	808	0.026	21.01
Miscellaneous (Diesel)*	848	0.139	117.87
Total Estimated Quarterly Emissions			**557.18**
* Includes pavers, excavators, compactors, and dozers. Source: M. Matson, pers. comm. 1998			

Operation

As discussed under Impact 3.15-1, no potentially significant impacts to air quality would be expected to result during pump station operation or maintenance.

Impact 3.15-6: Exposure of sensitive receptors to significant amounts of air pollutants.

Emissions generated during construction and operation of the Upstream Diversion Alternative would not violate the APCD significance thresholds (see discussion under Impacts 3.15-4 and 3.15-5). Therefore, the alternative would not expose sensitive receptors in the project study area to significant amounts of air pollutants and the impact would be less than significant.

Cumulative Impacts

All local projects could affect air quality during the construction and/or operation phases (grading and excavation operations, use of gasoline and diesel-powered equipment, increase in traffic). Like the Proposed Project, local projects may exceed Placer County APCD's significance thresholds for PM_{10} and ozone precursors during the construction phase. Each project would be expected to incorporate all feasible mitigation measures recommended by Placer County APCD in proportion to the severity of the impact to reduce project-specific construction effects. Although the Proposed Project would implement all feasible measures for NO_x emissions, short-term exceedances of the quarterly emission threshold may occur and would be considered significant. In the event that other construction projects are unable to fully mitigate NO_x emissions, then significant cumulative impacts would result on air quality. The Proposed Project would result in a considerable contribution to this impact.

3.15.2.5 Environmental Protection and Mitigation Measures

Measures to reduce or minimize construction air quality effects have been incorporated into the Mitigation Plan (Appendix D to the Final EIS/EIR) and would be included in the selected alternative's construction plans and specifications. These measures include those to reduce ozone precursor and particulate matter impacts and are listed below.

Minimize Ozone Precursor Emissions During Project Construction

Commitment:	Implement air emission control measures to reduce amount of ozone precursors, ROG and NO_x, emissions during construction.
Responsible Parties:	Reclamation/Construction Contractor
Location:	Project area
Timing:	During all phases of construction (2002 through 2004)
Monitoring:	Inspect Project area construction activities and indicate compliance with Placer County and El Dorado County APCD requirements. APCD representatives may inspect Project site to ensure compliance with measures.
Reporting Requirements:	Construction compliance reports/daily inspector reports

Description of Activities:
Reclamation will ensure that the Construction Contractor implements the following emission-reduction measures to minimize ozone precursor concentrations:

- Use low emission mobile construction equipment allowed for use in Placer and El Dorado counties.
- Maintain stationary and mobile construction equipment engines by keeping them tuned and in proper running order.
- Use only diesel fuel allowed for use by California State Fuel Standards.
- Use low emission on-site stationary equipment.
- Use only fuel allowed for use by California State Fuel Standards for stationary construction equipment.
- Utilize existing power sources (e.g., power poles) or clean fuel generators rather than temporary power generators.
- Actively coordinate with Placer County and El Dorado County APCDs during construction.

Additionally, where feasible, implement emission control strategies that are considered Best Available Control Technology for diesel-fueled construction equipment.

Success Criteria:	Document compliance with requirements. Record APCD inspection dates and results.

Minimize PM_{10} Emissions During Project Construction

Commitment:	Implement air emission control measures to reduce level of PM_{10} emissions during construction.
Responsible Parties:	Reclamation/Construction Contractor
Location:	Project area
Timing:	During all phases of construction (2002 through 2004)
Monitoring:	Inspect Project area construction activities and indicate compliance with Placer County and El Dorado County APCD requirements.
Reporting Requirements:	Construction compliance reports/daily inspector reports

Description of Activities:
Reclamation will require the Construction Contractor to implement the following measures to reduce PM_{10} emissions during construction:

- Water (sprinklers, water truck spray, other method) construction areas, haul roads, and disturbed soils as often as necessary to keep disturbed areas moist and control fugitive dust emissions.
- Cover any trucks hauling earth and debris to prevent dust emissions and spills onto paved roads, beyond the Project site.
- Sweep paved streets adjacent to the construction site to remove dust and dirt, as needed.
- Limit traffic speeds on all unpaved road surfaces to 15 miles per hour or less.
- Minimize the total active construction area (clearing, earth-moving, or excavation) to the extent practicable.
- Stabilize exposed/disturbed areas as soon as possible following completion of construction.

Success Criteria:	Document compliance with requirements. Record APCD inspection results.

3.16 NOISE

The Proposed Project or alternatives would have localized direct effects within the project study area. These effects are limited to facilities-related activities in the project area, including construction, operations and maintenance. The description of the affected environment and the evaluation of impacts, therefore, address only facilities-related effects within the project area.

3.16.1 AFFECTED ENVIRONMENT

3.16.1.1 Project Area Setting

The project study area for noise is defined as the immediate vicinity of the pump station project where construction, operation, and maintenance activities may increase noise levels above ambient conditions. This includes the project construction area as well as nearby residential and recreation areas.

Ambient Noise Levels

Noise levels in the project study area are assumed to be relatively low and the project area itself is relatively free of noise intrusions and constitutes a quiet environment. With the exception of the noise generated by installation and operation of the seasonal pump station and the PG&E substation operations, there are no other man-made noise sources within the immediate project area. Noise sources near the canyon include: the City of Auburn, including typical traffic noise and commercial and industrial sources; recreation noises associated with the local skateboard park; transportation noises, including Interstate 80, Highway 49, the Southern Pacific Railroad, and the Auburn Municipal Airport; and, logging and quarry operations east of Auburn and the truck traffic traveling to and from these operations.

Sensitive Receptors

Sensitive receptors, defined as land use types for which low ambient noise levels are integral to the use or value of the land, were identified by field survey and aerial photograph and topographic map surveys. The four sensitive receptors identified in the study area include: (1) residential areas on the western side of the canyon (Ridgetop Homes) near the Auburn Dam area; (2) residential areas on the western side of the canyon near Oregon Bar; (3) recreationists using the Auburn-to-Cool Trail; (4) recreationists using the Western States Trail that passes near the site (see Figure 3.9-1, Location of Sensitive Receptors); and (5) recreationists at the Auburn Recreation District Auburn Dam Overlook Campground. The trails are used frequently by hikers, equestrians, and mountain bikers. Refer to Section 3.8, Recreation, for more discussion of these trails.

Typical noise levels for residential settings are presented in **Table 3.16-1**. The homes in the study area would be considered quiet suburban residential areas because they are on large lots, and dead-end or looped streets which carry no through traffic. There are no commercial activities on these or adjacent streets. The sensitive receptors, at their closest points, are approximately within one-half mile from the pump station or public river access construction areas, and have an elevation difference of between 500 and 700 feet msl.

Table 3.16-1
Typical Noise Levels for Urban Settings

Description	Typical L_{dn} Range (dBA)	Average L_{dn} (dBA)
Quiet suburban residential	48-52	50
Normal suburban residential	53-57	55
Urban residential	58-62	60
Noisy urban residential	63-67	65
Very noisy urban residential	68-72	70

Notes: L_{dn} = 24-hour average sound level (day and night); dBA = A-weighted decibels. Source: Canter 1977

3.16.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.16.2.1 Methodology

The occurrence of noise-generating activities and the levels of noise emitted by noise-generating equipment that would be used in construction, operation, and maintenance activities were identified and quantified for the Proposed Project and alternatives based on preliminary design information. Engineering texts (Vesilind et al. 1988) also were reviewed regarding noise quantification.

Potential impacts were evaluated considering the Proposed Project activities, site conditions, and impact issues identified during public scoping. Local noise ordinances and general plans for the City of Auburn, Placer and El Dorado counties, the California Code of Regulations (CCR), and CEQA Guidelines were reviewed and used to develop significance criteria. The noise levels expected to be emitted by construction and operation of the Proposed Project and alternatives were examined and compared with the significance criteria to identify potential noise-related impacts.

3.16.2.2 Applicable Laws, Ordinances, Regulations, and Standards

The CDPR, the counties of Placer and El Dorado, and the City of Auburn have policies or standards applicable to noise levels in the project area (J. Dampier, pers. comm. 2000; Placer County 1994; El Dorado County 1994; City of Auburn 1993). Noise-related objectives and policies identified by CDPR and expressed in the respective city and county general plans, and in the City of Auburn's Noise Ordinance, are discussed below.

California Department of Parks and Recreation

The project study area where noise impacts would occur is located within the Auburn SRA, which is operated by the CDPR. The Auburn Interim Resource Management Plan (CDPR and Reclamation 1992) for the site does not have specific objectives with respect to noise, however, park activities are regulated under CCR Title 14. CCR 4320, Peace and Quiet, states the following:

To insure peace and adequate rest for visitors.

(a) No person shall disturb others in sleeping quarters or in campgrounds between the hours of 10:00 p.m. and 6:00 a.m.

(b) No person shall, at any time, use outside machinery or electronic equipment including electrical speakers, radios, phonographs, televisions, or other devices, at a volume which is, or is likely to be disturbing to others without specific permission of the Department.

(c) No person shall operate an engine driven electric generator which emits sound which is, or is likely to be, disturbing to others between the hours of 8:00 p.m. and 10:00 a.m. without permission of the Department (of Parks and Recreation).

Placer County General Plan

Placer County has established maximum noise levels by zone and at the property line versus interior spaces. Placer County's maximum noise level for residential communities not adjacent to industrial sites is 50 decibels (dB) at the property line (boundary) of the land use "receiving" the noise and 45 dB for interior spaces. Additional relevant Placer County General Plan policies include the following:

Policy 9.A.2. The County shall require that noise created by new non-transportation noise sources be mitigated so as not to exceed the [County noise level standards] as measured immediately within the property line of lands designated for noise-sensitive uses.

Policy 9.A.4. Impulsive noise produced by blasting should not be subject to [regular County noise level standards]. Single event impulsive noise levels produced by gunshots or blasting shall not exceed a peak linear overpressure of 122 dB, or a C-weighted Sound Exposure Level (SEL) of 98 dBC [(C-weighted decibels)]. The cumulative noise level from impulse sounds such as gunshots and blasting shall not exceed 60 dB L_{Cdn} [(C-weighted Day-Night Average Sound Level)] or $CNEL_C$ [(C-weighted Community Noise Equivalent Level)] on any given day. These standards shall be applied at the property line of a receiving land use.

El Dorado County General Plan

El Dorado County has specified maximum noise levels for its communities based on time of day, and on whether the noise is constant or irregular. El Dorado County's standards are presented in **Table 3.16-2**.

Additional relevant policies include the following:

Goal 6.5: Ensure that County residents are not subjected to noise beyond acceptable levels.

Objective 6.5.1: Protect existing noise-sensitive developments (e.g., hospitals, schools, churches and residential) from new uses that would generate noise levels incompatible with those uses and, conversely, discourage noise-sensitive uses from locating near sources of high noise levels.

Table 3.16-2
El Dorado County Noise Level Performance Protection Standards for Noise Sensitive Land Uses Affected by Non-Transportation Sources [a]

Noise Level Descriptor	Daytime (7:00 a.m. to 7:00 p.m.)		Evening (7:00 p.m. to 10:00 p.m.)		Nighttime (10:00 p.m. to 7:00 a.m.)	
	Community	Rural	Community	Rural	Community	Rural
Hourly Average Noise Level (L_{eq}) dB	55	50	50	45	45	40
Maximum Level (dB)	70	60	60	55	55	50

[a] Each of the noise levels specified above shall be lowered by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings). The county can impose noise level standards which are up to 5 dB less than those specified above based upon determination of existing low ambient noise levels in the vicinity of the project site.
Source: El Dorado County 1995

City of Auburn General Plan

The City of Auburn has specified maximum noise levels for its community based on time of day, and on whether the noise is constant or irregular. The City of Auburn's standards are presented in **Table 3.16-3**.

Table 3.16-3
City of Auburn Noise Level Performance Standards for New Projects Affected By or Including Non-Transportation Sources [a]

Noise Level Descriptor	Daytime (7:00a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Hourly L_{eq}, dB[b]	55	45
Maximum Level, dB	75	65

[a] Each of the noise levels specified above shall be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).
Source: City of Auburn 1993

Additional relevant general plan policies include the following:

Goal 1: Protect City residents from the harmful and annoying effects of exposure to excessive noise.

City of Auburn Noise Ordinance

Relevant information from the City's noise ordinance is presented below as a guideline for evaluating construction noise effects upon homes adjacent to the project site.

<u>*City of Auburn Noise Ordinance, Section 5-7.09. Unlawful Acts.*</u>

(j) *Construction or repair of buildings*.

(1) The performance of any construction, alteration or repair activities which require the issuance of any building, grading or other permit may occur only during the following hours:

(i) Monday through Friday: 7:00 a.m. to 6:00 p.m. For the period of June 1 through September 30 of each year the permissible hours for masonry and roofing work hereunder shall be from 6:00 a.m. to 6:00 p.m.;

(i) Saturdays: 9:00 a.m. to 5:00 p.m.;

(ii) Sundays and observed holidays: 10:00 a.m. to 6:00 p.m.

(2) Any noise from the above activities, including from any equipment used therewith, shall not produce noise levels in excess of the following:

(i) Saturdays: 80 dBA when measured at a distance of twenty-five (25') feet;

(ii) Sundays and observed holidays: 70 dBA when measured at a distance of twenty-five (25') feet.

(o) *Pile drivers, hammers, and the like*. The operation between the hours of 10:00 p.m. and 7:00 a.m. of any pile driver, steam shovel, pneumatic hammer, derrick, steam or electric hoist, or other appliance the use of which is attended by loud or unusual noise.

3.16.2.3 Impact Indicators and Significance Criteria

The impact indicators and significance criteria developed for the evaluation of noise impacts are presented in **Table 3.16-4**.

Table 3.16-4
Noise Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ Increase in noise levels associated with construction activity	❑ Construction outside of designated hours (as follows): ▪ Monday through Friday, 7:00 a.m. to 6:00 p.m.; ▪ Saturdays, 9:00 a.m. to 5:00 p.m. with restriction of 80 dBA at distance of 25 feet; ▪ Sundays and observed holidays, 10:00 a.m. to 6:00 p.m., with restriction of 70 dBA at distance of 25 feet (City of Auburn Noise Ordinance).
❑ Type of equipment	❑ Violate the restriction of the use of pile driver, steam shovel, pneumatic hammer, derrick, steam or electric hoist, or other appliance that results in loud or unusual noise, between the hours of 10:00 p.m. and 7:00 a.m.

Table 3.16-4 (Continued)
Noise Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
❑ Noise levels due to blasting	❑ Placer County General Plan noise level threshold: single event blasting noise level shall not exceed a peak linear overpressure of 122 dB or C-SEL of 98dBC; cumulative level shall not exceed 60 dB LCdn on any given day (Policy 9.A.4).
❑ Time of noise-generating activity (operations)	❑ Generation of disturbing noise levels during the following restricted timeframe: 10:00 p.m. and 6:00 p.m.
❑ Increase in recreation-related noise activities	❑ Result in a violation of Time 14, CCR 4320, Peace and Quiet restrictions: no disturbing noise levels between hours of 10:00 p.m. and 6:00 a.m.; no use of machinery or electric equipment at a disturbing volume; no use of electric generators between 8:00 p.m. and 10:00 a.m.
❑ Increase in operational noise levels relative to sensitive receptor locations	❑ Result in a violation of applicable noise level performance standards: ▪ 50 dB at property line and 45 dB for interior spaces (Placer County); ▪ 60 dB maximum 7:00 a.m. to 7:00 p.m., 55 dB maximum 7:00 p.m. to 10:00 p.m., 50 dB maximum 10:00 p.m. to 7:00 a.m. (El Dorado County) ▪ 75 dB maximum 7:00 a.m. to 10:00 p.m., 65 dB maximum 10:00 to 7:00 a.m. (City of Auburn).

3.16.2.4 Impact Analysis

This section presents the analysis of potential facilities-related noise impacts. A summary of the impact issues, level of significance, and environmental protection and mitigation measures is provided in the Executive Summary to the Final EIS/EIR, Table S-5.

Facilities-Related Impacts

No Action/No Project Alternative

Impact 3.16-1: Increase in ambient noise levels during installation and removal of the seasonal pump station.

Annual installation and removal of the seasonal pump station facilities create temporary increases in noise levels for local residents and recreationists in the project vicinity. Specific construction activities include: materials delivery, truck traffic, and other general construction noise associated with installing and removing the pump station facilities and pipeline.

Weekly, seasonal, and annual maintenance would continue to occur at the site and would generate periodic noise from vehicle traffic and site work. The frequency and duration of dredging built up in the sump pond where the diversion pipe is located is expected to be generally the same as current practices. Dredging of the sump pond takes a few days to a week. Re-grading pump station access roads and pipeline rehabilitation would continue to be required if damaged by landslides or flooding.

Seasonal pump station installation takes a minimum of four to six weeks. If significant pipeline and road rehabilitation is required, it can take up to three months. Pump station removal takes approximately two weeks in the late fall. Major pipeline and road rehabilitation has been required twice (1986 and 1997) since the seasonal pump station has been in use (MW et al. 1998). The pump station has been installed every year since 1990, but only a few years from 1967 to 1990 (W. Sanford, pers. comm. 1998).

Under the No Action/No Project Alternative, there would be no change in the type of construction activities necessary to install the seasonal pump station and intake structure; however, the months of high construction noise levels at the site would change due to the extended operations schedule. These activities are not known or expected to result in any violation of noise level standards. Therefore, the No Action/No Project Alternative would result in a less-than-significant impact.

Impact 3.16-2: Increase in the ambient noise levels during operation of the seasonal pump station.

The seasonal pump station is not enclosed in a building and over the four-month diversion period contributes continuous operational noise while water is being diverted. These conditions would generally remain the same under the No Action/No Project Alternative; however, operations would be extended by up to an additional two months in both the spring (April, May) and fall (October, November). Over the eight-month diversion period, four pumps would operate from May to September and two to three pumps would operate in April, October, and November. These changes in operations would result in an increase in (1) the length of time the pumps would be operated and (2) the duration of maximum pump operations. The maximum sound level generated by pump station operations, estimated at 96 dB at 10 feet, would not increase because the total number of pumps would remain the same.

The Ridgetop Homes and the Western States Trail are less than one-half mile from the seasonal pump station. Because the seasonal pump station is not in the line-of-sight of the homes closest to the ridgetop or to the Western States Trail, there would be some attenuation from vegetation and uneven terrain. Assuming a distance of one-fifth mile and 96 dB generated at 10 feet from the seasonal pump station, the attenuation due to distance would result in noise levels of between 44 and 54 dB at the closest Ridgetop Homes and trail sections (M. Matson, pers. comm. 1998).

The City of Auburn allows 55 dB during the day at the property line of a home and 45 dB at night (10:00 p.m. to 7:00 a.m.); Placer County permits a maximum of 50 dB at all times. If this community already experienced levels of 50 dB due to local traffic and other ambient noise (see Table 3.16-1), and if the range of 44 to 54 dB was received at the property line from operation of the pump station, the resulting noise level would be up to 55 dB. The resultant noise level would be up to 5 dB higher than the noise level allowed by Placer County and up to 10 dB higher than that allowed at night by the City of Auburn.

The Auburn-to-Cool Trail is one-tenth of a mile from the seasonal pump station. Because the seasonal pump station is in the line of sight of this trail at the section closest to the pump station, there would be no attenuation of sound other than by distance. Assuming a distance of one-tenth mile and 96 dB generated at 10 feet from the seasonal pump station, the attenuation due to distance would result in a change/increase of noise levels to approximately 60 dB at the trail. This noise level is generally between the range of conversational speech (at three feet) and average traffic noise (Vesilind et al. 1988). This noise level would be considerably higher than the ambient sound.

Overall, under the No Action/No Project Alternative, there would be a substantial increase in noise levels due to the increased length of time the pumps would be operating. These increases in noise levels would potentially result in violations of the City of Auburn and Placer County noise ordinances. Under the No Action/No Project Alternative, there are no feasible mitigation measures that could be applied (i.e., insulation panels) to further reduce noise levels. Therefore, the noise impact due to extended operation of the seasonal pump station under the No Action/No Project Alternative would be potentially significant and unavoidable.

Impact 3.16-3: Increase in ambient noise levels during maintenance of the seasonal pump station.

Weekly, seasonal, and annual maintenance would continue to occur at the site and would generate periodic noise from vehicle traffic and site work. The frequency and duration of dredging the sump pond is expected to be generally the same as current practices (a few days to a week). Re-grading pump station access of roads and pipeline rehabilitation would continue to be required as under existing conditions.

Overall, noise levels associated with maintenance activities would not be expected to increase and would be considered a less-than-significant impact.

Proposed Project

Impact 3.16-4: Increase in ambient noise levels during construction of the Proposed Project.

Construction of the Proposed Project would result in noise-generating activities such as blasting bedrock; materials delivery; truck traffic; and other general construction activities associated with building the permanent structures, road improvements, restoring the river channel and developing public access facilities. Construction would occur over approximately 22 months.

Blasting would take place over a three- to eight-month period. Blasting noise levels would depend on canyon acoustics, shot geometry (depth and placement of shot), and size of shots (amount of explosive material). Equipment and material deliveries to the site would average two to three trips per day over the duration of the construction period. Some of the activity would be concentrated during concrete and structure construction and equipment installation phases. During the height of concrete placement, up to 20 concrete truck deliveries and two or three rebar deliveries could be expected daily.

Noise-generating construction activities would be scheduled Monday through Friday (7:00 a.m. to 6:00 p.m.) and Saturday (9:00 a.m. to 5:00 p.m.). Saturday activities would be restricted, however, to comply with the City of Auburn Noise Ordinance, which limits Saturday noise levels to 80 dBA at 25 feet. Most of the construction equipment and activities (e.g., concrete mixers, dump trucks, backhoes) generate noise above this level.

Major construction equipment noise sources include heavy diesel equipment, such as backhoes, graders, pavers, and other earth-moving equipment. Stationary sources, such as compressors and generators, also will contribute to noise levels. Typical construction noise levels associated with the common practices of ground clearing, excavation, and foundation-laying range from 84 to 89 dBA (EPA 1971).

The Ridgetop Homes are approximately one-third of a mile from the proposed pump station site (the nearest project structure). Noise generated by construction activities at the site would be attenuated by distance, terrain, and to a lesser degree, vegetation. Some of the homes, however, are in the line-of-sight of the construction area and, therefore, attenuation will occur based on distance only.

A rock drill at the diversion structure would generate 98 dB at a distance of 50 feet. This sound would attenuate to levels between 63 and 70 dB for the Ridgetop Homes, with additional attenuation because of natural vegetation and terrain barriers. The sound of a rock drill at the pump station would potentially attenuate to 56 to 65 dB for the Ridgetop Homes. As a comparison, average traffic noise is 70 dB (Vesilind et al. 1988).

When necessary, the Auburn-to-Cool Trail would be closed during construction of the project. The Western States Trail is one-quarter mile from the diversion location and the proposed pump station site. Noise generated by a rock drill, as described above, would attenuate to between 65 and 72 dB on the Western States Trail.

Noise levels generated during the 22-month construction period for the Proposed Project would result in substantially higher noise levels at (1) the project site, (2) recreation trail locations, (3) Auburn Recreation District Auburn Dam Overlook Campground, and (4) the residential areas closest to construction compared to the existing condition or the No Action/No Project Alternative seasonal pump station activities. Measures to minimize the significance of the increased noise levels shall be included in the construction management plan for the project (see Section 3.16.2.5, Environmental Protection and Mitigation Measures). Implementation of these measures, including noise monitoring to ensure compliance, would result in an overall less-than-significant increase in noise levels.

Impact 3.16-5: Increase in ambient noise levels during operation of the Proposed Project.

The pumps would create continuous operational noise whenever being operated to divert water. Based on the maximum monthly diversion schedule, all pumps would be in operation from May to September. One to three pumps would be in operation from October to April. Each pump motor measures 90 dBA at a distance of 10 feet when not acoustically treated (M. Matson, pers. comm. 1998).

The pumps would be enclosed in a building that will be designed to reduce noise impacts to the surrounding area. The building would reduce noise to 45 dB at the canyon rim to comply with the City of Auburn and Placer County noise level performance standards for residential land uses.

Because the pumps would be enclosed, the operational noise would decrease noise levels for recreationists, and for the nearest residential area, relative to the existing condition. Overall, operational noise levels due to the Proposed Project would result in a less-than-significant change in ambient noise levels.

Impact 3.16-6: Increase in ambient noise levels during maintenance of the Proposed Project.

The maintenance activities and associated noise that would occur periodically in the project area include:

- Vehicle noise and miscellaneous low noise-generating activities during, on average, three maintenance visits per day;
- Miscellaneous low noise-generating activities, including the pump station and diversion structure inspections;
- Dredging of sediment build-up at the gradient structures approximately every fourth year; and
- Pump inspection and maintenance, which requires pulling the pumps vertically from their shafts using cranes mounted in the pump station roof during annual maintenance visits.

Weekly, seasonal, and annual maintenance activities occurring at the site would generate noise similar to existing maintenance activities for the seasonal pump station. Approximately every four years dredging of sediment at the gradient control structures is expected to be considerably more than that required for the seasonal pump station sump pond. The seasonal pump station dredging lasts less than one week per year. The year-round pump station could require dredging from several days to a few weeks. Project maintenance noise-generating activities would be noticeably increased over existing conditions, but not to an extent that would generate significant noise levels.

Impact 3.16-7: Increase in ambient noise levels associated with public river access at the Auburn Dam site and near Oregon Bar.

Incidental recreation activities anticipated to occur due to restoration of the dewatered river channel would result in increased noise levels compared to existing or No Action/No Project Alternative conditions associated with vehicular use of access roads and public use of the river. CDPR staff would be responsible for management of the public access areas and CDPR rangers, park aids, and volunteers would enforce the provisions of CCR 4320 which regulates the use of noisy devices (such as machinery or electronic equipment). Additionally, increased traffic-related noise from public river access related trips would less than double the traffic volume along Maidu Drive. A doubling of traffic levees could be expected to increase existing noise levels by less than 3 dB; this change in noise levels is generally not perceptible to the human ear (Federal Highway Administration).

Generally, due to (1) the distance and terrain between the river and sensitive receptors; (2) the seasonal and transient nature of the anticipated activity in the project area; (3) on-site CDPR enforcement of noise-related restrictions, and (4) the anticipated level of traffic-related noise; the potential increase in ambient noise levels would be expected to be less than significant.

Upstream Diversion Alternative

Impact 3.16-8: Increase in ambient noise levels during construction of the Upstream Diversion Alternative.

Construction of the Upstream Diversion Alternative pump station and diversion structure would generally be the same as described for the Proposed Project. These activities would result in short-term, temporary increases in ambient noise levels. Public notification and on-site measures to minimize the impact of increased noise levels would be implemented. Refer to Impact 3.16-4.

Overall, the increase in ambient noise levels would be considered less than significant.

Impact 3.16-9: Increase in ambient noise levels during operation of the Upstream Diversion Alternative.

Pump station operations under the Upstream Diversion Alternative would be the same as under the Proposed Project. Refer to Impact 3.16-5.

Impact 3.16-10: Increase in ambient noise levels during maintenance of the Upstream Diversion Alternative.

Maintenance activities under the Upstream Diversion Alternative would be the same as under the Proposed Project. Refer to Impact 3.16-6.

Cumulative Facilities-Related Impacts

In the future, ambient noise levels near the pump station site and in adjacent neighborhoods likely would increase as a result of increased recreation activity in the canyon and at the Auburn Overlook Campground, and from future residential developments in Auburn. Traffic noise levels also would be expected to increase along Maidu Drive. These anticipated changes in noise levels would be consistent with the character and land uses of the area, and would not be expected to result in a significant increase in noise levels. With regard to cumulative construction noise levels, potential impacts would be adequately mitigated as long as all projects implement standard noise control measures and adhere to applicable noise regulations.

3.16.2.5 Environmental Protection and Mitigation Measures

The Mitigation Plan (Appendix D to the Final EIS/EIR) that would be adopted for the selected action alternative, would include the measures described below to reduce noise-related impacts to levels considered less than significant.

Minimize Noise During Project Construction

Commitment:	Comply with local (El Dorado County, Placer County and City of Auburn) general plan noise ordinance requirements to minimize construction-related noise impacts.
Responsible Parties:	Reclamation/Construction Contractor
Location:	Project area/City of Auburn (neighborhoods near site)
Timing:	During all phases of construction (2002 through 2004)
Monitoring:	Monitor noise levels during periods of peak and/or unusually noisy construction activity
Reporting Requirements:	Construction compliance reports/daily inspector reports

Description of Activities:
Reclamation will enforce Reclamation's Safety and Health Standards regarding noise. Additionally, as specified in local noise ordinances, construction activity will be limited as follows:

Noise-generating construction activities will be scheduled Monday through Friday (7:00 a.m. to 6:00 p.m.) and Saturday (9:00 a.m. to 5:00 p.m.). Saturday activities will be restricted, however, to be consistent with the City of Auburn Noise Ordinance.

On-site construction practices will include the following:

Construction activities which generate noise levels above 95 dB at 50 feet (e.g., impact pile driving, rock drilling, and blasting) will be limited to the hours of 9:00 a.m. to 5:00 p.m., Monday through Friday, and will not be permitted on Saturday or Sunday.

All diesel construction equipment will be adequately muffled as recommended by the manufacturer.

Stationary construction equipment will be located as far as possible from resident boundaries.

Success Criteria: Construction noise levels remain within an acceptable range according to applicable standards and ordinances.

Minimize Operational Noise Levels by Enclosing Pumps

Commitment: Reduce the pump station operational noise levels by enclosing pumps in a structure that reduces noise levels to 45 dB at nearest residences.
Responsible Parties: Reclamation/Design Team
Location: Pump station/adjacent neighborhood
Timing: One-time design/construction
Monitoring: Following construction, monitor noise levels reached within adjacent neighborhoods to ensure compliance with local noise ordinances (i.e., 45 dB at nearest residence).
Reporting Requirements: Indicate noise level reduction achieved

Description of Activities:
Reclamation will require the Construction Contractor to enclose the pumps in a building designed to reduce noise impacts to the surrounding area. The building will reduce noise to 45 dB at the nearest residences to comply with the City of Auburn and Placer County noise level performance standards for residential land uses.

Success Criteria: Document achievement of noise level reduction and compliance with local noise ordinance standards.

Minimize Noise Levels Associated With Public Use of River Access Features

Commitment: Enforce CCR Title 14, CCR 4320, Peace and Quiet, within the Auburn SRA.
Responsible Parties: Reclamation/CDPR
Location: Public river access areas
Timing: Ongoing; when public river access facilities are open for use
Monitoring: Review records of neighborhood complaints and adjust enforcement level, as needed
Reporting Requirements: No specific reporting requirements

Description of Activities:
Reclamation, through its Auburn SRA management agreement with CDPR, will require CDPR to enforce hours of use and restrictions upon use of noisy equipment (e.g., radios) per CCR 4320, Peace and Quiet. Through this agreement, CDPR will be responsible for responding to and handling noise-related complaints associated with public use in the area.

Success Criteria: Minimal noise-related concerns or complaints.

3.17 PUBLIC HEALTH AND WORKER SAFETY

The Proposed Project or alternatives would have localized direct effects within the project study area. These effects are limited to facilities-related activities in the project area, including construction, operations and maintenance. The description of the affected environment and the evaluation of impacts, therefore, address only facilities-related effects within the project area.

3.17.1 AFFECTED ENVIRONMENT

3.17.1.1 Project Area Setting

The project study area for public health and worker safety issues includes areas where construction, operation, or maintenance activities would require the use of hazardous materials or activities. Areas upstream of the pump station construction area and downstream of Oregon Bar are therefore excluded from this evaluation.

Figure 3.17-1 identifies the project site, sensitive receptors, and the construction entrance to the site off of Maidu Drive. The non-motorized construction entrance is identified as a focal point because CALTRANS and California Highway Patrol (CHP) hazardous material permits do not apply on non-public roads, and because the construction road also serves as a recreation trail.

Public Health

Sensitive receptors include residences, schools, parks, playgrounds, hospitals, day care facilities, and health care facilities. Of the nearby land uses, only residences and one school are located close to the project site. Skyridge Elementary School is located on Perkins Way, approximately three-quarter mile from the project area (Figure 3.17-1). In February 2002, the school reported an enrollment of approximately 623 children, ranging in age from 5 to 12 years old (grades kindergarten through sixth). Residences on Maidu Drive, Gold Street, Robie Drive, Placerado Avenue, and Marina Avenue, as well as smaller roads branching off of those streets, are within the one-half mile radius of the project site or construction entrance, with the nearest home located approximately 0.2 mile from the project site.

Worker Safety

During construction, a maximum of 50 workers would be in the area in addition to any delivery personnel. The workers and delivery personnel would be sensitive receptors to any accidents involving hazardous materials at the project site. During operation, one worker would visit the project site at approximately eight-hour intervals for operation checks and maintenance of the pump station and associated facilities.

Project Site Hazardous Materials

The project site does not currently contain any hazardous materials, as fuels and other equipment maintenance-related materials are not stored at the seasonal pump station site. However, the area

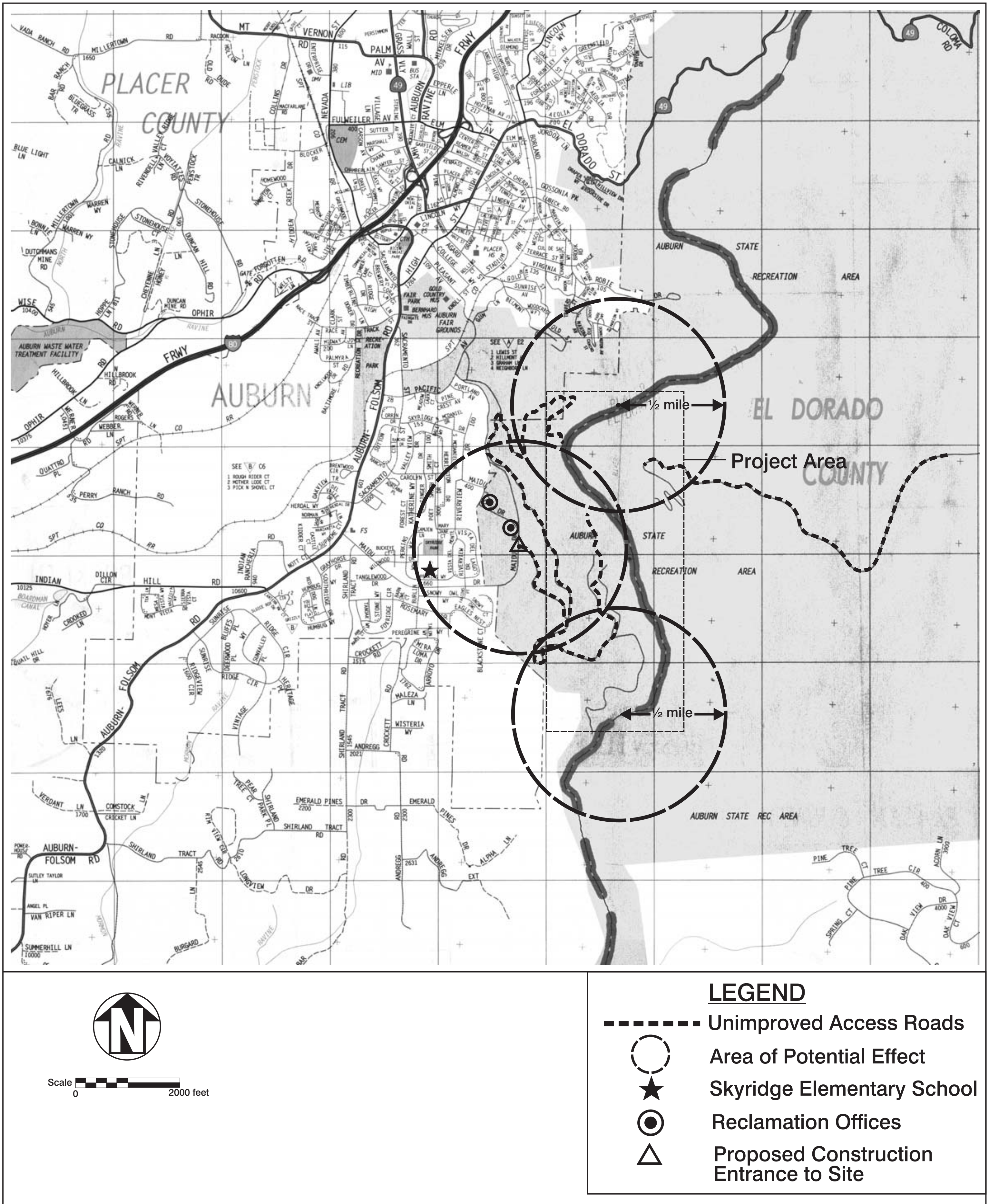


Figure 3.17-1 Project Site and Location of Sensitive Receptors

does contain naturally occurring asbestos. Reconnaissance mapping of the area during preliminary geotechnical investigations revealed serpentine rocks containing asbestos near the existing unimproved road to the seasonal pump station site (MARK 1997). Serpentine rocks are hard and dense, light greenish-gray to black, and some rocks may contain veinlets of chrysotile (asbestos) along joints (MARK 1997). Reclamation would determine the locations of asbestos-containing rocks and potential for project construction to disturb such areas based on the selected alternative final plans. While asbestos contained in rocks does not pose a threat to public or worker health, cracking or destruction of the rocks can release asbestos fibers which does present a health risk.

Construction activities under the Proposed Project or Upstream Diversion Alternative would require on-site use and storage of blasting equipment (i.e., explosives), diesel fuel, gasoline, paint, solvents, lubricating oils, and concrete curing compounds for use during construction and for maintenance of equipment and vehicles. Blasting equipment would include, but not be limited to, detonators, primers, and explosives. **Table 3.17-1** presents the types and amounts of hazardous materials that would be stored on-site.

Table 3.17-1
Hazardous Materials to be Stored On-Site During Construction of the Proposed Project and Upstream Diversion Alternative

Material	Application	Storage Location	Storage Quantity
Diesel Fuel	Fuel for construction vehicles, equipment, and generators	Refueling truck that visits the project site one to two times per day	5,000 gallons. Truck on-site temporarily, not stored throughout construction
Gasoline	Fuel for small construction equipment, vehicles, and generators	Storage tank on project site	Up to 1,000 gallons
Paint	Protective coating of ferrous and other surfaces	Within storage trailer on project site	Up to 500 gallons
Solvents	Miscellaneous uses	Within storage trailer on project site	Up to 100 gallons
Lubricant Oils	Vehicle and equipment lubrication	Within storage trailer on project site	Up to 50 gallons
Concrete Curing Compound	Concrete curing	Within storage trailer on project site	Up to 200 gallons

During project operation, the only hazardous materials to be stored on-site would be fuel and hydraulic oil for the emergency generator. The generator would hold a maximum of 50 gallons of fuel.

Fire Management

Through a Cooperative Agreement with Reclamation, the California Department of Forestry and Fire Protection (CDFFP) provides fire protection services for the Auburn Dam and Reservoir lands. These fire protection services include both fire prevention and suppression activities and include patrolling, maintenance of fuel breaks and signs, and fire suppression, among other things, within the Auburn SRA.

Reclamation, CDFFP, and CDPR are developing a comprehensive fire management plan for the Auburn Dam/Auburn SRA. This activity is being undertaken through coordination and consultation with the City of Auburn, American River Watershed Group, and other local organizations including appropriate Fire Safe Councils in the affected area. The project area, located within the Auburn Dam Project lands, is included in the comprehensive fire planning effort. As part of this effort, CDPR, CDFFP, and Reclamation have prepared an Auburn State Recreation Area Prefire Management Plan (January 2002). This Prefire Management Plan is included as Appendix A to the Final EIS/EIR. CDFFP records for the last 10 years show that approximately 60 percent of fires started within and around the Auburn SRA are a result of direct human activity, including arson, escaped campfires, smoking, debris burning, equipment use, playing with fire, and vehicles. Lightning, a natural cause, started two percent of the fires. Other causes noted were the railroad and power lines.

Emergency response in the project area is the responsibility of many agencies. While hazardous material spills and other emergencies would be reported to the Placer County Sheriff's dispatch through 9-1-1, a series of contacts with other agencies also would be made. Agencies involved in an emergency incident could include the U.S. Environmental Protection Agency National Response Center, CDFFP, Placer County Office of Emergency Services (OES), Placer County Department of Environmental Health (DEH), the Placer County Hazardous Materials Response Team (located in Auburn), CDPR, and CDFG.

3.17.2 ENVIRONMENTAL CONSEQUENCES/IMPACT ANALYSIS

3.17.2.1 Methodology

Preliminary impact analysis consisted of identifying the nearest population center and sensitive receptors located in the study area. Maps were reviewed to determine the sensitive receptors located within one-half mile of the project area, which included residences and Skyridge Elementary School. The one-half mile distance is considered the potential impact area due to blasting which would be the primary hazard associated with construction.

Hazardous materials that would be used and stored on-site during construction and operation were identified and evaluated to determine the potential risk to sensitive receptors resulting from exposure to these materials. Hazardous materials used and stored on-site would not be highly toxic or flammable. Additionally, applicable laws, ordinances, regulations, standards, and Placer County plans were reviewed, and Cal/OSHA, Placer County OES and DEH officials were consulted. Occupational, Safety, and Health Administration (OSHA) officials were consulted for information on asbestos requirements in an outdoor environment. OES and DEH were consulted for information on Placer County's hazardous material response plans and procedures.

For public health, potential impacts were considered in relation to the type and quantities of hazardous materials to be used and generated by construction, as well as the potential for the public to come in contact with such materials. This included consideration of the amount of hazardous materials as well as hazardous material storage handling and disposal procedures. The location of sensitive public receptors also was considered relative to the risk posed by project site accidents and hazardous material wind dispersal. Materials that would be transported, stored, handled, and disposed of during construction and operation include:

- Commercially available chemicals, including fuels, oils, solvents, paints, and other substances
- Explosives
- Naturally occurring asbestos

Regional issues, specifically the transport of hazardous materials to the project site on Interstate 80, local highways, and City of Auburn roadways, have been eliminated from further consideration. These issues have been eliminated due to the numerous requirements pertaining to the transport of hazardous materials specified by the Department of Transportation under the National Transportation Act (CFR 49).

Potential impacts to worker safety were considered in relation to OSHA requirements. OSHA requirements considered included those that specify the storage, handling (including the use of blasting equipment), and disposal procedures for hazardous materials.

3.17.2.2 Applicable Laws, Ordinances, Regulations, and Standards

Federal and state regulations govern the use, transportation, storage, and disposal of hazardous materials and wastes. **Table 3.17-2** summarizes the applicable federal and state regulations that were reviewed as part of this analysis.

Table 3.17-2
Summary of Hazardous Materials Regulatory Authorities

Regulatory Agency	Authority
Federal Agencies	
Department of Transportation	National Transportation Act (CFR 49)
Environmental Protection Agency	Federal Water Pollution Control Act Clean Air Act Resource Conservation & Recovery Act (RCRA) Comprehensive Environmental Response, Compensation & Liability Act Superfund Amendments & Reauthorization Act (SARA)
Bureau of Alcohol, Tobacco and Firearms	Explosives Control Act
Occupational Safety and Health Administration	Occupational Safety and Health Act and CFR 29
State/Local Agencies	
Department of Toxic Substances Control	Hazardous Waste Control Law Hazardous Materials Release Response Plans/Inventory Law Acutely Hazardous Materials Law CCR Titles 17, 19, and 22
Department of Industrial Relations (Cal/OSHA)	California Occupational Safety and Health Act, CCR Title 8
Placer County Office of Emergency Services	Hazardous Materials Release Response Plans/Inventory Law

Hazardous Materials Public Health Regulatory Structure

Public health is safeguarded against harmful exposure to hazardous materials through several agencies. At the federal level, the principal agency regulating the generation, transportation, and disposal of hazardous materials is the EPA, under the authority of RCRA. CALTRANS governs the transport of hazardous materials.

Several state agencies also work to minimize public exposure to hazardous materials. The California Environmental Protection Agency (Cal-EPA) and the California OES establish rules governing the use of hazardous materials. The CHP and CALTRANS are the enforcement agencies for hazardous materials transportation regulations. The Bureau of Alcohol, Tobacco and Firearms (ATF) regulates the use and storage of explosives. ATF regulations define storage conditions, permit regulations, and security obligations, including storage and staging distances for explosives.

Within Cal-EPA, the Department of Toxic Substance Control (DTSC), formerly part of the Department of Health Services, has primary regulatory authority over the generation, transport, and disposal of hazardous materials under the Hazardous Waste Control Law (HWCL). The state has delegated enforcement of HWCL to the Placer County OES and DEH. State regulations applicable to hazardous materials are indexed in Title 26 of the CCR.

Placer County's emergency response plan for hazardous material incidents serves to minimize harmful public exposure to hazardous materials in the event of an incident. This plan specifies procedures for emergency notification response and public safety information. The county also requires a right-to-know reporting program for projects storing more than 55 gallons, 500 pounds, or 2,000 cubic feet of hazard materials to protect the public against hazardous materials. The report program requires contractors to develop a spill prevention and containment plan, identify storage locations and amounts, and comply with storage requirements (J. Miners, pers. comm. 1998).

Hazardous Materials Worker Safety Regulatory Structure

OSHA sets federal standards regulating worker handling, transport, storage, and disposal of hazardous materials to ensure safety of workers in contact with such substances. OSHA also requires worker training and sets exposure limits and safety procedures for the handling of hazardous substances (as well as other hazards).

Cal/OSHA assumes primary responsibility for developing and enforcing work place safety regulations within the state. Cal/OSHA regulations for hazardous materials include requirements for safety training, availability of safety equipment, hazardous materials exposure warnings and emergency action, and fire prevention plan preparation. Cal/OSHA enforces the hazard communication program regulations, which include provisions for identifying and labeling hazardous materials, providing employees with Materials Safety Data Sheets (MSDS), describing the hazards of chemicals, and documenting employee training programs.

Cal/OSHA requirements (CCR Title 8) are more stringent than federal requirements and include establishing control areas, wetting asbestos-containing materials to preclude fiber release, wearing of personal protective equipment in the form of full-body protective suits and respiratory protection as necessary, and collecting air samples to test worker exposure, along with safety requirements regarding blasting equipment and commercially available hazardous materials.

3.17.2.3 Impact Indicators and Significance Criteria

Public health and worker safety impact indicators and significance criteria were developed based on the location of sensitive receptors and the types of hazardous materials that would be used and stored on site. **Table 3.17-3** presents the indicators and criteria used in the impact analysis.

Table 3.17-3
Public Health and Worker Safety Impact Indicators and Significance Criteria

Impact Indicators	Significance Criteria
Public Health	
❑ Hazardous material and blasting incidents in the project area of a large enough magnitude to pose a health risk to the nearest sensitive receptors.	❑ Result in a substantial increased risk of exposure to commercially available hazardous substances and explosives and the hazards associated with those materials such as explosions or fires.
❑ Sensitive receptor exposure to asbestos fibers through wind dispersion from the project site during construction only.	❑ Result in exposure to asbestos concentrations greater than the Cal/OSHA 0.1 fiber per cubic centimeter of air as an eight-hour time-weighted average, or greater than 1.0 fiber per cubic centimeter of air as averaged over a sampling period of 30 minutes, as measured by methods prescribed by Cal/OSHA regulations.
Worker Safety	
❑ Worker exposure to explosions and fires associated with commercially available chemicals (e.g., solvents, fuels, and oils).	❑ Result in a substantial increased risk of exposure to explosive and fire hazards associated with spills or incorrect handling, storage, or use of commercially available substances in relation to applicable worker safety regulations.
❑ Worker exposure to asbestos fibers during construction only.	❑ Result in an exposure to asbestos concentrations in violation of Cal/OSHA standards.
❑ Worker exposure to accidental explosions associated with blasting materials.	❑ Result in a substantial increased chance of injury due to blasting operations and presence of explosives in relation to applicable worker safety regulations.
Fire Safety	
❑ Public, resident, and worker exposure to fire dangers.	❑ Result in a substantial increase in potential for construction- or project-related fires.

3.17.2.4 Impact Analysis

Facilities-Related Impacts

No Action/No Project Alternative

There are no hazardous materials currently stored on-site and the No Action/No Project Alternative would not substantially change either public health or worker safety conditions. The No Action/No Project Alternative would not result in a substantial increase in the potential for wildfires or project-related fires relative to the existing condition.

Proposed Project

Public Health

Impact 3.17-1: Increased risk of public exposure to commercially available hazardous materials or explosives.

During construction, commercially available substances as identified in Table 3.17-1 will be used and stored on-site. These substances could be flammable, volatile, or possess other hazardous characteristics. The project area will be closed to the public during some construction activities; however, accidental explosions or fires associated with commercially available materials could pose a risk to sensitive receptors.

The nearest sensitive receptor to the project site is located approximately 0.2 mile from the seasonal pump station and 700 feet higher than at the top of the western side of the river canyon. The amount of hazardous materials stored on-site will not be sufficient to generate an accidental explosion of a large enough magnitude to pose a risk to this receptor.

As presented in Table 3.17-1, the largest amount of hazardous materials stored on-site will be 1,000 gallons of fuel. This amount exceeds the storage limit specified in the Placer County right-to-know reporting program, and as a result, a spill prevention and containment plan will be implemented and compliance with chemical storage and use requirements shall be followed. The lead agencies would ensure that the project construction contractor complies with relevant hazardous material regulations. In addition, Placer County has an emergency response plan. Based on the topography, distance to the nearest sensitive receptor, and the hazardous material storage, spill, containment, and emergency response conditions in place, the presence of the identified types and volumes of commercially available materials will not present a substantial increase in risk to public safety.

Construction of the Proposed Project could include up to three explosive events per day. Blasting will occur between the hours of 1:00 p.m. and 4:00 p.m. over a period of three to eight months. Cal/OSHA regulations (CCR Subchapter 4, Article 8) govern supervision of blasting operations and storage, transport, and handling of explosive materials. These regulations require that blasting operations are supervised by a blaster with a current, valid California "Blaster's License" (CCR §1550). Storage requirements specify conditions for the contents of explosive storage magazines; for example, detonators are not to be stored in a magazine with any other explosive material (CCR §1561). Handling and use regulations include numerous measures to prevent accidental or unplanned explosions. These measures also specify distances to be maintained between explosives and power lines and between simultaneous blasting operations, prohibit unattended or abandoned blasting materials, and detail blast loading and detonation methods (CCR §1565 and 1567). ATF regulations also define storage conditions, security obligations, and storage requirements for explosives. These regulations specify site security actions that must be taken to prevent theft and misuse of explosive materials such as posting warning signs and controlling access to areas where explosives are stored and used.

Reclamation will be responsible for ensuring that the construction contractor complies with Cal/OSHA, ATF, and other blasting regulations. With blasting regulation compliance, potential impacts from risks associated with accidental explosions, fires, or theft and misuse will be less than significant.

Based on the procedures and restrictions that will be in place to control the use, transport, and handling of hazardous materials and explosives, it is unlikely that the nearest project area receptors will be exposed to accidental explosions or fires associated with the commercially available chemicals and explosives to be used by the project. Therefore, construction and operation of the Proposed Project will represent a less-than-significant impact.

Impact 3.17-2: Increased public exposure to asbestos.

Excavation and blasting activities in the project area could release asbestos fibers. While asbestos was not encountered in pump station or pipeline location borings, asbestos was identified in bedrock outcrops and rock debris on the slope above the existing unimproved road to the diversion site during preliminary geotechnical investigations (MARK 1997). Increased public exposure to asbestos fibers could be a potentially significant impact of project construction. Reclamation would include measures to reduce the risk of exposure to asbestos as part of the Mitigation Plan (see Section 3.17.2.5).

Implementation of the environmental protection measures will lessen the impact of excavation and blasting activities and resultant increased public exposure to asbestos, if present at the site, resulting in a less-than-significant impact.

Impact 3.17-3: Increased public exposure to fire hazards.

Increased public use of the Auburn Dam and Oregon Bar areas at the site and of the North Fork American River from the confluence and downstream past the project area introduces an increased fire risk associated with human activity in the canyon.

The Comprehensive Fire Management Plan will include all aspects of public and firefighter safety and prevention and fire suppression activities. Since the release of the Draft EIS/EIR, a major component of the Comprehensive Fire Management Plan, the Fuels Management Action Plan, has been completed and is included in the Prefire Management Plan. This element directly affects the interface lands (the areas where public lands adjoin private lands) and lays out a process to implement fire management strategies for the Auburn SRA lands that are a priority interface with the Greater Auburn Area. As a major component of mitigation for the potential of increased fire danger on public lands within the interface areas directly affected by the American River Pump Station Project, ground implementation of the Fuels Management Action Plan is planned to be completed prior to opening the area for public use.

Through coordination and partnerships with local neighborhoods, citizen groups, and others, CDPR and Reclamation will work to implement appropriate fire management strategies as prescribed in this plan. The interface lands will be divided into priority areas with each having its own site-specific environmental review process.

Fuel modification within interface lands is critical for reducing the potential for a costly and damaging fire. The following prescriptions can be used for fuel management in three distinct geographic areas or zones within the interface areas: (1) Shaded Fuel Break, (2) Defensible Space, and (3) Defensible Landscape.

Shaded fuel breaks will be developed on public lands that interface private lands directly affected by the American River Pump Station Project. The width of the fuel break is usually 100 to 300 feet, depending on site conditions. Creating a shaded fuel break involves carefully planned thinning of dense vegetation, intended to inhibit fire from easily moving from ground into the overhead tree canopy. A shaded fuel break does not involve the removal of all vegetation in a given area.

Fire suppression ground and air resources can use the shaded fuel break area to suppress wildland fires. Any fuel break by itself will not stop a wildland fire. Shaded fuel breaks, to be most effective, must be accomplished in conjunction with the other prescriptions, such as defensible space and defensible landscapes, which would occur largely on adjacent private properties. The managing partners of the comprehensive fire plan are working with local entities and citizen groups to implement the Fuels Management Action Plan.

Construction-Related Fire Protection and Prevention

Reclamation would ensure that the construction contractor prepare and carry out an effective fire protection and prevention program covering all phases of construction under the contract for the selected alternative. The plan would be submitted to Reclamation, for approval prior to the start of construction operations. At the option of the construction contractor, the fire protection and prevention program may be incorporated into the safety program required in the project's construction specifications.

These requirements would be part of the Mitigation Plan (see Section 3.17.2.5) for fire protection and prevention.

All construction operations shall be in compliance with Reclamation Construction Safety Standards and applicable federal and state codes.

Fire Management and Prevention for Public River Access Features

Shaded fuel breaks would be constructed along the public river access roads and parking areas. These shaded fuel breaks would be 20 to 30 feet wide depending on the site conditions. Shaded fuel breaks are proposed along the main construction road that follows Maidu Drive to the batch plant, and from the batch plant to Oregon Bar and to the river-side turnaround and limited ADA-designated parking area. Shaded fuel breaks also would be constructed around the batch plant parking area and both turnarounds. Road improvements would meet emergency vehicle access needs. Moreover, the proposed prohibition on open fires within the project area would reduce the risk of wildfire potentially related to increased public use.

Additionally, distance or mile markers would be installed along the trails as appropriate to aid rescuers in emergency situations to locate hikers that may become disabled or lost.

Additional actions and activities may be identified as the comprehensive fire planning process continues to evolve. This plan would be in place prior to opening the project area for public use.

<u>Worker Safety</u>

Impact 3.17-4: Worker exposure to fire and explosive hazards associated with the handling and storage of commercially available hazardous materials.

Under the Proposed Project, various commercially available substances will be used in the project area, as well as explosives. Table 3.17-2 identifies the amount of each substance that will be stored on-site. As part of construction management, a right-to-know reporting program would be implemented and project contractors will be responsible for enforcing worker standards procedures for the correct handling and storage of these materials. PCWA and Reclamation also will ensure that the construction contractor complies with appropriate hazardous material and explosives regulations. A spill prevention and containment plan and worker briefings on correct handling and storage procedures also will be implemented. With these measures in place, the risk to workers from accidental fires and explosions related to commercially available hazardous materials and explosives will be less than significant.

Impact 3.17-5: Worker exposure to unacceptable levels of asbestos.

Construction activities could release asbestos fibers from rocks in the project area into the air, thereby increasing the health risk to workers. Environmental protection measures for the Proposed Project incorporate Cal/OSHA requirements to be implemented by the construction contractor and include: asbestos concentration monitoring, asbestos awareness training of construction workers, and implementation of a personal hygiene plan. Based on results of asbestos monitoring, respiratory requirements could be implemented, as necessary. Additionally, to prevent the dispersal of asbestos fibers, the construction contractor would water blast sites and other areas. These measures would reduce the risk of asbestos-related health effects to a less-than-significant level.

Impact 3.17-6: Increased risk of injury due to use of explosives.

Under the Proposed Project, explosives would be used during excavation activities. Hazards would be associated with accidental explosions during transport, storage, assembly, and detonation. Transport of detonators, fuses, dynamite, and other explosive materials could pose a threat to workers' safety; however, Cal/OSHA maintains a series of rules (CCR, Title 8) regarding blasting operations and storage, transport, and handling of explosives materials, as discussed under Impact 3.17-1. These safety measures would be part of the construction management of this project and the risk to worker safety from the use of explosives would be less than significant.

Blasting operations could pose seismic hazards to workers on-site (the public would not be exposed due to project site closure during blasting, nor would area residences be exposed due to the small magnitude of explosives). Specifically, blasting could result in falling rock or debris that could affect worker safety. Reclamation would be responsible for ensuring that the project blasting specialist designs timing, duration, and magnitude of blasts, so as not to trigger falling rock or debris. Therefore, this represents a less-than-significant impact.

Upstream Diversion Alternative

<u>*Public Health*</u>

Impact 3.17-7: Increased risk of public exposure to commercially available hazardous materials.

As with the Proposed Project, commercially available substances and explosives would be used and stored on-site during construction. These materials would be used and stored in compliance with all federal, state, and local requirements, thereby resulting in a less-than-significant impact. For discussion of this impact, refer to Impact 3.17-1.

Impact 3.17-8: Increased public exposure to asbestos.

As with the Proposed Project, construction activities potentially would expose and release asbestos into the surrounding environment. Environmental protection measures to prevent public exposure would be implemented and would reduce this impact to less than significant. For discussion of this impact, refer to Impact 3.17-2.

<u>*Worker Safety*</u>

Impact 3.17-9: Worker exposure to increased fire and explosive hazards associated with the handling and storage of commercially available hazardous materials.

Similar to the Proposed Project, activities related to the Upstream Diversion Alternative would involve the use and storage of various commercially available substances at the project site (see Table 3.17-2). Implementation of construction management measures would reduce this impact to less than significant. For discussion of this impact, refer to Impact 3.17-3.

Impact 3.17-10: Worker exposure to unacceptable levels of asbestos.

Construction activities under the Upstream Diversion Alternative could result in the release of asbestos fibers from project site rocks, thereby increasing the health risk to workers. As described for the Proposed Project, the construction management plan would employ protection measures to result in a less-than-significant impact. For further discussion of this impact, refer to Impact 3.17-4.

Impact 3.17-11: Increased risk of injury due to use of explosives.

Under the Upstream Diversion Alternative, explosives would be used during excavation, however, as with the Proposed Project, blasting operations would be carried out in compliance with Cal/OSHA regulations; therefore, impacts from the use of explosives would be less than significant. For further discussion of this impact, refer to Impact 3.17-5.

Cumulative Facilities-Related Impacts

Implementation of the selected alternative would require compliance with all local, state, and federal regulations governing the transport, delivery, use, storage, and accident response activities relative to the project to protect public health and worker safety. It is expected that regulatory agencies would require the same level of public health and worker safety protection of other planned/proposed projects in the study area, thereby minimizing the potential for cumulative public health or work safety effects.

The Comprehensive Fire Management Plan would serve to address cumulative fire prevention, protection, and management concerns within the Auburn SRA.

3.17.2.5 Environmental Protection and Mitigation Measures

Several mitigation measures have been incorporated into the Mitigation Plan to reduce potential public health and worker safety concerns.

Minimize the Potential for Increased Erosion and Slope Instability During Project Construction

Commitment:	Implement the best available engineering design standards and grading techniques to reduce the possibility of undue risks to members of the public and/or additional environmental degradation that could be caused by erosion, mass wasting or unstable slope conditions.
Responsible Parties:	Reclamation/Construction Contractor
Location:	Project area
Timing:	During all phases of construction (2002 through 2004)
Monitoring:	Regular on-site inspection of active construction areas
Reporting Requirements:	Construction compliance reports/daily inspector reports

Description of Activities:
Reclamation will require the Construction Contractor to perform all grading and excavation operations such that the potential for creating unstable slopes or landslides would be minimized. Potential measures include terracing, reducing slope angles, and reducing the height of cut and fill slopes.

Reclamation will require the Construction Contractor to fence-off or identify with temporary markers, areas of substantial instability in order to prevent unauthorized access.

Success Criteria: Hazardous unstable slope conditions are avoided.

Minimize Potential for Increased Exposure to Hazardous Materials or Fire Risk During Project Construction

Fuel would be stored on-site in an amount that exceeds the storage limit specified in the Placer County right-to-know reporting program, and as a result, a spill prevention and containment plan will be implemented and compliance with chemical storage and use requirements will be followed.

Commitment:	Use potentially hazardous materials according to manufacturers instructions. Minimize potential for fire hazard due to construction activities.
Responsible Parties:	Reclamation/Construction Contractor
Location:	Project area
Timing:	During all phases of construction (2002 through 2004)
Monitoring:	Inspect and record use of hazardous materials
Reporting Requirements:	Construction compliance reports/daily inspector reports

Description of Activities:

Hazardous Materials
Reclamation will require the Construction Contractor to ensure compliance with all applicable hazardous material regulations, including regulations for blasting operations.

Reclamation will require the Construction Contractor to provide evidence of worker training and education on the proper transport, storage, handling, and use of hazardous materials and explosives.

Reclamation will require the Construction Contractor to restrict public access in areas of hazardous material storage or use.

Fire Protection and Prevention
Reclamation will ensure that the Construction Contractor prepare and implement an effective fire protection and prevention program covering all phases of construction under the contract. This plan will be submitted to Reclamation’s Construction Engineer for approval prior to construction

operations. Construction Contractor will provide and maintain a fire-tool cache and a sufficient number of employees familiar with this equipment will be available at all times when work is in progress.

In the event of a fire resulting from Project operations, the local fire-protection agency will be notified and the contractor shall take immediate control action with all available equipment and manpower.

In areas where a significant fire hazard exists as determined by the Contracting Officer, the contractor shall provide a fire patrol for one hour after the shutdown of construction operations each day during the fire season.

Contractor will establish a firebreak on the uphill side of the Project in areas where natural fuels are present and where existing roads or creek beds will not serve the purpose. The firebreak will be within the right-of-way acquired by Reclamation and will consist of a 10-foot wide strip with flammable material either cleared or covered with mineral soil.

Where normal fire protection services are interrupted by construction operations, the contractor will provide equivalent temporary services including water supplies and access for fire equipment through the Project area.
All construction operations will be in compliance with Reclamation Construction Safety Standards and all applicable state and federal codes.

Success Criteria: Document compliance with all activities.

Remove All Construction-related Materials From Project Site Prior to Opening for Public Use

Commitment: Ensure public safety within the Project area.
Responsible Parties: Reclamation/Construction Contractor
Location: Project area
Timing: Upon completion of construction/prior to opening site for public use
Monitoring: On-site Monitor to inspect site following clean-up efforts and demobilization.
Reporting Requirements: Final construction compliance report

Description of Activities:
Reclamation will require the Construction Contractor to remove all waste materials, rubbish and unused construction materials from the Project site after construction and before public access into the area is granted.

Success Criteria: Document site condition in final construction report.

Minimize the Risk of Public Exposure to Fire Hazards During Project Operations

Reclamation, CDFFP, and CDPR developed a comprehensive fire management plan for the Auburn Dam and Reservoir lands/Auburn SRA. This activity involved coordination and consultation with the City of Auburn, the American River Watershed Group, and other local organizations including Fire Safe Councils within the Auburn area.

Commitment:	Provide fire protection services including fire prevention and suppression.
Responsible Parties:	Reclamation/CDPR/CDFFP
Location:	Project area/Auburn SRA
Timing:	During construction/ongoing once public river access is granted.
Monitoring:	No specific monitoring requirements
Reporting Requirements:	No specific reporting requirements

Description of Activities:
Reclamation will be responsible for ensuring implementation of the Comprehensive Fire Management Plan. Agencies involved in coordination and implementation of the plan include Reclamation, CDPR, and CDFFP. Additionally, will CDPR enforce the provisions of CCR Title 14, Section 4311 restricting fires and smoking at the public river access locations.

The Fuels Management Plan element of the Comprehensive Fire Management Plan includes establishment and maintenance of shaded fuel breaks adjacent to all public access roads associated with the Project. This includes the main construction road from Maidu Drive to the batch plant, the road from the batch plant to Oregon Bar, and the road from the batch plant to the riverside turnaround and handicap-accessible parking lot (across the river from the existing tunnel outlet). Shaded fuel breaks also will be constructed around the batch plant parking area and both turnarounds.

Additional measures include:

- Implementation of standards set forth in Public Resources Code 4290 to ensure safe passage of fire suppression resources and egress of private vehicles should a wild fire occur in the canyon. These standards address road widths, turnouts, and dead-end turnarounds.

- Placement of distance/mile markers along Project area trails to aid rescuers in emergency situations to locate hikers that may become disabled or lost.

Additionally, a 300-foot wide shaded fuel break is being constructed between the houses adjacent to Auburn SRA and the Maidu Drive/Skyridge neighborhood. Construction of the shaded fuel breaks is being completed separately from the Project in cooperation between CDPR, CDFFP and Reclamation. However, although not part of the Project, this action will serve to benefit the Project area and further reduce potential risk of fire in the study area.

Success Criteria:	Placement of shaded fuel breaks. Ongoing agency coordinated protection of area.

Prevent Vehicular Access in Undesignated Areas

Commitment:	Restrict vehicular public access to permitted routes only.
Responsible Parties:	Reclamation/Construction Contractor and CDPR
Location:	Project area roads
Timing:	Permanent barriers
Monitoring:	Monitoring condition of barriers and provide replacement or repair, as needed
Reporting Requirements:	No specific reporting requirements

Description of Activities:
Reclamation will require the Construction Contractor to install large rocks, guard rail posts, or other barriers at all trail or road intersections or termination points where off-road public access is to be restricted.

Reclamation will require CDPR to monitor the condition of these barriers and provide maintenance, repair or replacement, as needed.

Success Criteria:	Road barriers remain in place and prevent off-road vehicular use in Project area.

Minimize Inappropriate or Illegal Activities at Public River Access Locations

Commitment:	Patrol and enforce state regulations regarding illegal or inappropriate activities.
Responsible Party:	CDPR, through management agreement with Reclamation
Location:	Project area - public river access features
Timing:	Ongoing during use of public river access sites
Monitoring:	Record incidents and how they were handled
Reporting Requirements:	According to CDPR requirements

Description of Activities:
Reclamation, through the Auburn SRA management agreement, will require CDPR to post the rules and regulations applicable to use of the Project area at the entrance and at each of the parking areas and turnaround locations. The following restrictions are anticipated:

- No alcohol use.
- No open fires or smoking.

A new gate will be installed at the junction of Maidu Drive and the public access road into the canyon. An entrance station is to be constructed near the junction of Maidu Drive and the construction road into the dam site that will be used as the access road; the station will be manned during all hours of operation.

The gated entrance station will limit vehicle access to designated hours.

Limit Public Access to Water Supply Facilities and Structures

Commitment:	Protect PCWA's facilities and minimize public safety issues due to misuse of water supply facilities.
Responsible Party:	PCWA
Location:	Project area/river channel
Timing:	Post-construction
Monitoring:	Inspect fencing and signs on a regular basis and repair/replace as needed
Reporting Requirements:	Record condition of facilities in operations and maintenance log book

Description of Activities:
Prior to opening the site, PCWA's water supply facilities (on land) would be enclosed, to the extent feasible, in order to minimize public access or injury.

Signs indicating PCWA's ownership of the structures/facilities and warning of potential hazards would be posted in strategic locations to discourage unauthorized access.

CDPR's patrolling of the area will provide further management and reduction of potential unauthorized use.

Minimize Potential for Disturbance of Asbestos and Exposure of Construction Personnel or General Public During Project Construction

Commitment:	Reclamation will determine the potential for asbestos-containing rock to be encountered at the Project site. Depending upon the likelihood of such, the Construction Contractor will be required to implement air emission control measures to reduce the level of asbestos emissions during construction; as determined appropriate for the Project site and specific earthwork activities.
Responsible Parties:	Reclamation/Construction Contractor
Location:	Project area
Timing:	During all phases of construction (2002 through 2004)
Monitoring:	Inspect Project area and indicate compliance with Placer County APCD, El Dorado County APCD, and CARB requirements, as applicable.
Reporting Requirements:	Construction compliance reports/daily inspector reports

Description of Activities:
Reclamation will determine the presence of and potential for construction to disturb asbestos-containing rock areas in the Project area. Should the likelihood be determined to be low, Reclamation will require the controls listed below as contingency measures in the construction contract, to be implemented in the event asbestos is encountered during earthwork.

As a precautionary measure, the construction specifications will require the contractor to obtain air samples periodically during earth moving and drilling operations to document whether an asbestos hazard exists.

Reclamation will require the Construction Contractor to meet all applicable requirements of the Placer County APCD, El Dorado County APCD (Ordinance 4548), and CARB for any grading, excavation or other construction that potentially could result in the disturbance of asbestos-containing rock. Provisions that may apply include the following:

- Apply chemical soil stabilizers to inactive construction areas.
- Regularly clean construction equipment.
- Suspend all grading operations when instantaneous wind speeds exceed 25 miles per hour.
- Stabilize exposed or disturbed areas as soon as possible after disturbance.

If required, implement additional measures required by CARB for Asbestos Control

If asbestos-containing rock areas are determined to occur on site, construction personnel exposure to asbestos will be reduced by the implementation of standard California Occupational, Safety, and Health Administration protective measures including monitoring, awareness training and personal hygiene. The construction management plan will include practices to reduce public exposure to asbestos fibers. Such practices will include:

- Geotechnical survey of excavation areas to map areas of serpentine rock.
- Public notification regarding blasting and earthwork prior to and throughout construction.
- Closure of site to public access with warning signs alerting the public to potential exposure to asbestos.
- Monitoring of residential and Project site asbestos levels during earthwork and blasting.
- Watering of active construction areas to minimize air dispersal of asbestos and dust.
- Worker education briefings regarding risks and ways to minimize health risks including personal hygiene practices. In addition, minimize worker exposure by implementing an asbestos mitigation plan and by requiring proper protective clothing and respiratory devices if deemed necessary after monitoring asbestos concentrations.

Minimize Potential for Disturbance of Asbestos and Exposure of Construction Personnel or General Public During Project Construction

Commitment: Reclamation will determine the potential for asbestos-containing rock to be encountered at the Project site. Depending upon the likelihood of such, the Construction Contractor will be required to implement air emission control measures to reduce the level of

	asbestos emissions during construction; as determined appropriate for the Project site and specific earthwork activities.
Responsible Parties:	Reclamation/Construction Contractor
Location:	Project area
Timing:	During all phases of construction (2002 through 2004)
Monitoring:	Inspect Project area and indicate compliance with Placer County APCD, El Dorado County APCD, and CARB requirements, as applicable.
Reporting Requirements:	Construction compliance reports/daily inspector reports

Description of Activities:
Reclamation will determine the presence of and potential for construction to disturb asbestos-containing rock areas in the Project area. Should the likelihood be determined to be low, Reclamation will require the controls listed below as contingency measures in the construction contract, to be implemented in the event asbestos is encountered during earthwork.

As a precautionary measure, the construction specifications will require the contractor to obtain air samples periodically during earth moving and drilling operations to document whether an asbestos hazard exists.

Reclamation will require the Construction Contractor to meet all applicable requirements of the Placer County APCD, El Dorado County APCD (Ordinance 4548), and CARB for any grading, excavation or other construction that potentially could result in the disturbance of asbestos-containing rock. Provisions that may apply include the following:

- Apply chemical soil stabilizers to inactive construction areas.
- Regularly clean construction equipment.
- Suspend all grading operations when instantaneous wind speeds exceed 25 miles per hour.
- Stabilize exposed or disturbed areas as soon as possible after disturbance.

3.18 OTHER IMPACT CONSIDERATIONS

3.18.1 INDIAN TRUST ASSETS

Indian Trust Assets (ITAs) are legal interests in property and rights held in trust for Indian tribes or individuals by the United States. Although there is no concise legal definition of ITAs, courts have traditionally interpreted them as being tied to real property. Indian reservations, rancherias, and allotments are common ITAs. Types of actions that could affect ITAs include an interference with the exercise of a reserved water right, degradation of water quality where there is a water right, impacts to fish and wildlife where there is a hunting or fishing right, or noise near a land asset where it adversely impacts uses of reserved land. It is Reclamation's policy to protect ITAs from adverse impacts resulting from its programs and activities. There have been no ITAs identified within the project study area. The Proposed Project or alternatives would not result in adverse impacts to ITAs.

3.18.2 ESSENTIAL FISH HABITAT

The 1996 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) added a provision for federal agencies to consult with NMFS on impacts to EFH. EFH are specifically identified waters and substrate necessary for fish spawning, breeding, feeding, or growing to maturity. In the Mid-Pacific Region, the Pacific Fishery Management Council designates EFH and NMFS approves the designation.

EFH only applies to commercial fisheries. For the action addressed within this EIS/EIR, this means all chinook salmon habitat, but not steelhead habitat. EFH includes all anadromous streams (including some intermittent streams) up to impassable barriers. In the American River basin, EFH includes the lower American River up to Nimbus Dam. In the Central Valley, it also includes accessible waters of the Delta, Sacramento River, and tributaries up to impassable barriers. Keswick Dam represents the first impassable barrier on the Sacramento River, within the study area.

Federal agencies must consult with NMFS on all actions that may adversely affect EFH (Section 305 (b)(2) of the MSFCMA). The NEPA review process may be used to satisfy EFH consultation requirements. Thus, a separate EFH document is not needed. Information contained within the EIS/EIR regarding potential effects of implementation of the pump station project satisfy analytical requirements for EFH for Central Valley fall-run chinook salmon throughout the potentially affected area including Auburn Ravine and other tributaries of the Sacramento River. Specifically, PCWA identified an operational change that would involve maintaining its North Fork American River water releases to Auburn Ravine within the limits of recent historical monthly maximums, thereby avoiding potential changes to the existing quantity, seasonal distribution, or source water composition. Hence, impact considerations in Auburn Ravine and other potentially affected tributaries of the Sacramento River focus on the issues of straying and "false attraction," which are thoroughly analyzed and discussed in the Auburn Ravine Master Response (see Appendix C, Volume 1, Responses to Comments, Master Response 3.1.13, Auburn Ravine, for further detail). Implementation of the Proposed Project or alternatives would not be expected to adversely affect fall-run chinook salmon essential fish habitat.

3.18.3 ENVIRONMENTAL JUSTICE

Executive Order 12898, Environmental Justice, requires that review of proposed federal actions analyze any disproportionately high and adverse environmental or human health effects on minority and low-income communities. No disproportionately high or adverse environmental or human health impacts on minority or low-income communities have been identified for this project.

3.18.4 IRREVERSIBLE AND IRRETRIEVABLE USE OF RESOURCES

Irreversible commitments of resources would result from implementing either the Proposed Project or alternatives. These resources include:

- Construction materials
- Labor
- Land area devoted to project facilities; and
- Energy needed for construction, operation, and maintenance.

Up to 0.11 acre of wetlands would be permanently lost under the Upstream Diversion Alternative. This acreage would be replaced according to the terms of the Corps' consultation and permitting process.

3.18.5 SHORT-TERM USES OF THE ENVIRONMENT VERSUS LONG-TERM PRODUCTIVITY

CEQA Guidelines Section 15126(e) requires discussion of the "relationship between local short-term use of man's environment and the maintenance and enhancement of long-term productivity." This discussion addresses how the implementation of the proposed actions would affect the long-term productivity of the natural and human environment. Long-term refers to the time period that includes the operational life of the new facilities and beyond.

Installation of a year-round pump station would increase the reliability and availability of water supplies for PCWA. This increased reliability and availability would help PCWA meet current and projected demands, thus supporting the economic viability of the project service area. The project would have short-term impacts on air quality, habitat of wildlife species, recreation, and noise, but these impacts are not expected to alter the long-term productivity of the natural environment.

The Proposed Project includes restoration of the currently dewatered segment of the North Fork American River, resulting in increased habitat availability for fish and aquatic resources in the project vicinity. This habitat alteration represents a long-term beneficial effect on fish resources and aquatic habitat. Additionally, fish passage conditions through the project area would be greatly improved through river restoration, providing a long-term benefit to fish species of the American River.

The Proposed Project would have long-term beneficial effects on water supply, fish and terrestrial resources and recreation. On balance, these long-term improvements or benefits outweigh the potentially significant short-term impacts to environmental resources in the project area.

3.18.6 CLIMATE CHANGE

Long-term climate change is a well-documented phenomenon. Based on predictions made by the Global Change Research Program, climate (air) temperatures in the United States are expected to rise between three to five degrees in the next 100 years. Some very likely consequences of climate change include an increase in precipitation and reduced snow pack. Locally, the American River may be expected to see alterations in the timing and amount of watershed flow patterns. The Global Research Program identified key issues in the West to be: (1) changes in water resources, (2) changes in natural ecosystems, (3) agricultural effects and shifts in tourism, and (4) recreation. A potentially important impact on water resources will be the potential change in amount and timing of peak flows. It also is likely that current reservoir systems eventually will be inadequate to control anticipated occurrences of earlier spring runoff and then maintain supplies for the summer. However, the Global Research Program states, “More research is necessary to identify which systems are most vulnerable.”

Therefore, while it is considered inevitable that climate change will occur, the consequences of climate change are largely speculative and also will be likely to result in other unexpected consequences. The most foreseeable effect that climate change would have on the American River pump station is in regards to whether the pump station is positioned high enough to avoid damage from increased river flows. The Proposed Project’s design specifications place the station at a 100-year flood elevation. This location is expected to be more than adequate to withstand anticipated high river flows. However, ongoing monitoring, operation and maintenance of the facility would identify incremental changes in seasonal river flow patterns that may affect the reliability of the system. Preventive measures to protect facilities would be taken as needed. No adverse impacts due to long-term climate change are anticipated.

Climate change impacts on resources (e.g. fisheries) are speculative. Unfortunately, based on the current research and documentation available, there is no scientifically sound way of predicting absolutes resulting from climate change. For example, water quality could either improve or degrade. In some areas, more precipitation would, very likely, increase contaminant levels (such as agricultural chemicals) and sediments in lakes and rivers. However, in other regions, higher flows would likely dilute pollutants and potentially improve water quality. Massive dislocations of species or pest outbreaks may/may not be a consequence of climate change. Many of the biological impacts are too complex for accurate impact analysis. Therefore, while the effects of climate change are extremely important to analyze, the level of scientific research needed in order to formulate an accurate response is outside the scope of the American River Pump Station Project. The construction design of the pump station utilizes all available data to ensure that it will be a safe and long-lived facility.

3.19 ENDANGERED SPECIES ACT COMPLIANCE

The Mid-Channel Diversion Alternative is the project or action under consideration and being evaluated by the resource agencies for ESA compliance. This alternative is referred to as the Proposed Project throughout the Draft EIS/EIR and in the following discussions. Because ESA and NEPA refer to the project as an "action," the terms Proposed Project and action may be used interchangeably in the following discussions.

3.19.1 INTRODUCTION

Section 3.5 (Fish Resources and Aquatic Habitat) and Section 3.6 (Terrestrial Resources) and the Cumulative Report provide much of the information and analysis requirements of a biological assessment for the Proposed Project. This information, along with that presented below, will help determine to what extent the Proposed Project may affect any of the endangered, threatened, proposed, or candidate species that may occur in the regional study area. Additional information needed to satisfy biological assessment requirements, but not already included in the EIS/EIR or Cumulative Report, is provided in this section. This information is prepared in accordance with legal requirements set forth under Section 7 of the ESA (16 USC 1536 (c)), and follows the standards established in the Reclamation NEPA guidelines and the NMFS and USFWS Endangered Species Consultation Handbook.

The Proposed Project area is within the Auburn, Colfax, Coloma, Greenwood, Gold Hill, Citrus Heights, Rio Linda, Roseville, Sheridan, Lincoln, Pleasant Grove, Camp Far West, Lake Combie, Wolf, Rocklin, and Pilot Hill USGS quadrangles. The regional study area includes Trinity and Shasta reservoirs, the upper and lower Sacramento River, the Yuba, Feather, and Cosumnes rivers, the Delta, and Folsom Reservoir and the lower American River.

3.19.1.1 Endangered, Threatened, or Proposed Species

Sacramento River Winter-run Chinook Salmon - Endangered

NMFS listed the Sacramento River winter-run chinook salmon as "endangered" on July 16, 1993 (59 *Federal Register* (FR) 440). The ESA defines the term "*endangered species" as "any species that is in danger of extinction throughout all or a significant portion of its range."* NMFS concludes that winter-run chinook salmon in the Sacramento River warrant listing as an endangered species due to several factors, including: (1) the continued decline and increased variability of run sizes since its first listing as a threatened species in 1989; (2) the expectation of weak returns in certain years as the result of two small year classes (1991 and 1993); and (3) continued threats to the population. On November 5, 1990, the NMFS section 4(d) rule prohibiting the "take" of Sacramento River winter-run chinook salmon (when winter-run-chinook salmon was listed threatened) went into effect (65 FR 42421).

Central Valley Steelhead Evolutionary Significant Unit - Threatened

NMFS listed the Central Valley ESU of steelhead as "threatened" on March 19, 1998 (63 FR 13347). Section 3 of the ESA defines the term "*threatened species" as "any species which is* *likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range*." NMFS concludes that steelhead in the Central Valley ESU warrant listing as a threatened species due to numerous factors, including: (1) naturally spawning steelhead in Central Valley streams occur in small numbers; (2) many populations are of non-native, mixed, or uncertain origin; (3) long-term declines in abundance; (4) high risk of interbreeding between hatchery and naturally spawned steelhead; (5) loss of historic habitat; (6) degradation of remaining habitat; (7) reduction in water quality and other factors; and (8) lack of monitoring data on abundance (65 FR 13368: March 19, 1998). On September 8, 2000, the NMFS section 4(d) rule prohibiting the "take" of Central Valley steelhead went into effect (65 FR 42421).

Central Valley Spring-run Chinook Salmon ESU - Threatened

NMFS listed the Central Valley ESU of spring-run chinook salmon as "threatened" on September 16, 1999 (64 FR 50393). NMFS concludes that spring-run chinook salmon in the Central Valley warrant listing as threatened due to varied human-induced factors, including: (1) habitat degradation; (2) water diversions; and (3) artificial propagation that serves to exacerbate the adverse effects of natural environmental vulnerability from such factors as drought, flood, and poor ocean conditions (64 FR 5049: September 16, 1999). NMFS has not yet adopted a section 4(d) rule for Central Valley spring-run chinook salmon. NMFS will propose such protective measures for spring-run chinook salmon in a forthcoming *Federal Register* document. However, under Section 7 of the ESA federal agencies must consult with NMFS if any activity they authorize, fund, or carry out may affect listed chinook salmon ESUs (55 FR 46515: September 16, 1999).

Sacramento Splittail - Threatened

USFWS listed Sacramento splittail as "threatened" on February 8, 1999 (64 FR 5963). USFWS concludes that Sacramento splittail warrant listing as threatened due to several factors, including: (1) changes in water flows and water quality resulting from the export of water from the Sacramento and San Joaquin rivers; (2) periodic prolonged drought; (3) loss of shallow-water habitat; (4) introduced aquatic species; and (5) agricultural and industrial pollutants (64 FR 5963: February 8, 1999). Critical habitat has not been designated for Sacramento splittail. USFWS has not yet adopted a 4(d) rule for the Sacramento River splittail. On August 17, 2001, USFWS announced re-opening of the comment period for the final rule on the Sacramento splittail to *"....invite comments and to obtain peer-review on the statistic analysis completed by the Service to re-analyze the available splittail abundance data."* USFWS also is inviting additional comments on the status of the species (66 FR 43145).

Delta Smelt - Threatened

USFWS listed delta smelt as "threatened" on March 5, 1993 (58 FR 12863). USFWS concludes that delta smelt warrant listing as threatened due to several factors, including: (1) large freshwater exports from the Sacramento River and San Joaquin River diversions for agricultural and urban use; (2) prolonged drought; (3) introduced nonindigenous aquatic species; (4)

reduction in abundance of key food organisms; and (5) agricultural and industrial chemicals (58 FR 12863: March 5, 1993). USFWS has not yet adopted a 4(d) rule for delta smelt.

Bald Eagle - Threatened

USFWS listed bald eagle as "threatened" on July 5, 1995 (64 FR 5963). USFWS also adopted a 4(d) rule for the bald eagle, further protecting the species. The bald eagle historically ranged throughout North America, except extreme northern Alaska and Canada and central and southern Mexico. Critical Habitat has not been designated for the bald eagle. On July 6, 1999, the USFWS proposed to remove the bald eagle from the list of endangered and threatened wildlife in the contiguous United States. USFWS concludes that the bald eagle warrant delisting as a threatened species because the species has recovered due to protection and management actions initiated under ESA and reduction in levels of persistent organochlorine pesticides occurring in the environment.

Valley Elderberry Longhorn Beetle - Threatened

USFWS listed VELB as "threatened" on August 8, 1980 (45 FR 52803). Several factors contribute to the listing of VELB as threatened, including: (1) degradation of undisturbed patches of riparian habitat; (2) extensive clearance of riparian forest for fuel and building material and agricultural, as well as urban and suburban development; (3) extensive use of pesticides; and (4) overgrazing.

The Proposed Project site was examined for the presence of VELB, as well as other listed species that have the potential to occur at the site. Elderberry shrubs, the sole habitat of VELB, have been reported upstream of the project area on the north side of Tamaroo Bar (MW and JSA 1995). No exit holes, which would indicate the presence of VELB, were found on the trunks of the elderberry cluster. Also, no elderberry shrubs were observed in or around the areas proposed for construction during the project site surveys. However, USFWS has designated the American River Parkway as Critical Habitat for this beetle (USFWS 1996). This species has been recorded in elderberry shrubs near backwater ponds along the lower American River.

California Red-Legged Frog - Threatened

The Proposed Project site was examined for the presence of the California red-legged frog. Surveys and research indicate that the California red-legged frog is not likely to occur at the project site (Carrier 1998; Carrier 2002). Wetlands suitable for the California red-legged frog are not present in the project area. In addition, suitable sites for the California red-legged frog in adjacent areas are inhabited by bullfrogs, thereby precluding occupancy by the red-legged frog in the Proposed Project area.

3.19.1.2 Candidate Species

For the Proposed Project, Central Valley fall-run and late fall-run chinook salmon are the only candidate species under the federal ESA.

Central Valley Fall-run and Late-fall-run Chinook Salmon Evolutionary Significant Unit - Candidate Species

NMFS concluded in its September 16, 1999 determination that, even though the Central Valley fall-run and late-fall-run chinook salmon ESU do not warrant listing, NMFS considers these species candidate species. NMFS will reevaluate the status of Central Valley fall-run and late-fall-run chinook salmon ESU as new information becomes available to determine whether listing may be warranted (64 FR 50412: September 16, 1999). Although federal candidate species are generally considered in federal environmental documents and may be included in Conservation Plans prepared as part of the application for a Section 10 incidental-take permit under the ESA, they are not provided protection, nor are take prohibitions required, under the ESA.

3.19.1.3 Critical Habitat

The Proposed Project addressed within this EIS/EIR falls within Critical Habitat for the Sacramento River winter-run chinook salmon, delta smelt and VELB. Sacramento River winter-run chinook salmon Critical Habitat was designated by NMFS on June 16, 1993 (58 FR 33212). Critical Habitat for delta smelt was designated by USFWS on December 19, 1994 (58 FR 12863). Final Critical Habitat for VELB was designated by the USFWS on August 8, 1980 (45 FR 52803).

Critical Habitat for Sacramento River winter-run chinook salmon is designated to include the Sacramento River from Keswick Dam, Shasta County to Chipps Island at the westward margin of the Delta, all waters from Chipps Island westward to Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge (58 FR 33212: June 16, 1993).

Critical Habitat for Central Valley steelhead previously was designated but recently was withdrawn to include all river reaches accessible to listed steelhead in the Sacramento and San Joaquin rivers and their tributaries in California. Also included were river reaches and estuarine areas of the Delta, all waters from Chipps Island westward to the Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge (65 FR 7779: February 16, 2000).

Critical Habitat for Central Valley spring-run chinook salmon previously was designated to include all river reaches accessible to listed chinook salmon in the Sacramento River and its tributaries in California but recently was withdrawn. Also included were river reaches and estuarine areas of the Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge (65 FR 7778: February 16, 2000).

Critical Habitat for delta smelt is designated in areas of all water and all submerged lands below the ordinary high water and the entire water column bounded by and contained in Suisun Bay (including the contiguous Grizzly and Honker Bays); and Montezuma sloughs; and the existing contiguous waters contained within the Delta, as defined in section 12220 of the California Water Code (58 FR 12863: December 19, 1994).

Critical Habitat for the VELB is designated in an area in the City of Sacramento enclosed on the north by the Route 160 Freeway, on the west and southwest by the Western Pacific Railroad Tracks, and on the east by Commerce Circle and extends southward to the railroad tracks (NSFR 52803: August 8, 1980). The USFWS has designated the American River Parkway as critical habitat for this beetle (USFWS 1996).

3.19.1.4 Essential Fish Habitat

The 1996 reauthorization of the MSFCMA added a provision for federal agencies to consult with NMFS on impacts to EFH. EFH only applies to commercial fisheries; therefore, for the Proposed Project, this means all chinook salmon habitat, but not steelhead habitat. EFH includes specifically identified waters and substrate necessary for fish spawning, breeding, feeding, or growing to maturity. In the Mid-Pacific Region, the Pacific Fishery Management Council designates EFH, and NMFS approves the designation.

EFH includes all anadromous streams (including some intermittent streams) up to impassable barriers. In the American River Basin, EFH includes the lower American River up to Nimbus Dam. In the Central Valley, it also includes accessible waters of the Delta, Sacramento River, and tributaries up to impassable barriers. Keswick Dam represents the first impassable barrier on the Sacramento River, within the regional study area.

Federal agencies must consult with NMFS on all actions that may adversely affect EFH (Section 305 (b)(2) of the MSFCMA). The NEPA review process may be used to satisfy EFH consultation requirements. Thus, a separate EFH document is not needed. Information contained within this Final EIS/EIR regarding potential effects of implementation of the pump station project satisfy analytical requirements for EFH for Central Valley fall-run chinook salmon.

3.19.2 CONSULTATION TO DATE

3.19.2.1 U.S. Fish and Wildlife Service

August 28, 1998 – PCWA submits a draft Biological Assessment to the USFWS for use in consultation on the Proposed Project.

February 3, 1999 – USFWS, Reclamation, and PCWA meet to discuss the scope of the consultation, including conditions or other conservation measures for the Proposed Project. USFWS agrees that the scope of the consultation for the project will not require assessment of the CVP contract issues. However, USFWS indicates that an evaluation of potential service area effects must still be included in the information provided to USFWS as part of this consultation.

The consultation and coordination with USFWS will require the evaluation of potential direct, indirect, and cumulative impacts at the Proposed Project site, within the affected portion of the service area, and upstream and downstream of the Proposed Project site, based on the hydrologic analysis.

March 15, 1999 – USFWS, Reclamation and PCWA meet to continue discussion of the scope of the consultation and terms and conditions for the Proposed Project. USFWS requests additional discussion in the environmental document of other species that may be affected by the Proposed Project's operation, and expresses the need to mitigate for the loss of habitat, particularly special habitat such as wetlands or riparian areas. Reclamation suggests a draft biological assessment be used to formulate a draft biological opinion, rather than preparing a final biological assessment.

March 30, 1999 – At a meeting, PCWA provides to USFWS an updated description of the Proposed Project and has available service area maps, aerial photographs, and photographs of the existing facilities in response to a USFWS information request. Reclamation's suggestion regarding preparing a draft biological assessment is discussed further, and it is decided that PCWA will prepare the draft EIS/EIR to satisfy ESA and FWCA coordination requirements.

May 3, 1999 – USFWS, Reclamation, and PCWA visit the Proposed Project site and continue discussions related to Proposed Project conditions and draft biological assessment preparation. Following the site visit, USFWS indicates that, primarily due to the extremely disturbed nature of the Proposed Project site, site-specific ESA considerations will not be an issue. However, it is decided to have a focused field survey of wetland area(s) for elderberry shrubs. All parties agree to proceed with a draft BO. It is also agreed that the BO will incorporate conservation measures specific to PCWA, and that the USFWS will pursue municipal measures separately.

November 1999 – USFWS sends a letter to Reclamation advising them that they will not be required to prepare a service area analysis for the Proposed Project. An assessment of service area impacts within the PCWA service area will be completed for the CVP water service contract amendment. This analysis is included in the Cumulative Report (Appendix D of the Draft EIS/EIR).

December 15, 1999 – USFWS, Reclamation and PCWA meet to discuss the Proposed Project. It is relayed that NMFS wants to consult on the Proposed Project.

December 21, 1999 – USFWS sends Draft PAM to Reclamation detailing the scope of the cumulative impact analysis.

December 28, 2000 – USFWS sends revised Draft PAM to Reclamation.

Since December 2000, USFWS, Reclamation and PCWA have participated in additional meetings to consider the potential effects of the Proposed Project on listed species. In May 2002, PCWA agreed to not supply retail treated water service to new developments within environmentally sensitive areas of western Placer County until USFWS has certified that the new development is consistent with the interim conservation strategies of the Placer County Habitat Conservation Plan, that is to be prepared at a later date. Environmentally sensitive areas within western Placer County as used above refers to that area within Placer County west of Highway 65, south of the proposed Highway 65 Lincoln Bypass, and north of Pleasant Creek.

Reclamation, at USFWS request, retained a qualified biologist to perform an additional habitat assessment and site survey for California red-legged frogs, March 2002 and June 2002, respectively. The habitat assessment and site survey both concluded that it would be unlikely for California red-legged frogs to utilize the project area. These findings will be provided to USFWS for consideration during preparation of the Biological Opinion for the Proposed Project.

The Biological Opinion must be completed by USFWS and considered by Reclamation prior to issuance of the Record of Decision for the project.

3.19.2.2 National Marine Fisheries Service

June 16, 2000 – Reclamation meets with NMFS to obtain guidance regarding fish species prioritization in application of target temperature schedules for use in the Cumulative Report. NMFS directs Reclamation to prioritize management of the Folsom Reservoir coldwater pool for steelhead, because fall-run chinook salmon is a candidate species (versus the federally listed threatened species status of steelhead), and because of steelhead over-summer rearing.

October 30, 2000 – Reclamation sends a letter to NMFS requesting their concurrence in use of the multi-species balance temperature schedules in modeling for the Cumulative Report. This approach replaces the steelhead prioritization approach. Because both steelhead and fall-run chinook salmon require consultation, as species of primary management concern, a schedule of target temperatures is developed to address multi-species objectives.

November 30, 2000 – NMFS, Reclamation, and PCWA meet regarding: (1) Folsom Reservoir cold water pool management and temperature modeling for a multi-species approach; (2) consultation needs and procedures; and (3) the content, organization and completion timeline of the Project EIS/EIR and Cumulative Report.

December 15, 2000 – NMFS sends a letter to Reclamation to express their concurrence with the use of the multi-species temperature objective model for the Cumulative Report.

February 8, 2001 – Reclamation sends to NMFS the report outlines for the Project EIS/EIR and Cumulative Report.

Reclamation has continued its coordination effects with NMFS since issuing the Draft EIS/EIR in September 2001. In May 2002, Reclamation and PCWA met with and provided NMFS with updated information describing proposed "double-pump" procedure to minimize impacts to fish resources in Auburn Ravine.

The Biological Opinion must be completed by NMFS and considered by Reclamation prior to issuance of the Record of Decision for the project.

3.19.3 CURRENT MANAGEMENT DIRECTION

PCWA is a member of the Water Forum, a diverse group of water agencies, business groups, agricultural interests, environmentalists, citizen groups, and local governments (stakeholders) that have been working since the fall of 1993 evaluating future water needs and supplies in the Sacramento area. The Water Forum has formulated a Water Forum Proposal for the effective long-term management of the region's water resources. The Water Forum Proposal was formulated based on the two coequal objectives of the Water Forum: (1) provide a reliable and safe water supply for the region's economic health and planned development through the year 2030; and (2) preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River. The Water Forum Proposal has seven linked elements, including *"Support for an improved pattern of fishery flow releases from Folsom Reservoir."*

The Water Forum Proposal was refined into a Water Forum Agreement (in the form of a Memorandum of Understanding among stakeholder agencies). The Water Forum Agreement contains PCWA's purveyor specific agreement that includes provisions for PCWA diversions in drier and driest years. Under this agreement, when projected March through November unimpaired inflow to Folsom Reservoir is less than 950,000 AF, PCWA will replace to the American River a portion of the water diverted at the pump station by reoperation of the MFP reservoirs (referred to as "replacement water"). This arrangement is contingent upon agreements with PG&E and a willing buyer downstream of the project site. The replacement would start when the unimpaired inflow is less than 950,000 AF and would reach a maximum of 27,000 AF when the unimpaired inflow is less than 400,000 AF. Replacement water operations were modeled as delivery to Folsom Reservoir from MFP reservoirs in equal monthly amounts during the months of March through September. The maximum replacement was 27,000 AF corresponding to a Folsom Reservoir unimpaired inflow of 400,000 AF. For a Folsom Reservoir unimpaired inflow between 950,000 AF and 400,000 AF, the replacement water is linearly interpolated between zero and 27,000 AF.

3.19.4 PURPOSE OF THE PROPOSED PROJECT

The purpose of the Proposed Project is threefold: (1) to provide facilities to allow PCWA to convey its MFP water entitlement to the Auburn Ravine Tunnel (also referred to locally as the Ophir Tunnel) to meet demands within its service area; (2) to eliminate the safety issue associated with the Auburn Dam bypass tunnel; and (3) to allow for beneficial uses of water in what is now the dewatered river channel, including recreation, navigation, and other instream beneficial uses.

3.19.5 DESCRIPTION OF THE PROPOSED PROJECT

The Proposed Project evaluated in the EIS/EIR consists of increasing diversions from the American River from 50 cfs up to 100 cfs. This water would be delivered within PCWA Service Area Zones 1 and 5, and possibly the Citizens Utilities Placer County Franchise Area (see Figure 3.2-1) to serve as a back-up M&I and agricultural supply to the Drum-Spaulding Project. This water also would accommodate future planned urban development within the service area.

Because the water supply removes a potential obstacle to growth in Placer County, the project is considered growth-inducing.

Consistent with the project objectives, the design of the individual facilities would provide capacity for a future potential expansion diversion of up to 225 cfs. Sizing the facilities to accommodate the potential expanded diversion amount minimizes environmental effects and costs associated with meeting project objectives. The future expansion would involve installation of higher capacity pumps and increased diversion from the river, the details of which remain undetermined at this time. Expansion of the pump station and any increase of diversions above 100 cfs, including extension of infrastructure to GDPUD, would be subject to additional environmental review and resource agency approvals and permitting.

The major features and activities associated with construction of the Proposed Project include:

- Construction of a new pump station, placed above the 100-year flood level;
- Construction of a water diversion/intake structure;
- Installation of a CDFG-approved fish screen;
- Closure of the bypass tunnel;
- Restoration of flow to the American River channel;
- Installation of water conveyance pipelines;
- Improvement and development of all-weather access roads for project construction and operation;
- Extension of power supply lines; and
- Creation of public river access sites/safety features and related improvements at the Auburn Dam site and near Oregon Bar.

For further information on the description of the Proposed Project, please refer to Section 2.2.2 of the EIS/EIR.

3.19.5.1 Conservation Measures as Part of the Description of the Proposed Project

Conservation measures are actions to benefit or promote the recovery of listed species that are included by the federal agency as an integral part of the proposed action. These measures will be taken by the federal agency or applicant, and serve to minimize or compensate for, project effects on the species under review. These may include actions taken prior to the initiation of consultation, or actions which the federal agency or applicant have committed to complete in a biological assessment or similar document (USFWS, NMFS and AFS 2001).

PCWA is developing or implementing numerous conservation measures which were discussed by PCWA, Reclamation, and USFWS during internal consultations on the Proposed Project from February through May 1999. These conservation measures include: (1) participation in the western Placer County Natural Communities Conservation Plan (NCCP); (2) resource mapping (baseline habitat inventory); (3) access to PCWA lands (by USFWS); (4) expanded place of use (PCWA and USFWS agreed that if an expanded place of use for American River MFP/pump station water was pursued, then a subsequent (and separate) consultation would be conducted); (5) vernal pool preserves (PCWA would provide mapping of vernal pool resources and would encourage associated municipalities in cooperating with the USFWS on preservation of vernal pool resources); (6) programmatic CVP biological opinions (because of Reclamation involvement in the pump station project, PCWA's actions will be consistent with those identified in the USFWS biological opinion for this project); (7) reporting (PCWA agreed to cooperate in reporting of potential impacts to biological resources or potential take of listed species); it is assumed that these reporting responsibilities will also be assigned to participants as part of the Placer County NCCP; (8) planning and communication (PCWA agreed to participate in appropriate planning and communication with USFWS to ensure the receipt of environmental documents and other CEQA-related materials by the USFWS); and (9) general operations and maintenance (PCWA agreed to implement a system of operations and maintenance (O&M) procedures that would incorporate species protection measures).

As indicated earlier, PCWA also recently agreed to not supply retail treated water service to new developments within environmentally sensitive areas of western Placer County until USFWS has certified that the new development is consistent with the interim conservation strategies of the Placer County Habitat Conservation Plan, that is to be prepared at a later date. Environmentally sensitive areas within western Placer County as used above refers to that area within Placer County west of Highway 65, south of the proposed Highway 65 Lincoln Bypass, and north of Pleasant Creek.

Additionally, PCWA has proposed to undertake a flow and water temperature monitoring program for Auburn Ravine, despite the absence of any expected adverse significant impacts on the aquatic resources of Auburn Ravine from the Proposed Project. Flow and water temperature data will be collected to develop a database for future use in decision-making regarding Auburn Ravine resources. The objective of the flow monitoring is to enhance the ability of resource and water managers to determine water quantities of Auburn Ravine. The water temperature monitoring element objective is to collect data to enable assessment of the effects of watershed activities on Auburn Ravine water temperatures. The program includes installation of seven new flow gages and eight new temperature recorders at strategic locations along Auburn Ravine and near the American River pump station. The program is described in greater detail in the Mitigation Plan (Appendix D to the Final EIS/EIR).

The Water Forum, of which PCWA also is a member, is implementing and proposing to implement numerous additional protection, mitigation, and enhancement measures for threatened and endangered species in the lower American River. Many of these measures require, or will require, a significant commitment of resources, and could result in major enhancement of habitat, or reduction in potential effects on listed species.

Reclamation is involved in numerous conservation measures throughout the CVP. On the American River, Reclamation is providing several conservation measures associated with impact avoidance and mitigation measures for specific actions, including a TCD at Folsom Dam and a TCD at the EID intake in Folsom Reservoir. Reclamation also is directly involved in the implementation of other basin-wide efforts such as CALFED, the CVPIA, and the Central Valley Project Conservation Program. In addition, Reclamation continues to be an active participant in the Water Forum process and development of an updated lower American River flow release regime, and flow fluctuation criteria. Reclamation recently sponsored a Value Analysis workshop addressing temperature improvement for the Folsom-Nimbus complex, and continues to convene the Lower American River Operations Working Group. Reclamation also continues to be an active participant in the development of the Aquatic Resources Management and Restoration Plan for the lower American River, and the development of the River Corridor Management Plan for the lower American River.

Implementation of the Proposed Project would result in restoration of the North Fork American River channel in the Auburn Dam construction area. These efforts would include closure of the bypass tunnel and restoration of the currently dewatered channel. In addition, the river restoration design considerations include creation of natural river system features to provide and enhance fish and wildlife habitat of the area.

3.19.6 ACTION AREA

The action area is defined in 50 CFR 402.14(g)(3) as the immediate area involved in the action and the entire area where effects to listed species extend as a direct and indirect effect of the action. For purposes of the Proposed Project, the action area includes the direct effect study area defined as the upper American River from Ralston Afterbay on the Middle Fork American River to the Middle Fork confluence with the North Fork American River, downstream along the North Fork to downstream of Oregon Bar, north of Folsom Reservoir. The direct effect action area also includes the Auburn Dam construction area where the footprint of the Proposed Project facilities would be placed. The indirect effect, or regional study area, encompasses a broad geographic region addressing both diversion-related influences within the CVP system and secondary land-based resources within the water service study area. Due to the coordinated and integrated operations of CVP and SWP system components, the diversion-related regional study area encompasses the Trinity Reservoir/Shasta Reservoir components of the upper Sacramento River, the Sacramento River, the upper American River, Folsom Reservoir, the lower American River downstream to the confluence with the Sacramento River, the Delta, and the Feather, Yuba, and Cosumnes rivers.

3.19.6.1 Species Accounts and Status of the Species in the Action Area

Sacramento River Winter-run Chinook Salmon

Winter-run chinook salmon is a federally endangered species under the ESA. Winter-run chinook salmon Critical Habitat was designated by NMFS on June 16, 1993 (58 FR 33212). A status review of winter-run chinook salmon was conducted by NMFS prior its listing as endangered in 1993. The Winter-run Chinook Salmon Biological Opinion was completed in

February 1993. For further description and additional detail of the winter-run chinook salmon species account for the Proposed Project, please refer to the winter-run chinook salmon status review and biological opinion.

Recovery Plan Implementation

NMFS completed a proposed recovery plan for the federally endangered Sacramento River winter-run chinook salmon in August 1997. The goal of the recovery plan is "*to establish a framework for the recovery of the Sacramento River winter-run chinook salmon population through a logical program of improving the habitat and the species*" (NMFS 1997). According to NMFS, the recovery of the winter-run chinook salmon "*requires actions which increase their abundance and improve their habitat to the point that the probability of subsequent extinction will be very low.*" (NMFS 1997). For further description and additional detail of the recovery plan for winter-run chinook salmon in the Proposed Project regional study area, please refer to *NMFS Proposed Recovery Plan for the Sacramento River Winter-run Chinook Salmon* (1997).

Central Valley Steelhead

Central Valley steelhead is a federally threatened species under the ESA. Central Valley steelhead Critical Habitat was previously designated by NMFS on February 16, 2000 (65 FR 7778) but recently was withdrawn. For further description and additional detail of the steelhead species account for the Proposed Project, please refer to Section 3.5 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

Recovery Plan Implementation

NMFS will enter the process of developing a recovery plan for California Central Valley steelhead in the near future. The recovery plan will: (1) assess the factors affecting steelhead; (2) identify recovery (delisting) goals; (3) identify the entire suite of actions necessary to achieve these goals; and (4) estimate the cost and time required to carry out those actions (NMFS 1997).

Central Valley Spring-run Chinook Salmon

Spring-run chinook salmon is a federally threatened species under the ESA. Critical Habitat for this species previously was designated by NMFS on February 16, 2000 (65 FR 7778) but recently was withdrawn. A status review of spring-run chinook salmon was conducted by NMFS in February 1998. An update of the status review for Central Valley spring-run chinook salmon was conducted on July 16, 1999. For further description and additional detail of the spring-run chinook salmon species account for the Proposed Project, please refer to the spring-run chinook salmon status review, update to the status review, and final ruling for spring-run chinook salmon (64 FR 50393).

Recovery Plan Implementation

NMFS will enter the process of developing a recovery plan for California Central Valley spring-run chinook salmon in the near future. The recovery plan will: (1) assess the factors affecting spring-run chinook salmon; (2) identify recovery (delisting) goals; (3) identify the entire suite of actions necessary to achieve these goals; and (4) estimate the cost and time required to carry out those actions (NMFS 1999).

Sacramento Splittail

Sacramento splittail is a federally threatened species under the ESA. Critical Habitat has not been designated for Sacramento splittail. A biological opinion for Sacramento splittail was completed by USFWS in 1995, when it was then proposed threatened. For further description and additional detail of the Sacramento splittail species account for the Proposed Project, please refer to the USFWS biological opinion for the Sacramento splittail, Section 3.5, and the Cumulative Report (Appendix D of the Draft EIS/EIR).

Recovery Plan Implementation

The Sacramento splittail is not currently included in the USFWS list of federally threatened species with a final recovery plan.

Delta Smelt

Delta smelt is a federally threatened species under the ESA. Critical Habitat for delta smelt was designated by USFWS on December 19, 1994 (58 FR 12863). A status review for delta smelt was conducted by USFWS prior to its designation as threatened in 1993. A biological opinion discussing potential impacts of CVP operations on delta smelt was completed by the USFWS in 1995. For further description and additional detail of the delta smelt species account for the Proposed Project, please refer to the USFWS biological opinion for delta smelt, the status review, and final ruling for delta smelt (58 FR 12863).

Recovery Plan Implementation

USFWS completed a proposed recovery plan for the federally threatened delta smelt in August 1996. The objective of the recovery plan is "*to remove delta smelt from the Federal list of threatened species through restoration of its abundance and distribution."* (USFWS 1996). According to USFWS, the basic strategy to recover delta smelt is "*to manage the estuary in such a way that is better habitat for native fish in general and the delta smelt in particular.*" (USFWS 1996). For further description and additional detail of the recovery plan for delta smelt, please refer to *USFWS Recovery Plan for the Sacramento/San Joaquin Delta Native Fishes* (1996).

Central Valley Fall-run and Late Fall-run Chinook Salmon

Central Valley fall-run and late fall-run chinook salmon are federal candidate species under the ESA. The anadromous Central Valley fall-run and late-fall-run chinook salmon occur throughout the Central Valley, including the Sacramento River and its tributaries, up to impassable fish barriers. For further description and additional detail of the fall-run and late-fall-run chinook salmon species account for the Proposed Project, please refer to Section 3.5 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

Recovery Plan Implementation

Since at this time listed status has not been conferred to the Central Valley fall-run and late fall-run chinook salmon ESU (64 FR 50412), the implementation of recovery plans is not required.

Bald Eagle

Bald eagle is a federally threatened species under the ESA. Bald eagles typically are found near open water (e.g., reservoirs, lakes, and rivers). Large dead trees near open water are used for perching and are an important habitat component (USFWS 1986). Bald eagles have been observed at and around Folsom Reservoir during the winter season, although generally in low numbers (Manolis 1998). Bald eagles may occur in the action area during the winter (B. Williams, pers. comm. 1998). In addition to the ESA and CESA, bald eagles are protected under the Bald and Golden Eagle Protection Act. For further description and additional detail of the bald eagle species account for the Proposed Project, please refer to Section 3.6 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

Recovery Plan Implementation

USFWS completed a proposed recovery plan for the Pacific region bald eagle in 1986. The goal of the recovery plan for the Pacific region is "*a minimum of 800 nesting pairs with an average reproductive rate of 1.0 fledged young per occupied area, and an average success rate for occupied areas of not less than 65% over a 5 year period necessary for recovery. Attainment of breeding population goal should be met in at least 80% of management zone. Wintering populations should be stable or increasing*." (USFWS 1986). According to USFWS, numeric delisting goals have been met since 1995. However, the plan goal for distribution among management zones is not fully achieved for all areas. Nonetheless, the USFWS is currently proposing the removal of bald eagle from the List of Endangered and Threatened wildlife in the lower 48 states of the United States (USFWS 1986). For further description and additional detail of the recovery plan for bald eagle in the action area, please refer to *Pacific Bald Eagle Recovery Plan* (USFWS 1986).

Valley Elderberry Longhorn Beetle

The VELB is a federally threatened species under the ESA. Critical Habitat for VELB was designated by USFWS on August 8, 1980 (45 FR 52803). A status review was conducted by USFWS prior to its listing as threatened in 1980. For further description and additional detail of the VELB species account for the Proposed Project, please refer to the VELB status review and final ruling (45 FR 52803).

Recovery Plan Implementation

USFWS completed a recovery plan for the federally threatened VELB in 1984. The goals of the recovery plan for VELB are *"to protect the three known localities, survey riparian vegetation along certain Central Valley rivers for remaining VELB colonies and habitats, provide protection to remaining VELB habitat within its suspected historic ranges, and determine the number of sites and populations."* On July 9, 1999, the USFWS issued revised conservation guidelines for VELB. This most recently issued version of the guidelines should be used in developing all projects and habitat restoration plans. The survey and monitoring procedures described in these guidelines are designed to avoid any adverse effects to the VELB and obviates the need of a permit to survey for VELB or its habitat or to monitor conservation areas (USFWS 1999). For further description and additional detail of the recovery plan and the new conservation guidelines for VELB in the action area, please refer to *Recovery Plan for the Valley Elderberry Longhorn Beetle* (USFWS 1984) and to the *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS 1999), respectively.

3.19.7 PROPOSED PROJECT, INTERRELATED, INTERDEPENDENT AND CUMULATIVE EFFECTS

This section refers to the extensive impact analysis conducted in the Draft EIS/EIR for the Proposed Project and addresses the direct and indirect effects, interrelated effects, interdependent effects, and cumulative effects. For a full discussion of the impact considerations, please see Section 3.5 and Section 3.6 This section briefly summarizes the overall impact conclusions by species and is, therefore, consistent with the NEPA/CEQA language. However, NEPA/CEQA impact significance consideration terminology is not necessarily consistent with the language specified in the USFWS and NMFS Endangered Species Consultation Handbook. Therefore, although the impacts consideration and determination summaries provided in this section are consistent with the NEPA/CEQA language determination, the conclusion and determination section utilizes the language specified in the USFWS and NMFS Endangered Species Consultation Handbook.

3.19.7.1 Direct and Indirect Effects

Direct effects are those effects caused by the Proposed Project and that occur at the time of the action. Indirect effects are those that are caused by the Proposed Project and are later in time, but still are reasonably certain to occur (USFWS, NMFS and AFS 2001).

The Proposed Project would not result in substantial changes in storage, elevation, or temperature at Oroville Reservoir, or in flow or temperature in the Feather River, relative to the existing condition. Any small changes that might occur would be considered to represent less-than-significant impacts on fisheries resources. Integrated operations of the CVP, as simulated by currently available hydrologic modeling doe not directly affect the Yuba and Bear rivers. Therefore, the Proposed Project would not be expected to substantially effect fish resources and aquatic habitat on the Yuba and Bear rivers. EID's continued use of Cosumnes River water from the Sly Park Unit at Jenkinson Lake and Camp Creek would not result in increased diversions or changes on system operations. The Proposed Project would therefore not have an affect on fish resources and aquatic habitat of the Cosumnes River. These components of the regional study area are not discussed further in this analysis.

Winter-run Chinook Salmon

Sacramento River and the Delta

Minimal potential differences in lower Sacramento River flows and water temperatures, relative to the existing condition, would be expected to have a less-than-significant impact to winter-run chinook salmon. Monthly mean flows below Keswick Dam in the upper Sacramento River would be essentially equivalent to the existing condition in most months. Modeling results indicate that monthly mean flows below Keswick Dam would not be reduced below the NMFS Biological Opinion (1993, as revised in 1995) 3,250 cfs threshold for the protection of winter-run chinook salmon rearing and downstream passage in any month of the October through March period. Long-term average water temperatures for the upper Sacramento River (i.e., Keswick Dam and Bend Bridge) would not change from the existing condition in any month of the year; in most years, individual monthly mean water temperatures would be essentially equivalent to or less than the existing condition. There potentially could be only two additional months when water temperatures could exceed 56°F or 60°F at either Keswick Dam or Bend Bridge, relative to the existing condition.

The long-term average flow at Freeport in the lower Sacramento River would be within 0.2 percent of the long-term average flow under the existing condition in all months of the year. During individual months, flow reductions of more than five percent would occur on only one occasion, relative to the existing condition, over the 70-year period of record. Based on these flow results, physical habitat availability and immigration of adult or emigration of juvenile anadromous fish would not be adversely affected relative to the existing condition. Long-term average water temperatures at Freeport would not change more than 0.1°F during any month of the year; monthly mean water temperatures would be essentially equivalent to the existing condition for all but one month of the simulation. The number of years in which water temperature would exceed index temperatures would be similar to the existing condition during the March through November period. Monthly mean water temperatures would be essentially equivalent to the existing condition for almost all months included in the analysis (827 out of 828 months).

The Proposed Project would have less-than-significant impacts to winter-run chinook salmon in the Delta. Reductions in the long-term average Delta outflow of up to only 0.3 percent for any given month of the February through May period could occur relative to the existing condition. Delta outflow reduction of more than three percent occurred during only seven individual months (out of 350 months) of the February to June period, relative to the existing condition. There would not be any shift in the long-term average position of X2, relative to the existing condition. The maximum upstream shift for any individual month (out of 350 months) of the

February through June period would be less than 1 km (i.e., 0.7 km). All simulations included conformance with SWRCB X2 and the Delta maximum export/inflow ratio requirements.

Early-Lifestage Survival

The long-term average winter-run chinook salmon early-lifestage survival would be 95.8 percent under the Proposed Project, relative to 96 percent under the existing condition. There would not be any substantial decrease in annual early-lifestage survival of winter-run chinook salmon in any individual year of the 69-year period of record, relative to the existing condition. Moreover, the long-term average percent change (i.e., relative change) in early-lifestage survival would decrease by only 0.2 percent. The relative change in early-lifestage survival ranges from a seven percent decrease to a 2.9 percent increase for all 69 years included in the simulation. For further description and additional detail of the effects of the Proposed Project on winter-run chinook salmon, please refer to Section 3.5 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

Central Valley Steelhead

Lower American River

Minimal potential differences in lower American River flows and water temperatures, relative to the existing condition, would be expected to have a less-than-significant impact to steelhead immigration, spawning and incubation, or juvenile rearing and emigration.

Sacramento River and the Delta

In the Sacramento River, potential differences in flows and water temperatures under the Proposed Project would be expected to have a less-than-significant impact to steelhead. The Proposed Project would have less-than-significant impacts to steelhead in the Delta. The effects on flows, water temperature, location of X2, and Delta outflow discussed for the Sacramento River and the Delta under the winter-run chinook salmon section also pertains to steelhead. For further description and additional detail of the effects of the Proposed Project to steelhead lifestages in the lower American River and steelhead in the Sacramento River and the Delta, please refer to Section 3.5 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

Central Valley Spring-run Chinook Salmon

Sacramento River and the Delta

Potential differences in lower Sacramento River flows and water temperatures, relative to the existing condition, would be expected to have a less-than-significant impact to spring-run chinook salmon. The Proposed Project would have less-than-significant impacts to spring-run chinook salmon in the Delta. The potential effects on flows, water temperature, location of X2 and Delta outflow, which are discussed for the Sacramento River and the Delta under the winter-run chinook salmon section, also pertain to spring-run chinook salmon.

Early-Lifestage Survival

The long-term average spring-run chinook salmon early-lifestage survival in the Sacramento River would be 87.7 percent under the Proposed Project, relative to 87.5 percent under the existing condition. There would not be any substantial decrease in annual early-lifestage survival of spring-run chinook salmon in any individual year of the 69-year period of record, relative to the existing condition. The long-term average percent change in early-lifestage survival would only decrease by one percent, relative to early-lifestage survival under the existing condition. The long-term average relative percent change of one percent is primarily due to one individual year of the 69-year period of record included in the simulation. For this individual year of the simulation (i.e., 1933), the estimated absolute survival under existing conditions is 1.8 percent and under the Proposed Project is 0.1 percent. Therefore, the absolute difference between the Proposed Project and the existing condition is only 1.7 percent. However, because early-lifestage survival would be low under the existing condition for this particular year, the relatively small absolute change in early life-stage survival translates into a very large relative change in early-lifestage survival. Excluding this one year, the long-term average relative percent change for the remaining 68 years included in the simulation would be a 0.4 percent decrease. Moreover, the largest increase in early-lifestage survival was an absolute value of 15.4 percent, which translates into an approximate 27 percent increase under the Proposed Project relative to the existing condition.

For further description and additional detail of the potential effects of the Proposed Project on spring-run chinook salmon, please refer to Section 3.5 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

Sacramento Splittail

Lower American River

Potential differences in lower American River flows and water temperatures, relative to the existing condition, would be expected to have a less-than-significant impact to Sacramento splittail spawning. The long-term average monthly flow at Watt Avenue during the February through May period would range between 0.5 to two percent less than under the existing condition. The long-term average acreage of usable riparian vegetation inundated during the February through May spawning period would not change substantially relative to the existing condition. Flow changes would have little, if any, effect on in-channel spawning habitat availability from the mouth up to RM 5. Long-term population trends of splittail would not be expected to be adversely affected, compared to the existing condition. No substantial change in the frequency of water temperature exceeding the reported preferred range for splittail spawning would occur, relative to the existing condition.

Sacramento River and the Delta

Minimal potential differences in lower Sacramento River flows and water temperatures, relative to the existing condition, would be expected to have a less-than-significant impact to Sacramento splittail. The Proposed Project would have less-than-significant impacts to Sacramento splittail in the Delta. The potential effects on flows, water temperature, location of X2 and Delta outflow, which are discussed for the Sacramento River and the Delta under the winter-run chinook salmon section, also pertain to Sacramento splittail. For further description and additional detail of the potential effects of the Proposed Project on Sacramento splittail, please refer to Section 3.5 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

Delta Smelt

Minimal potential differences in Delta outflow and X2 position, relative to the existing condition, would be expected to have a less-than-significant impact to delta smelt. The potential effects on the location of X2 and Delta outflow, which are discussed for the Delta under the winter-run chinook salmon section, also pertain to delta smelt. For further description and additional detail of the potential effects of the Proposed Project on delta smelt, please refer to Section 3.5 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

Central Valley Fall-run and Late Fall-run Chinook Salmon

Lower American River

Potential differences in lower American River flows and water temperatures, relative to the existing condition, would be expected to have a less-than-significant impact to fall-run chinook salmon immigration, spawning and incubation, or juvenile rearing and emigration.

Sacramento River and the Delta

In the Sacramento River, potential differences in flows and water temperatures under the Proposed Project would be expected to have a less-than-significant impact to fall-run and late-fall-run chinook salmon. Also, the Proposed Project would have less-than-significant impacts to fall-run and late-fall-run chinook salmon in the Delta. The potential effects on flows, water temperature, location of X2, and Delta outflow discussed for the Sacramento River and the Delta under the winter-run chinook salmon section, also pertain to fall-run and late fall-run chinook salmon.

Early Lifestage Survival

Fall-run chinook salmon long-term early-lifestage average survival in the lower American River would slightly increase under the Proposed Project relative to the existing condition, from 84.9 to 85 percent. The relative long-term average change in early-lifestage survival also would slightly increase (i.e., 0.1 percent) under the Proposed Project. For all individual years included in the 69-year period of record simulations, the change in early-lifestage survival under the Proposed Project relative to the existing condition would range from a decrease of 0.9 percent to an increase of 1.2 percent.

Under the Proposed Project, the long-term early-lifestage average survival in the Sacramento River would result in a slight increase (i.e., 89.7 percent under the Proposed Project relative to 89.6 percent under the existing condition) and in no estimated change for fall-run and late-fall-run chinook salmon, respectively, relative to the existing condition. The relative long-term average change in early-lifestage survival also would result in a slight increase (i.e., 0.1 percent) and no change under the Proposed Project relative to the existing condition, for fall-run and late-fall-run chinook salmon, respectively. For all individual years included in the 69-year period of record simulated, the change in relative early-lifestage survival under the Proposed Project relative to the existing condition would range from a decrease of 1.2 percent to an increase of 4.4 percent, and a decrease of 0.1 percent to an increase of 0.6 percent for fall-run and late-fall-run chinook salmon, respectively.

For further description and additional detail of the potential effects of the Proposed Project on fall-run chinook salmon lifestages in the lower American River, and fall and late-fall-run chinook salmon in the Sacramento River and the Delta, please refer to Section 3.5 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

Bald Eagle

Construction-related increases in noise and human activity at the Proposed Project site would not be expected to disturb the bald eagle because they are rarely seen and are not known to nest in the area. Individuals foraging in the area could easily use other similar or higher quality habitats in the canyon. Most of the construction activities would occur in a previously dewatered part of the river channel that contains no roosting habitat for the bald eagle. In addition, operation activities would likely disturb bald eagle at a level below existing conditions, because the annual installation and dismantling of seasonal facilities would not be necessary. Operation of the Proposed Project would result in reduced monthly mean flows during certain periods of the year. However, these small flow reductions would not be of sufficient magnitude and frequency to significantly alter existing riparian vegetation dependent on the lower American River. Because cottonwood forest and open-water habitats under the Proposed Project would not be adversely affected, bald eagle also is not expected to be adversely affected. For further description and additional detail of the potential effects of the Proposed Project on the bald eagle, please refer to Section 3.6 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

Valley Elderberry Longhorn Beetle

Backwater ponds/habitats would not be expected to be significantly altered under the Proposed Project, relative to the existing condition; therefore, elderberry shrub and critical habitat for VELB would not be expected to be adversely affected.

For further description and additional detail of the potential effects of the Proposed Project on the VELB, please refer to Section 3.6 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

3.19.7.2 Interrelated Effects

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification—i.e., this action would not occur “but for” a larger action (USFWS, NMFS and AFS 2001). The Proposed Project is not dependent upon a larger action for its implementation. Therefore, the Proposed Project does not directly result in interrelated effects according to the definition provided above. However, the Proposed Project is consistent with the Water Forum Agreement, described above, and its coequal objectives of: (1) provide a reliable and safe water supply for the region's economic health and planned development through the year 2030; and (2) preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River. For further description and detail regarding the Water Forum, please refer to the Water Forum Action Plan (Water Forum 2000).

3.19.7.3 Interdependent Effects

Interdependent actions are those that have no significant utility apart from the action that is under consideration—i.e., other actions would not occur "but for" this action (USFWS, NMFS and AFS 2001). Although other projects are proceeding in the action area, none of these actions or other actions depend on the Proposed Project. Therefore, the Proposed Project does not directly result in interdependent effects according to the definition provided above.

The GDPUD action will require a point of diversion and conveyance infrastructure to deliver that water. The Proposed Project is being designed to be able to be modified for the future conveyance infrastructure needs of GDPUD. This design accommodation represents engineering efficiency, although GDPUD may have alternative means to meet future demands. Nonetheless, extension of infrastructure to GDPUD would be subject to separate environmental review and resource agency approvals.

3.19.7.4 Cumulative Effects

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area. Future federal actions that are unrelated to the Proposed Project are not considered in this section because they will be subject to separate consultation pursuant to section 7 of the ESA (USFWS, NMFS and AFS 2001).

As previously discussed, Reclamation is involved in more than two dozen actions in the American River Basin. These actions include new, amended and renewed CVP water service contracts, Warren Act contracts, flood control operations for Folsom Reservoir, an updated lower American River release pattern, construction of a permanent pump station for PCWA, and construction of a TCD for the EID Pumping Plant. Each of these projects is reasonably foreseeable and affects the hydrologic balance of the American River Basin. The cumulative analysis included in the Cumulative Report (Appendix D of the Draft EIS/EIR) has been conducted with the inclusion of all these reasonably foreseeable actions in the American River Basin. In addition, both this EIS/EIR and the Cumulative Report assess cumulative impacts for four comparisons: (1) Cumulative vs. No Action/No Project Alternative; (2) Cumulative vs. Existing Condition; (3) Cumulative vs. Future Base Condition; and (4) Cumulative vs. ESA Baseline. These comparisons have been assessed for all months of the year, over 70-year (i.e., flows) and 69-year (i.e., water temperature) periods of record throughout the regional study area. For this section of the Draft EIS/EIR, the appropriate focus is on the cumulative versus ESA baseline comparison. As discussed in the Cumulative Report, potentially significant impacts for this comparison include flow-related impacts on steelhead rearing in the lower American River and the effects of flow reductions on potential Sacramento splittail spawning habitat in the lower

American River. For the cumulative versus ESA baseline comparison, no potentially significant impacts were identified for Sacramento River, Feather River, Yuba River, Cosumnes River, or Delta aquatic or terrestrial, proposed, or candidate species. For further discussion and additional detail regarding the cumulative effects analysis for these comparisons, please refer to Section 3.5, Section 3.6, and the Cumulative Report.

3.19.8 CONCLUSION AND DETERMINATION

The USFWS and NMFS have defined the different conclusions and determinations that can be reached through consultation with these agencies. These different conclusions are *"it is likely to adversely affect," "it is likely to jeopardize proposed species/adversely modify proposed critical habitat" and "it is not likely to adversely affect"* (USFWS and NMFS 1998). *"It is likely to adversely affect"* is the appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the proposed action, or indirect result of the interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. In the event the overall effect of the proposed action is beneficial to the listed species, but also is likely to cause some adverse effects, then the proposed action *"is likely to adversely affect"* the listed species. If incidental take is anticipated to occur as a result of the proposed action, an *"is likely to adversely affect"* determination should be made (USFWS and NMFS 1998). *"It is likely to jeopardize proposed species/adversely modify proposed critical habitat"* is the appropriate conclusion when the action agency or USFWS and/or NMFS identify situations where the proposed action is likely to jeopardize the proposed species or adversely modify critical habitat. If this conclusion is reached, conference is required (USFWS and NMFS 1998). *"It is not likely to adversely affect"* is the appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial (USFWS and NMFS 1998).

Based on analysis of the existing environment in the Proposed Project area, the habitat status in the Proposed Project site, the regional study area, and potential project effects, it is concluded that the Proposed Project is not likely to adversely affect federally listed fish species, nor is it expected to jeopardize the continued existence of any federally listed species.

Overall, in the Sacramento River and the Delta and according to the definitions described above, the Proposed Project relative to the existing condition is not likely to adversely affect the Central Valley ESUs of steelhead, spring-run chinook salmon, fall-run and late fall-run chinook salmon, Sacramento winter-run chinook salmon, delta smelt, and Sacramento splittail. Long-term water temperatures in the upper Sacramento River would not change relative to the existing condition, and monthly mean water temperatures would remain essentially equivalent under both scenarios. Long-term average flow in the lower Sacramento river (i.e., Freeport) would not change more than 0.2 percent during any month of the year, and monthly mean water temperatures would remain essentially equivalent in all but one year of the simulation. Long-term average water temperatures at Freeport would not change more than 0.1ºF during any month of the year. In the Delta, reductions in long-term average Delta outflow would be up to 0.3 percent and there would be no change in X2 position for any given month of the February through June period. Moreover, Sacramento winter-run chinook salmon, Central Valley spring-run chinook salmon, fall-run, and late fall-fun chinook salmon would not exhibit any substantial long-term increase in absolute early-lifestage survival, and reflect either slight increases or minor decreases in relative early-lifestage survival. Therefore, based on these results, a conclusion of *"it is not likely to adversely affect"* is warranted. Also, impacts to Critical Habitat that includes the Sacramento River and the Delta are likely to be insignificant, and discountable. For further discussion and additional detail regarding the Proposed Project effects on water temperature, flows, early-lifestage salmon survival, Delta outflow, and X2 position, please refer to Section 3.5 and the Cumulative Report (Appendix D of the Draft EIS/EIR).

In the lower American River, the Proposed Project is not likely to adversely affect fall-run chinook salmon, steelhead or Sacramento splittail. Under the Proposed Project, there would be minor decreases in flow and increases in water temperature in some years, although these changes will be accompanied by minor flow increases and water temperature decreases in other years. Slight increases in long-term average absolute and relative early-lifestage fall-run chinook salmon survival would occur under the Proposed Project relative to the existing condition. Under the Proposed Project, potential differences in flow and water temperature are expected to have a less-than-significant impact on fall-run chinook salmon, steelhead, and Sacramento splittail. Of these species, Critical Habitat previously was designated only for steelhead, although the designation recently was withdrawn. Adverse modification of Critical Habitat is defined as "*...a direct or indirect alteration that appreciably diminishes the value of Critical Habitat for both the survival and recovery of a listed species* [50 CFR §402.02]." The phrase "*appreciably diminish the value*" is further defined as "*...to considerably reduce the capability of designated or proposed Critical Habitat to satisfy requirements essential to both the survival and recovery of listed species* (USFWS and NMFS 1998)." The minor changes in flow and water temperature in the lower American River do not "*appreciably diminish the value*" of steelhead habitat. Nonetheless, potentially significant flow-related impacts on steelhead rearing and potential Sacramento splittail spawning habitat in the lower American River were identified for the cumulative versus ESA baseline comparison. Therefore, for the lower American River, it is concluded that the Proposed Project is not likely to adversely affect the federal candidate or listed fish species, and the cumulative condition is not likely to affect fall-run chinook salmon but may adversely affect but not jeopardize the continued existence of the federally threatened steelhead and Sacramento splittail.

In the upper American River, construction, operation and maintenance of the Proposed Project is not likely to adversely affect the federally threatened bald eagle. As previously discussed, construction-related increases in noise and human activity at the Proposed Project site would not be expected to disturb the bald eagle because they are rarely seen and are not known to nest in the area. Individuals foraging in the area could easily use other similar or higher quality habitats in the canyon. Most of the construction activities would occur in a previously dewatered part of the river channel that contains no roosting habitat for the bald eagle. Moreover, operation activities would likely disturb bald eagle at a level below existing conditions, because the annual installation and dismantling of seasonal facilities would not be necessary. In addition, operation and maintenance of the Proposed Project is not likely to adversely affect the federally threatened VELB. Backwater ponds, open water habitats, and cottonwood forest in the lower American River would not be expected to be significantly altered under the Proposed Project, relative to the existing condition; therefore, elderberry shrub and Critical Habitat for VELB would not be expected to be adversely affected. For further discussion and additional detail regarding the

Proposed Project construction, operation, and maintenance effects on bald eagle and the VELB, please refer to Section 3.6.

Chapter 4.0
Consultation and Coordination

During preparation of this Environmental Impact Statement/Environmental Impact Report (EIS/EIR), the lead agencies, Placer County Water Agency (PCWA) and the U.S. Department of the Interior (Interior) Bureau of Reclamation (Reclamation), consulted with resource specialists, agencies with specific expertise in project issues, and members of the public. These consultations assisted the lead agencies in determining the scope of the EIS/EIR, identifying the range of alternatives and environmental protection and mitigation measures, and defining impact significance. Consultation included telephone calls, formal interagency meetings, and public meetings. The lead agencies provided the Draft EIS/EIR to the resource agencies for their review during the public comment period. Additionally, Reclamation sought formal consultation with both the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) pursuant to the federal Endangered Species Act (ESA). This chapter summarizes agency consultations and public involvement efforts conducted during the project planning and environmental review process.

4.1 CONSULTATION

4.1.1 FEDERAL ENDANGERED SPECIES ACT CONSULTATION

U.S. Fish and Wildlife Service

In compliance with the federal ESA, Reclamation entered into informal consultation with U.S. Fish and Wildlife Service in 1997. Reclamation, PCWA, and USFWS met several times between July 1998 and October 1999 to determine the scope, identify species of concern, and to develop an appropriate approach for assessing listed and proposed for listing species as part of the Section 7 consultations required by the federal ESA. In June 1999, USFWS and Reclamation initiated development of the analysis approach for the American River Basin Cumulative Report (Cumulative Report) (Appendix D of the Draft EIS/EIR). This approach was documented in a Planning Aid Memorandum (PAM) from USFWS to Reclamation on December 28, 2000. Formal consultation began with initiation of the public review period for the EIS/EIR. USFWS provided comments on the Draft EIS/EIR and Cumulative Report/PAM. Additional meetings were held to provide additional information relative to the Proposed Project and USFWS consultation requirements. USFWS will provide a biological opinion for Reclamation's consideration prior to completion of the NEPA process and preparation of the Record of Decision (ROD). The biological opinion will become part of the administrative record for the project. Terms and conditions for the protection of special status species will be incorporated into the contract specifications for the project. The biological opinion will indicate USFWS findings regarding impacts to the bald eagle, American peregrine falcon, California horned lizard, spotted bat, greater western mastif-bat, Townsend big-eared bat, foothill yellow-legged frog, California red-legged frog, valley elderberry longhorn beetle, Sacramento splittail, and delta smelt.

National Marine Fisheries Service

Reclamation also participated in informal consultations with NMFS during preparation of the Draft EIS/EIR for the project. Formal consultations began with the initiation of the public review period for the Draft EIS/EIR. Representatives from NMFS also were involved in the development of the PROSIM modeling assumptions and aquatic resources impact assessment approach for the Cumulative Report. NMFS will prepare a biological opinion on the Proposed Project (Mid-Channel Diversion Alternative) that will identify findings regarding project impacts upon chinook salmon and steelhead, to be provided to Reclamation and considered in the decision- making for the project prior to completion of the ROD. Terms and conditions for the protection of special status species will be incorporated into the contract specifications for the project. The consultation process with NMFS also includes consideration of potential direct or indirect effects on Essential Fish Habitat (EFH) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act.

4.1.2 FISH AND WILDLIFE COORDINATION ACT CONSULTATION

The Fish and Wildlife Coordination Act (FWCA) ensures that fish and wildlife receive equal consideration during planning and construction of federal water projects. The FWCA requires that the USFWS's views be considered when evaluating impacts and determining mitigation needs. Consultation with USFWS under the FWCA began in 1997 and has continued over the course of the environmental process for the project. USFWS representatives assisted in defining the scope of analysis for this Draft EIS/EIR and participated in its review. USFWS provided comments on the Draft EIS/EIR and prepared a draft Coordination Act Report (CAR). Reclamation and USFWS will review the recommendations of the draft CAR and finalize the CAR. The final CAR recommendations will be provided to Reclamation and considered in the decision-making for the project and incorporated into the ROD.

4.1.3 INDIAN TRUST ASSETS AND NATIVE AMERICAN CONSULTATION

Reclamation's Indian Trust Assets (ITAs) Coordinator has confirmed that no ITAs would be affected by the Proposed Project or alternatives. No further action is required (Section 3.18.1).

4.1.4 NATIONAL HISTORIC PRESERVATION ACT/STATE OFFICE OF HISTORIC PRESERVATION CONSULTATION

The National Historic Preservation Act of 1966 (as amended in 1992) requires federal agencies to consult with the Advisory Council on Historic Preservation concerning potential effects of federal actions on historic properties. Notices of public meetings for this project have been sent to the State Historic Preservation Officer (SHPO). A copy of this Draft EIS/EIR has been sent to SHPO requesting its review and soliciting input on the project. Reclamation will continue to coordinate with the Advisory Council on Historic Preservation and SHPO, consistent with Section 106 of the National Historic Preservation Act.

4.1.5 CALIFORNIA RESOURCES AGENCY DEPARTMENT OF PARKS AND RECREATION

In September 1999, the State Attorney General's office and Interior began correspondence regarding closure of the Auburn Dam construction area bypass tunnel and restoration of the North Fork American River to its natural channel. Correspondence and coordination continued into early 2001 with the result being a Memorandum of Agreement (MOA) (Appendix A of the Draft EIS/EIR) between the United States and the State of California regarding cost-sharing for the planning phase of the restoration of the North Fork American River.

The MOA, signed in January 2001, specifies project components including the provision of public river access facilities and safety features in response to the anticipated increased incidental recreation use of the restored river channel under the Proposed Project. The public river access sites are proposed to permit management of public health and safety/emergency purposes, as well as resource protection activities related to restoring the dewatered portion of the river channel.

In addition to the agreement between the two agencies, California Department of Parks and Recreation (CDPR) resource experts are actively involved in the development of the river channel restoration design concepts and planning efforts.

4.1.6 CALIFORNIA DEPARTMENT OF FISH AND GAME COORDINATION

Reclamation and PCWA are coordinating with representatives from California Department of Fish and Game (CDFG) regarding the design of fish screens for the proposed intake structure for the Mid-Channel Diversion and Upstream Diversion alternatives. The selected alternative final design will incorporate the most recent recommended fish screening design criteria appropriate for the species and lifestages present at the project site as agreed to by CDFG. The No Action/No Project Alternative would include use of CDFG-approved fish screening techniques identified in the Streambed Alteration Agreement for the seasonal pump station. CDFG resource experts are actively involved in the development of the river channel restoration design concepts and planning efforts. CDFG fish screen experts will remain actively involved in the design and approval of fish screens to be constructed for the selected alternative.

4.2 PUBLIC INVOLVEMENT

The following is a summary of the public involvement activities including public informational and environmental process scoping meetings for the project. Further discussion of these activities and the issues identified for evaluation in the EIS/EIR are presented in the Scoping Summary Report available through lead agency contacts (see Cover Page for information).

4.2.1 PUBLIC MEETINGS

Reclamation and PCWA have invited public and agency stakeholders to several meetings since initiation of project planning in July 1995. All meetings were held in the City of Auburn, at the offices of PCWA, and jointly hosted by PCWA and Reclamation.

Stakeholder meetings were held July 6, 1995 and April 11, 1997 to provide key resource agencies and local interest groups information regarding project objectives, design considerations, and the environmental process. The July 6, 1995 meeting provided for an introduction of the project and planning process and involved interested parties. The April 11, 1997 meeting included an informal question and answer workshop followed by a visit to the project site. Discussion of key issues included channel stabilization, power, fish screening, fish habitat, bypass tunnel concerns, riparian revegetation, pump station location, and recreation opportunities.

A public scoping meeting was held the evening of May 28, 1997 to inform the public of the project and solicit input on the scope of the Environmental Assessment/Initial Study (EA/IS) as to the project alternatives and the potentially significant design/environmental issues. A meeting notice was mailed to over 100 agency and interest group representatives. Lead agency representatives described the proposed project alternatives, including a brief history of the Auburn Dam site, project objectives, and issues associated with each of the project alternatives. Questions and comments were taken throughout the meeting and attendees were encouraged to provide written comments as well. Twenty-three people attended the meeting.

On May 14, 1998, the lead agencies held a public stakeholder status meeting to update interested parties concerning progress on the project studies since May 1997. The lead agencies reviewed preliminary design considerations and initial value planning results, and requested input to identify any additional issues that the public felt should be discussed in the environmental documentation. Twenty-six people attended the meeting.

On September 16, 1998, a public meeting was held as a follow-up to the May 1998 session, to update interested parties on the project, describe refinements to the design of the project, and discuss the anticipated schedule for completion of an EA/IS. One hundred meeting announcements were distributed to agency and interest group representatives, members of the public, and local media. Eighteen people attended the meeting.

In early 1999, prior to completing the Administrative Draft EA/IS, the lead agencies determined that an EIS/EIR should be prepared for the project. This decision was based on the evaluation of other proposed actions involving the Central Valley Project (CVP) and the anticipated cumulative effects upon resources within the lower American River and other portions of the CVP system. Scoping activities related to the Draft EIS/EIR are described below followed by a summary listing of public comments received since initiation of the public involvement activities for this project.

Following completion and circulation of the Draft EIS/EIR, Reclamation, PCWA, CDPR and CDFG representatives participated in several additional meetings with interested parties on the project. These meetings included stakeholder groups interested in project area trail issues, Auburn Ravine fish resources, and City of Auburn neighborhood groups. The Proposed Project and

Upstream Diversion Alternative descriptions and mitigation measures were modified to reflect these stakeholder concerns and to provide further clarification of environmental protection efforts of the lead agencies related to these topics.

4.2.2 ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT SCOPING

Reclamation published the Notice of Intent (NOI) to prepare an EIS and notice of a scoping meeting pursuant to the National Environmental Policy Act (NEPA) in the *Federal Register* on June 18, 1999. At the same time, PCWA distributed the Notice of Preparation (NOP) of an EIR pursuant to the California Environmental Quality Act (CEQA) to resource agencies and interested members of the public. Copies of the NOI and NOP are included in Appendix B of the Draft EIS/EIR.

A scoping session was held in Auburn on July 8, 1999 to provide the public with an update on the status of the project and to identify additional significant issues to be addressed in the Draft EIS/EIR. Both lead agencies published news releases announcing the time and place for the scoping session. The meeting was attended by about 50 people. Eighty-nine comment letters were received during the comment period (June 18, 1999 through July 30, 1999). The lead agencies and the Draft EIS/EIR project team reviewed each letter and determined how each issue raised by agencies and individuals would be addressed in the Draft EIS/EIR. A Scoping Summary Report was prepared to summarize the public comments received at the scoping session, as well as those received during previous public involvement efforts. The Scoping Summary Report is available through lead agency contacts (see Cover Page for information).

4.2.3 SUMMARY OF PUBLIC CONCERNS

The comments received during project scoping and public involvement activities are summarized below by major topic. Consultations with resource agencies and the professional judgment of the specialists involved in preparation of the Draft EIS/EIR further defined the impact issues that are addressed in Chapter 3.0, Affected Environment and Environmental Consequences.

Water Supply and Hydrology

- Commitment to Water Forum purveyor-specific agreement elements
- River channel stability – cofferdam debris movement
- Long-term stability of the diversion structure
- Backwater effect at Tamaroo Bar
- Flood event effects on project facilities
- Meet increased demand by conservation or water exchanges with other purveyors
- Instream flow/diversion effect
- Discuss possible use of pump station facilities by Georgetown Divide Public Utility District, identify any rate increase associated with facility construction
- Consistency of this project with the CVP Improvement Act PROSIM 99 model
- Groundwater supplies

Fish Resources and Aquatic Habitat

- Special-status species – chinook salmon, steelhead (flow, diversion structure)
- Instream flow requirements for fisheries
- Water chemistry changes – effects on special-status fish species migration (Auburn Ravine)
- Restoration of coho salmon to the north and middle forks of river (otters and eagles)
- Restore the river channel
- Restore fish runs upstream of Folsom Dam
- Protection of fish from injury at the pump station
- Auburn Ravine impacts from increased flows

Terrestrial Resources

- Wildlife migration corridors and flyways
- Riparian habitat protection/enhancement
- Restore the river channel to improve the ecosystem

Water Quality

- Sedimentation/turbidity
- Water temperature
- Auburn Ravine – when the water leaves the Auburn Ravine Tunnel – where does it go?
- Groundwater quality

Recreation

- Public access – hiking/equestrian/bicycle trails, access to the river for water-based activities
- Public use of roads constructed by the project
- Project consistency with the Auburn State Recreation Area Interim Resource Management Plan
- Cost-benefit comparison of recreation opportunities between alternatives
- Diversion tunnel safety hazard to recreation
- Restore the river channel for water-based activities
- Attract Olympic events

Visual Resources

- Pump station aesthetics

Land Use

- Growth-inducement aspects of increased diversion/water supply (traffic, loss of habitats, public service burden)
- Agriculture impacts
- Placer County General Plan – what does "build-out" look like; will the project serve build-out; will other facilities need to be constructed?
- Public utilities and services – energy consumption by pump station

Air Quality

- Short-term construction emissions
- Long-term operational emissions

Public Health and Worker Safety

- Diversion tunnel safety
- Structures as potential attractive nuisance (safety issue)

Alternatives Analysis

- Upstream location poor choice – silt settling basin requires frequent dredging or special effort to maintain
- Cost-benefit analysis between alternatives – particularly related to recreation opportunities

Other Issues

- Political support
- Funding/use of tax dollars
- Auburn Dam – future construction/waste of resources
- Future planned changes to Folsom Dam (height)
- Relationship of project to other local and regional projects (cumulative analysis)
- Public Trust Doctrine
- Unreasonable methods of diverting water prohibited by Article X, Section 2 of the California Constitution and Section 100 of the California Water Code

4.2.4 PUBLIC REVIEW OF DRAFT EIS/EIR

The Public Draft EIS/EIR was available for review and comment for 60 days following filing of the Notice of Availability (NOA) of the EIS with the Environmental Protection Agency and the Notice of Completion (NOC) of the EIR with the California State Clearinghouse.

The NOA and notice of public hearing on the EIS were published in the *Federal Register.* The NOC was filed with the California State Clearinghouse and posted at the Placer, El Dorado, and Sacramento county clerk offices.

The purpose of public review of the Draft EIS/EIR is to receive comments from interested parties on its completeness and adequacy in disclosing the environmental effects of the proposed project. Following the close of the Draft EIS/EIR public review period, a second document containing comments received on the Draft EIS/EIR and responses to the significant environmental points raised in those comments, will be prepared and published. Together, the Draft EIS/EIR and the responses to comments will constitute the Final EIS/EIR. Reclamation is responsible for adopting the EIS as adequate in compliance with NEPA, and PCWA is responsible for certifying the EIR as adequate in compliance with CEQA. After adoption and certification, the agencies will use the EIS/EIR in making their determinations whether to approve the project.

4.3 DISTRIBUTION LIST

The Draft EIS/EIR was available for public review at Reclamation and PCWA offices as well as several libraries, listed in **Table 4-1**. Additionally, copies of the Draft EIS/EIR were distributed to federal and state government officials and resource agencies; regional and local government offices; water districts, agencies, and utilities; other interest groups and organizations; and individuals as identified in **Table 4-2**.

The Final EIS/EIR was also made available for review at Reclamation and PCWA offices and local libraries throughout the study area. The distribution of the Final EIS/EIR is reflected in Tables 4-1 and 4-2.

Table 4-1
Locations Where the Draft EIS/EIR was made Available for Public Review

Auburn-Placer County Library 350 Nevada Street, Auburn, CA 95603	Placer County Water Agency 144 Ferguson Road, Auburn, CA 95604
Georgetown Divide Public Utility District 6425 Main Street, Georgetown, CA 95634	Rocklin Library 5460 5th Street, Rocklin, CA 95677
El Dorado County Main Library 345 Fair Lane, Placerville, CA 95667	Sacramento Public Library 828 I Street, Sacramento, CA 95814
Lincoln Library 590 Fifth Street, Lincoln, CA 95648	U.S. Bureau of Reclamation 7794 Folsom Dam Road, Folsom, CA 95630
Loomis Branch Library 6050 Library Drive, Loomis, CA 95650	U.S. Bureau of Reclamation 2800 Cottage Way, Sacramento, CA 95825
Penryn Library 2215 Rippey Road, Penryn, CA 95663	

Table 4-2 Agencies, Organizations, and Individuals Receiving Copies of the Draft and Final EIS/EIR
U.S. Government Officials
Barbara Boxer, U.S. Senate Dianne Feinstein, U.S. Senate John T. Doolittle, U.S. House of Representatives, District 4 Robert Matsui, U.S. House of Representatives, District 5 Doug Ose, U.S. House Representatives, District 3
Federal Government Agencies
El Dorado National Forest National Marine Fisheries Service National Park Service Native American Heritage Commission Tahoe National Forest U.S. Army Corps of Engineers U.S. Bureau of Land Management U.S. Bureau of Reclamation U.S. Department of Agriculture U.S. Department of Energy U.S. Environmental Protection Agency U.S. Fish and Wildlife Service U.S. Geological Survey, Water Resources Division
State Government Officials
Dave Cox, Assembly District 5 Bob Franzoia, State Senate Appropriations Staff Tim Leslie, Senate District 1 Mike Machado, Senate District 5 Thomas "Rico" Oller, Assembly District 1 Deborah Ortiz, Senate District 6 Anthony Pescetti, Assembly District 10 Jeff Shellito, State Senate Staff
State Government Agencies
California Air Resources Board California Department of Boating and Waterways California Department of Conservation California Department of Fish and Game California Department of Forestry and Fire Protection California Department of Health Services California Highway Patrol California Department of Parks and Recreation California Department of Water Resources California Environmental Protection Agency California Office of Historic Preservation California Regional Water Quality Control Board, Central Valley Region California Resources Agency California State Attorney General's Office California State Clearinghouse California State Lands Commission California State Reclamation Board California State Water Resources Control Board CALTRANS District 03

Table 4-2 Agencies, Organizations, and Individuals Receiving Copies of the Draft and Final EIS/EIR
Regional and Local Government Agencies
Auburn Recreation District City of Auburn Chamber of Commerce City of Auburn City Clerk/City Council City of Colfax City Clerk/City Council City of Folsom Chamber of Commerce City of Folsom City Clerk/City Council City of Folsom Planning Department City of Lincoln City Clerk/City Council City of Placerville Community Development Department City of Rocklin Clerk/City Council City of Rocklin Community Development Department City of Roseville Clerk/City Council City of Roseville Development Department El Dorado County Air Pollution Control District El Dorado County Board of Supervisors El Dorado County Department of Community Development El Dorado County Parks Department Granite Bay Community Association Placer County Air Pollution Control District Placer County Board of Supervisors Placer County Planning Agency Placer County Sheriff's Office Roseville Community Development Department Sacramento County Department of Environmental Review Sacramento County Sanitation District Sacramento Metropolitan Air Quality Management District Sacramento Metropolitan Chamber of Commerce Shingle Springs/Cameron Park Chamber of Commerce Town of Loomis
Water Districts, Agencies and Utilities
Association of California Water Agencies California Urban Water Agencies Central Valley Project Water Association California American Water Works (Citizens Utilities of California) City/County Office of Metropolitan Water Planning East Bay Municipal Utility District El Dorado County Water Agency El Dorado Irrigation District Foresthill Public Utility District Fruitridge Vista Water Company Georgetown Divide Public Utility District Kirkwood Meadows Public Utility District Northern California Water Association Pacific Gas and Electric Company Placer County Flood Control District Placer County Water Agency Sacramento Area Flood Control Agency Sacramento County Water Agency San Juan Water District

Table 4-2
Agencies, Organizations, and Individuals Receiving Copies of the Draft and Final EIS/EIR

Environmental Organizations
American River Parkway Foundation American River Recreation Association California Fly Fishers Unlimited California Native Plant Society California Sportfishing Protection Alliance California Striped Bass Association California Trout, Inc. California Wilderness Coalition Center for Sierra Nevada Conservation Defenders of Wildlife Environmental Council of Sacramento Environmental Defense Fund Folsom Auburn Trail Riders Association Friends of the River National Audubon Society Natural Resources Defense Council Nature Conservancy Pacific Coast Federation of Fishermen Planning and Conservation League Protect American River Canyon Save the American River Association Sierra Club
Other Interests
A Whitewater Connection Actium Development Corporation American River Guides Association American River Raft Rentals Auburn Centennial Auburn Journal Bailey Environmental Bookman-Edmonston Engineering Building Industry Association California Farm Bureau Federation California Outdoors California State University of Sacramento CH2M Hill Curly Media Current Adventures Earthtrek Expeditions EDAW EIP Associates El Dorado Citizens for Water El Dorado County Association of Realtors El Dorado County Farm Bureau El Dorado Gazette ESRI California Region Fruit Growers Supply G.W. Consulting Engineers Gold Rush White Water Rafting Kronick, Moskovitz, Tiedemann and Girard League of Women Voters

Table 4-2 Agencies, Organizations, and Individuals Receiving Copies of the Draft and Final EIS/EIR
Other Interests (Continued)
McKay and Somps Engineers McLaughlin Water Engineers Montgomery Watson Mountain Democrat Nolte Engineers Parsons Remy, Thomas and Moose River Rat Sierra Outdoor Center Somach, Simmons and Dunn Southwest Bedford Holdings Taxpayer's Association of El Dorado County The Sacramento Bee Triple 7 Ranch U.C. Davis URS Corporation Water Education Foundation Western States Endurance Run Western States Trail Foundation Whitewater Expeditions and Tours
Individuals
James Alderink Elaine Baden Amy Bostone Abigal Cartier Emmet Cartier Donna Cederland Marcie Cedree Eileen Crim Nancy Dagle Wesley Dill Jean Dimanto Kendra Douglas Peggy Egli Annie Embree Gary Estes Jared Ficker Laurie Fowler James Haagen-Smit Dennis Hada Sarah Jordan Carolyn Kemmler Melba Leal Jay McCain Bill Michel John Milliken Brian O'Brien Ron Otto Erin and Matt Perry Richard Pompo Steven Proe

Table 4-2 Agencies, Organizations, and Individuals Receiving Copies of the Draft and Final EIS/EIR
Individuals (Continued)
Jim Roberts Lore Roberts David Ruark Laura Snow Jim Strong Jack Tolomei Ben Troia Charlie Walbridge

Chapter 5.0
List of Preparers

Table 5-1 identifies the names and area of participation of the lead and resource agency representatives who were primarily responsible for providing input to the Draft and Final Environmental Impact Statement/Environmental Impact Reports (EIS/EIR). **Table 5-2** includes the names, qualifications, and area of participation of the persons who were primarily responsible for preparing the EIS/EIR, including those persons who provided substantive supporting information or analyses.

Table 5-1
Resource Agency Participants and Preparers

Name	Area of Participation
U.S. Bureau of Reclamation – NEPA Lead Agency	
Tom Aiken	Project Oversight
Roderick Hall	Lead Agency Contact, Description of Alternatives, Response to Comments, Mitigation Monitoring and Reporting Program/Environmental Commitments Plan
Doug Kleinsmith	NEPA Coordination, Document Review and Processing
Cecil Lesley	Reclamation Contract Terms and Negotiations
Robert Meador	Response to Comments, Mitigation Monitoring and Reporting Program/Environmental Commitments Plan
William Sanford	Project Design and Description
Rob Schroeder	Liaison with Other Reclamation American River Basin Actions; Document Review; Response to Comments, Mitigation Monitoring and Reporting Program/Environmental Commitments Plan
Jim West	Cultural Resources Issues, Coordination with SHPO Regarding Section 106 Compliance and Programmatic Agreement for Mitigation of Potential Effects
Placer County Water Agency – CEQA Lead Agency	
Einar Maisch	Lead Agency Contact; Description of Alternatives; Document Review
Brent Smith	Document Review and Project Management Assistance
Mal Toy	Input Regarding Agency Policies and Operations
U.S. Fish and Wildlife Service	
Michael Thabualt	ESA Consultation
Jan Knight	ESA Consultation
Justin Ly	ESA Consultation
Bart Prose	FWCA Coordination
Arnold Roessler	ESA Consultation
Jill Wright	FWCA Coordination
National Marine Fisheries Service	
Mike Aceituno	ESA and EFH Consultations
Bruce Oppenheim	ESA and EFH Consultations
John Baker	ESA and EFH Consultations

Table 5-1 (Continued) Resource Agency Participants and Preparers	
Name	**Area of Participation**
California Department of Parks and Recreation	
Jill Dampier	Channel Restoration and Public River Access Information; Response to Comments, Mitigation Monitoring and Reporting Program/Environmental Commitments Plan
Jim Micheaels	Channel Restoration and Public River Access Information, Response to Comments, Mitigation Monitoring and Reporting Program/Environmental Commitments Plan
California Department of Fish and Game	
Kris Vyverberg	Channel Restoration and Fish Screen Design Consideration, Responses to Comments
Dan Odenweller	Fish Screen Design Considerations
Cindy Watanobee	Fish Screen Design Considerations

Table 5-2 List of Preparers		
Name	**Expertise and Education**	**Area of Participation**
Surface Water Resources, Inc.		
Paul Bratovich	Fisheries Biology, Endangered Species, Flow-Habitat Relationships M.S., Fishery Resources, 1985 B.S., Fisheries, 1977	Principal-In-Charge, Resource Agency Consultations, Fish Resources and Aquatic Habitat, ESA Compliance, Terrestrial Resources, Responses to Comments, Document Review
Tami Mihm	CEQA/NEPA Compliance, Water Resources and Land Use Planning, Permitting B.S., Environmental Policy Analysis and Planning, 1988	EIS/EIR Project Manager, Description of Project Alternatives, Affected Environment and Environmental Consequences, Consultation and Coordination, Public Scoping Report, Oversight of Document Preparation and Production, Technical Editing, and Agency Coordination, Responses to Comments, Mitigation Monitoring and Reporting Program/Environmental Commitments Plan
Carol Brown	Administrative Support and Document Management	Document Word Processing, Formatting, Technical Editing, Production, and Project Mailing List
Thomas Duster	Fisheries Biology B.S., Wildlife Biology, Aquatic Emphasis, 2001	Responses to Comments, Fish Resources and Aquatic Habitat
Allison Dvorak	Water Resources Systems and Hydrologic Modeling M.S., Hydrologic Sciences, 2000 B.S., Earth and Atmospheric Sciences, 1998	Modeling Output Template Development and Production

Table 5-2 (Continued) List of Preparers		
Name	**Expertise and Education**	**Area of Participation**
Surface Water Resources, Inc. (Continued)		
John Faux	Water Resources Systems and Hydrologic Modeling M.S., Agricultural and Resource Economics, 1996 M.S., Civil Engineering: Water Resources Planning and Management, 1983 B.S., Watershed Science, 1979	Power Supply, Fish Resources and Aquatic Habitat, Water Supply and Hydrology, Recreation, Visual Resources, and Cultural Resources
Inês Ferreira	Water Resources Systems and Hydrologic Modeling M.S., Civil Engineering, 1993 M.S., Applied Mathematics, 1992 B.S., Mathematics, 1985	Water Supply and Hydrology, Fish Resources and Aquatic Habitat, and Recreation
Shannon Gates	Biological Sciences B.S., Biology, Neurobiology, Physiology, and Behavior Emphasis, 2001	Responses to Comments (Air Quality); Mitigation Monitoring and Reporting Program/Environmental Commitments Plan
Jeanie Hinds	Conservation Biology, NEPA/CEQA Compliance B.S., Evolution and Ecology, 2000	Responses to Comments (Terrestrial Resources)
Steve James	Conservation Biology, ESA Compliance, Terrestrial Ecology M.S., Biology/Botany, 1996 B.A., Aquatic Biology, 1984 B.A., Environmental Studies, 1979	Terrestrial Resources
Michael Jones	Water Resources Planning B.S., Chemistry, 1993 J.D., 1998	Cumulative Impacts
Carol Lazzarotto	Water Resources Planning P.P.A., Public Policy, 1984 B.A., Political Science, 1981	Water Supply and Hydrology, Water Quality, Visual Resources, and Noise
George "Buzz" Link	Water Resources Systems and Hydrologic Modeling B.S., Civil Engineer, 1975 Professional Engineer, California	Modeling, Water Supply and Hydrology, Recreation, Power Supply
Janice Pinero	Fisheries and Aquatic Habitat Resources B.A., Biology and Economics, 1999	Fish Resources and Aquatic Habitat and ESA Compliance
Jason Ramos	Water Resource Science and Land Use Planning B.S., Natural Resources Planning and Interpretation, 2000	Project Description, Terrestrial Resources, Geology and Soils, Public Health and Worker Safety, Transportation and Circulation
Karen Riggs	Environmental Planning B.S. Environmental Studies, Biology, 2001	Responses to Comments

Table 5-2 (Continued)
List of Preparers

Name	Expertise and Education	Area of Participation
Surface Water Resources, Inc. (Continued)		
Dianne Simodynes	Environmental and Biological Sciences M.S., Aquatic Resource Management, 2001 B.S., Biological Sciences, 1993	Responses to Comments, Environmental Mitigation and Monitoring Program/Environmental Commitments Plan; Document Preparation Assistance
Linda Standlee	Administrative Support	Responses to Comments Coordination and Document Preparation
Jeff Strawn	Technical Illustration, Cartography, Graphics, Geographic Information System B.S., Business Administration, 1989	Cartography, Maps, and Figures
John Anderson		
John Anderson	Whitewater Recreation B.S., Architecture, 1978	Whitewater Recreation Input for Restored River Channel and Diversion Structure
Montgomery Watson		
Wayne Dahl, P.E.	Civil and Environmental Engineering B.S., Civil Engineering, 1979	Project Design Considerations (Pump Station, Diversion, Intake, Pipelines); Facilities, Operation, Maintenance, and Construction Activities, Responses to Comments
Janet Atkinson, P.E.	Professional Engineer B.S., Civil Engineering	Project Design Considerations
Mark Hargrove	Civil Engineering B.S., Civil Engineering	Project Design Considerations, Graphics
Amy Wade	Civil and Environmental Engineering B.S., Civil and Environmental Engineering, 2001	Project Design Considerations, Permitting Conditions
McLaughlin Water Engineers, Ltd.		
Rick McLaughlin	Water Resources Engineering M.S., Water Resources Engineering, 1989 B.S., Civil Engineering, 1982	Channel Restoration Design, Responses to Comments, Mitigation Monitoring and Reporting Program/Environmental Commitments Plan
John T. Kaufman	Hydrogeology M.S., Geological Engineering, 1975 B.A., Geology, 1973	Channel Restoration Design
Kronick, Moskovitz, Tiedemann, and Girard		
Ed Tiedemann	Public Agency Water and Power, Natural Resource, and Construction Law J.D., 1961	Water Rights and Contracts, NEPA/CEQA Compliance, ESA Compliance, Document Review
Jan Goldsmith	Water, Natural Resources, and Related Litigation J.D., 1975	Water Rights and Contracts, NEPA/CEQA Compliance, ESA Compliance, Response to Comments, Mitigation Monitoring and Reporting Program/Environmental Commitments Plan, Document Review
Thomas, Remy and Moose		
Jim Moose	CEQA Compliance J.D., 1985; B.A., 1981	Review and Preparation of Responses to Comments; Mitigation Monitoring and Reporting Program/Environmental Commitments Plan

Table 5-2 (Continued) List of Preparers		
Name	**Expertise and Education**	**Area of Participation**
Lisa Stallings Associates		
Lisa Stallings	Agronomy, Soil Science, and Plant Ecology Ph.D., Soil Science M.S., Soil Science B.S., Soil Science	Preliminary Wetlands Delineation
ECM SERVICES		
Maureen Daggett, R.E.A., C.H.M.M.	Environmental, Health, and Safety Regulatory Analysis B.S., Manufacturing Engineering Technology, 1990 B.S., Chemistry, 1982	Public Health and Worker Safety (Support)
Dean Carrier and Associates		
Dean Carrier	Wildlife Biology, Endangered Species Act Compliance B.S., Wildlife Biology, 1963	California Red-legged Frog Habitat Survey
kD Anderson Transportation Engineers		
Ken Anderson	Transportation Engineering and Planning; Civil Engineer B.S., Transportation Engineering, 1978	Traffic Study

Chapter 6.0
References

This chapter of the Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) includes reference materials, including literature, documents and personal communications cited in the following volumes of the American River Pump Station Project environmental documentation: Draft EIS/EIR, American River Basin Cumulative Report (Appendix D to the Draft EIS/EIR), Final EIS/EIR, and Responses to Comments on the Draft EIS/EIR (Appendix C, Volume 1, Master Responses and Volume 2, Individual Comment Letters and Responses to the Draft EIS/EIR).

Alabaster, J.S., and R. Lloyd. 1980. Water Quality Criteria for Freshwater Fish. Butterworths, London.

American River Basin Cumulative Analysis Species Lists March 2000

Anderson, John. 1998. American River Recreation Plan Technical Memorandum No. 9. Recreation Plan. Prepared for Montgomery Watson. January 1998.

Anderson, K. 2002. Unpublished report prepared by kDAnderson Transportation Engineers, Traffic Impact Assessment Report Relating to the PCWA American River Pump Station Project, Auburn, CA. April 9, 2002

Auburn, City of. 1993. City of Auburn General Plan. November 3, 1993.

Auburn, City of. 1997. Final EIR for the Auburn Wastewater Facility Plan. (State Clearinghouse Number 95082040). Prepared by CH2M Hill, Sacramento, CA. March 1997.

Ayres and Associates. 1997. American and Sacramento River, California Project: Geomorphic, Sediment Engineering, and Channel Stability Analyses. Prepared for the U.S. Army Corps of Engineers, Sacramento District. Final Report. December 1997.

Ayres and Associates. 2001. *Two-Dimensional Modeling and Analysis of Spawning Bed Mobilization*. Prepared for the U.S. Army Corps of Engineers. October 2001.

Baltz, D.M., B. Vondracek, L.R. Brown, and P.B. Moyle. 1987. Influence of Temperature on Microhabitat Choice by Fishes in a California Stream. Transactions of the American Fisheries Society, 116:12-20.

Bams, R.A. 1976. Survival and Propensity for Homing as Affected by Presence or Absence of Locally Adapted Paternal Genes in Two Transplant Populations of Pink Salmon (*Oncorhynchus gorbuscha*). In Journal of the Fisheries Research Board of Canada 33:2716-2725. 1976.

Beak Consultants, Incorporated. 1989. Yuba River Fishery Investigation, 1986-1988. Sacramento, CA Prepared for the California Department of Fish and Game, Sacramento, CA.

Beak Consultants, Incorporated. 1993. California Department of Fish and Game and Hanson Environmental, Incorporated. 1993. Lower American River Operations and Fisheries Plan. September and October 1993.

Bell, M.C. 1986. Fisheries handbook of engineering requirements and biological criteria. United States Army Corps of Engineers, Office of the Chief of Engineers, Fish Passage Development and Evaluation Program, Portland, Oregon. 307 pp.

Bodznick. D. 1975. The Relationship of the Olfactory EEG Evoked by Naturally-occurring Stream Waters to the Homing Behavior of Sockeye Salmon (*Oncorhynchus nerka*). Comp. Biochem. Physiol 52A:487-495. 1975.

Bouey, P.D. 1990. Intensive Cultural Resources Survey and National Register Evaluation: Sacramento Urban Area Flood Control Project. Far Western Anthropological Research Group, Inc. Davis. Prepared for United States Army Corps of Engineers, Sacramento, Contract #DACWO589P3759.

Bovee, K.D. 1978. Instream Flow Information Paper 12, FWS/OBS-78/07. Probability-of-use Criteria for the Family Salmonidae. United States Fish and Wildlife Service.

Brabrec, E. 1992. The Value of Nature and Scenery, Scenic America: Technical Information Series v. 1 (2); 1.3. 1992.

Brannon, E.L. 1982. Orientation Mechanisms of Homing Salmonids. In Salmon and Trout Migratory Behavior Symposium. D.L. Brannon and E.O. Salo., eds. School of Fisheries, University of Washington, Seattle. Pages 219-227. 1982.

Brooks, K.N., Ffolliott, P.F., Gregersen, and L.F. DeBano. 1997. *Hydrology and the Management of Watersheds*. Iowa State University Press.

Brown and Caldwell, Archibald & Wallberg Consultants, Marvin Jung & Associates, and McGuire Environmental Consultants, Inc. 1995. Study of Drinking Water Quality in Delta Tributaries. Prepared for the California Urban Water Agencies, May 1995.

Brown, L.R., P.B. Moyle, and C.D. Vanicek. 1992. American River Studies: Intensive Fish Surveys, March- June 1991. Department of Wildlife and Fisheries Biology, University of California, Davis, and Department of Biology, California State University, Sacramento. April 1992.

Burger, J. and M. Gochfeld, 1998. Effects of Ecotourists on Bird Behavior at Loxahatchee National Wildlife Refuge, Florida. Environmental Conservation 25(1): 13-21. 1998.

Caicco, S. 1996. RIPVEG Version 1.0. U.S. Fish and Wildlife Service, Division of Habitat Conservation. 27 pp. 1996.

CALFED. 1998. CALFED Bay-Delta Program. Programmatic Environmental Impact Statement/Environmental Impact Report. Draft. 1998.

CALFED. 2000. CALFED Bay-Delta Program. Programmatic Environmental Impact Statement/Environmental Impact Report. Final. July 2000.

California Air Resources Board, Emissions by Category, 2000 Estimated Annual Average Emissions; Forecast Emissions by Summary Category

California Department of Transportation (CALTRANS). 2001. Highway Design Manual. As cited *in* Anderson, K. 2002. Unpublished report prepared by kDAnderson Transportation Engineers, Traffic Impact Assessment Report Relating to the PCWA American River Pump Station Project, Auburn, CA.

California Division of Mines and Geology (CDMG). 1982. Guidelines for Geologic/Seismic Considerations in Environmental Impact Reports.

California Resources Agency and U.S. Bureau of Reclamation. 2001. Memorandum of Agreement Between the United States and the State of California Regarding Cost Sharing for the Planning Phase of a Joint Restoration Project on the North Fork of the American River. January 16, 2001.

Canter, Larry. 1977. Environmental Impact Assessment. New York. McGraw Hill. 1977.

California Air Resources Control Board (CARB). 1994. Summary of 1993 Air Quality Data Gaseous and Particulate Pollutants. 1994

CARB. 1995. Summary of 1994 Air Quality Data Gaseous and Particulate Pollutants.

CARB. 1996. Summary of 1995 Air Quality Data Gaseous and Particulate Pollutants.

CARB. 1997. Summary of 1996 Air Quality Data Gaseous and Particulate Pollutants.

CARB. 1998. Summary of 1997 Air Quality Data Gaseous and Particulate Pollutants.

CARB. 1999. Summary of 1998 Air Quality Data Gaseous and Particulate Pollutants.

CARB. 2000. Summary of 1999 Air Quality Data Gaseous and Particulate Pollutants.

CARB. 2001. Summary of 2000 Air Quality Data Gaseous and Particulate Pollutants.

California Department of Finance. 2001a. California County Profiles. El Dorado County. http:www.dof.ca.gov/HTML/FS-DATA/profiles/pf_home.htm

California Department of Finance. 2001b. California County Profiles. Placer County. http:www.dof.ca.gov/HTML/FS-DATA/profiles/pf_home.htm

California Department of Finance. 2001c. California County Profiles. Sacramento County. http:www.dof.ca.gov/HTML/FS-DATA/profiles/pf_home.htm

California Department of Fish and Game (CDFG). 1971. California Trout, Salmon, and Warmwater Fish Production and Costs, 1969-1970. Inland Fisheries Branch. Inland Fisheries Administrative Report 71-8.

CDFG. 1980. California Trout, Salmon, and Warmwater Wish Production and Costs, 1978-1979. Inland Fisheries Branch. Inland Fisheries Administrative Report 80-1.

CDFG. 1986. Stream Evaluation Report No. 86-1. Instream Flow Requirements of the Fish and Wildlife Resources of the Lower American River, Sacramento County, California.

CDFG. 1987. Associations Between Environmental Factors and the Abundance and Distribution of Resident Fisheries in the Sacramento-San Joaquin Delta. (California Department of Fish and Game, Exhibit No. 24.) State Water Resources Control Board 1987 Water Quality/Water Rights Proceeding for the San Francisco Bay/Sacramento-San Joaquin Delta, Sacramento, CA.

CDFG. 1988. Comments on: R. DeHaven. 1989 Draft Report: Distribution, Extent and Relative Value to Fish and Wildlife of Heavily Shaded Riverine Aquatic Cover, Lower Sacramento River. Part 1. 1987 - 1988 Study Results and Recommendations.

CDFG. 1989. Striped bass restoration and management plan for the Sacramento-San Joaquin Estuary: Phase I.

CDFG. 1991. Steelhead Restoration Plan for the American River. 1991.

CDFG. 1992. Chinook Salmon and Steelhead Trout Redd Survey Lower American River, 1991-1992, Final Report.

CDFG. 1993. Restoring Central Valley Streams: A Plan for Action. 1993.

CDFG. 1994. Critical Evaluation of the Emigration Survey: Lower American River, 1993. Final Report.

CDFG. 1996. Steelhead Restoration and Management Plan for California. Department of Fish and Game, Inland Fisheries Division, February 1996. 234 pp.

CDFG. 1998. California GAP Analysis.

CDFG. 1999. California Wildlife Habitat Relationships System 7.0, 1999

CDFG. 1999. CDFG's Comments on the Proposed Critical Habitat Designation for California Steelhead Listed Under the Federal Endangered Species Act. June 28, 1999.

CDFG. 2000a. California Natural Diversity Data Base. January 2000.

CDFG. 2000b. Special Plants List. July 2000.

CDFG. 2001. *Special Animals List.* January 2001.

California Department of Forestry and Fire Protection (CDFFP). 2002. Auburn State Recreation Area Prefire Management Plan. Preliminary Draft. January 29, 2002.

California Department of Parks and Recreation (CDPR). 1973. Lake Oroville Resource Inventory. Cultural Heritage Division, Sacramento.

CDPR. 1998. Folsom Lake State Recreation Area Information Brochure.

CDPR and U.S. Bureau of Reclamation (Reclamation). 1992. Auburn State Recreation Area, Interim Resource Management Plan. September 1992.

California Division of Mines and Geology. 1999. Seismic Shaking Hazard Maps of California, DMG Map Sheet MS048, 1999.

California GAP Analysis, El Dorado County Planning Department. GIS Data.

California Native Plant Society. Inventory of Rare and Endangered Vascular Plants of California. April 1994.

California Regional Water Quality Control Board (RWQCB). 1998. The Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and the San Joaquin River Basin, 4th Edition. 1998.

California Regional Water Quality Control Board. 2000. Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for Temperature at Deer Creek. Draft Report. September 29, 2000.

Carrier, Dean. 1998. Placer County Water Agency American River Pumping Project. Red-legged Frog Habitat Survey Report. Dean Carrier & Associates. May 29, 1998.

Carrier, Dean. 2002. Placer County Water Agency American River Pumping Project. Red-legged Frog Habitat Survey Report. Dean Carrier & Associates. March 20, 2002.

Cassady, Jim and Fryar Calhoun. 1995. California Whitewater. A Guide to the Rivers. North Fork Press. Berkeley, California. Third Edition.

Cech, J.J., Jr., S.J. Mitchell, D.T. Castleberry, and M. McEnroe. et. al. 1990. Distribution of California Stream Fishes: Influence of Environmental Temperature and Bypoxia. Environmental Biology of Fishes.

Chilcote, M.W. S. A. Leider, and J.J. Loch. 1986. Differentiation Reproductive Success of Hatchery and Wild Summer-run Steelhead Under Natural Conditions. Transactions of the American Fisheries Society. 115:726-735.

City of Folsom. 1991. Groundwater Feasibility Investigation. Final Report. Prepared by James M. Montgomery, Consulting Engineers, Inc. Sacramento, CA.

City of Roseville. 1992. Final Environmental Impact Report. Roseville 2010 General Plan. City of Roseville. November 1992.

City of Sacramento. 1993. Notice of Preparation for Central Valley Project Water Supply Contracts.

City/County (Sacramento) Office of Metropolitan Water Planning (CCOMWP). 1999. Final Environmental Impact Report for the Water Forum Proposal. City of Sacramento and County of Sacramento. Prepared by EDAW, Inc. and Surface Water Resources, Inc. October 1999.

County of Sacramento. 1992. Sacramento County General Plan EIR. Sacramento County Planning Department. 1992

County of Sacramento. 1993. Sacramento County General Plan Update EIR. Sacramento County Planning Department. June 11, 1993.

Conomy, J.T., Dubovsky, J.A., Collazo, J.A., and W.J. Fleming. 1998. Do Black Ducks and Wood Ducks Habituate to Aircraft Disturbance? Journal of Wildlife Management 62(3): 1135-1142.

Cooper, J., T. Scholz, R. Horral, A. Hasler, D. Madison. 1976. Experimental Confirmation of the Olfactory Hypothesis with Homing, Artificially Imprinted Coho Salmon (*Oncorhynchus kisutch*). Journal of the Fisheries Research Board of Canada 33:703-710.

Courtenay, S.C., T. Quinn, H. Dupuis, C. Groot, P. Larkin. 2001. Discrimination of Family-Specific Odours by Juvenile Coho Salmon: Roles of Learning and Odour Concentration. Journal of Fish Biology 58:107-125.

DeHaven, R.W. 1977. Annual Progress Report No. 2. An Angling Study of Striped Bass Ecology in the American and Feather Rivers, California United States Fish and Wildlife Service. 1977.

DeHaven, R. W. 1978. An Angling Study of Striped Bass Ecology in the American and Feather rivers, California. Prepared for the California Department of Fish and Game. Unpublished Progress Report No. 2.

Department of Water Resources (DWR). 1992. Proposed Study Plan for the Lower Feather River. Prepared for State Water Resources Control Board. Sacramento, CA.

DWR. 1993. Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary. Compiled by P.L. Herrgesell.

DWR. 1994. Effects of the Central Valley Project and State Water Project on Delta Smelt and Sacramento Splittail. Prepared for the United States Fish and Wildlife Service. August 1994.

DWR. 1997. American River Basin Conjunctive Use Project; Feasibility Report/Memorandum Report. Central District. July 1997.

DWR. 2001. Initial Information Package. Relicensing of the Oroville Facilities. Federal Energy Regulatory Commission License Project No. 2100. January 2001.

DWR and U.S. Bureau of Reclamation. 1996. Interim South Delta Program - Draft Environmental Impact Environmental Impact Statement. July 1996.

Dickhoff, W., and C. Sullivan. 1987. Involvement of the Thyroid Gland in Smoltification, with Special Reference to Metabolic and Developmental Processes. Am. Fish. Soc. Symp. 1, 197-210.

Dickhoff, W., D. Darling, and A. Gorbman. 1982. Thyroid Function During Smoltification of Salmonid Fish. Gunma Symp Endocr. 19, 45-61.

Dickhoff, W., L. Folmar, and A. Gorbman. 1978. Changes in Plasma Thyroxine During Smoltification of Coho Salmon, *Oncorhynchus kisutch*. Gen. Comp. Endocr 36, 229-232.

Dirksen, G., and R. Reeves. 1993. Recreation Lakes of California. Tenth Edition.

Dittman, A., and T. Quinn. 1996. Homing in Pacific Salmon: Mechanisms and Ecological Basis. The Journal of Experimental Biology 199:83-91.

Dittman, A., T. Quinn, and G. Nevitt. 1996. Timing of Imprinting to Natural and Artificial Odors by Coho Salmon (*Oncorhynchus kisutch*). Can. J. Fish Aquat. Sci. 53:434-442.

Domagalski, J.L., and P.D. Dileanis. 2000. Water Quality Assessment of the Sacramento River Basin, Califonria - Water Quality of Fixed Sites, 1996 - 1998: United States Geological Survey Water-Resources Investigations Report 00-4247, 60 pp.

Doving, K.B., H. Nordeng, and B. Oakley. 1974. Single Unit Discrimination of Fish Odors Released by Char (*Salmo alpinus L.*) Populations. Comp. Biochem. Physiol., 47A:1051-1063.

Doving, K.B., R. Selset, and G. Thommesen. 1980. Olfactory Sensitivity to Bile Acids in Salmonid Fishes. Acta Physiol. Scand. 108:123-131.

EIP Associates. 1996. Marble Valley Rezone and Subdivision Draft Environmental Impact Report. Prepared for the El Dorado County Planning Department. July 1996.

EIP Associates. 2001. California Department of Fish and Game, Special Plants List. July 2000; California Native Plant Society Inventory of Rare and Endangered Vascular Plants of California. April 1994; CDFG California Natural Diversity Data Base. January 2000.

El Dorado County. 1994. El Dorado County General Plan Update Draft Environmental Impact Report. 1994.

El Dorado County. 1995. El Dorado County General Plan and Final Environmental Impact Report - SCH#94012008. December 1995.

El Dorado County. 2001a. Information Developed by County Staff and Subject to Further Refinement.

El Dorado County. 2001b. "No Project" Land Use Scenario Final Report. 2001.

El Dorado County Air Pollution Control District. 2002. Guide to Air Quality Assessment: Determining Significance of Air Quality Impacts Under the California Environmental Quality Act. First Edition. February 2002.

Environmental Protection Agency (EPA). 1971. Bolt, Beranek, and Newman, Inc. Noise From Construction Equipment and Operations, Building, and Home Appliances. Washington. 1971.

EPA. 1977. Federal Guidelines for State and Local Pretreatment Programs. Construction Grants Program Information. (EPA-420/9-76-017).

EPA. 1982. Fate of Priority Pollutants in Publicly Owned Treatment Works. 30-day Study. (EPA 440/1-82/302). July. Conducted by E.C. Jordan Co.

EPA. 1986. Report to Congress on the Discharge of Hazardous Waste to Publicly Owned Treatment Works. Office of Water Regulations and Standards. (EPA/530-SW-86-004). February.

Fausold, C. and R. Lilieholm. 1996. The Economic Value of Open Space. Published in Land Lines, September 1996, Volume 8, Number 5.

Federal Power Commission. 1963. Federal Power Commission (Federal Energy Regulatory Commission). Order Issuing License to Placer County Water Agency for Project 2079. March 13, 1963.

Fenenga, F. 1948. Appraisal of the Archeological Resources of Folsom Reservoir, California. Manuscript on File, California Department of Parks and Recreation, Sacramento.

Fleming, I.A., and M.R. Gross. 1992. Reproductive Behavior of Hatchery and Wild Coho Salmon (*Oncorhynchus kisutch*): Does it Differ? Aquaculture 103:101-121.

Foerster, R.E. 1968. The Sockeye Salmon, *Oncorhynchus nerka*. ish Res. oard Can. Bull.

Foster, J.W., J.C. Bingham, C. Carter, K. Cooley-Reynolds, and J.L. Kelly. 1977. The Effects of Inundation on the Pedersen Site, CA-ELD-201, Folsom Lake, California. Submitted to the National Park Service, Sacramento. 1977.

Foster, W. and J.C. Bingham. 1978. Archeology in Solution: Testing Inundations' Effects at Folsom Reservoir, California. Submitted to Southwest Cultural Resources Center, National Park Service, Sacramento. 1978.

Fujioka, Y.S. Fushiki, M. Tagawa, T. Ogasawara, and T. Hirano. 1990. Downstream Migratory Behavior and Plasma Thyroxine Levels of Biwa Salmon, *Oncorhynchus rhodorus*. Bull. Jap. Soc. Sci. Fish. 56, 1773-1779.

Fuke, S. and S. Konosu. 1991. Taste-active Components in Some Foods: A Review of Japanese Research. Physiol. Behav. 49:863-868.

Gertsch, M., M.D. Valentine, D. Van DeWater, and B. Walton. 1994. American Peregrine Falcon. In C.G. Thelander, editor. Life on the Edge: A Guide to California's Endangered Natural Resources. Biosystems Books. Santa Cruz, California. 1994.

Grau, G., W. Dickhoff, R. Hishioka, H. Bern, L. Folmar. 1981. Lunar Phasing of the Thyroxine Surge Preparatory to Seaward Migration of Salmonid Fish. Science 211:607-609.

Griffith, J. A. Hendry, and T. Quinn. 1999. Straying of Adult Sockeye Salmon, *Oncorhynchus nerka*, Entering a Non-natal Hatchery. Fish. Bull. 97:713-716.

Grubb, T.G. and R.M. King. 1991. Assessing Human Disturbance of Breeding Bald Eagles with Classification Tree Models. Journal of Wildlife Management 55(3): 500-511.

Hara, T., K. Ueda, A. Gorbman. 1965. Electroencephalographic Studies of Homing Salmon. Science 149:884-885.

Harden Jones, F.R. 1968. Fish Migration. Arnold, London.

Hasler, A.D., and W. J. Wisby. 1951. Discrimination of Stream Odors by Fishes and its Relation to Parent Stream Behavior. Am. Nat. 85:223-238.

Healy, M.C. 1991. Life History of the Chinook Salmon (*Oncorhynchus tshawytscha*). In*:* Groot, C. and L. Margolis, eds. 1991. Pacific Salmon Life Histories. UBC Press. Published in Cooperation with the Government of Canada, Department of Fisheries and Oceans.

Heizer, R.F. 1934. Archaeological Site Survey Records for CA-SAC-26, 28, 29, 30, 41, 42, 43, 44, 46. On file at North Central Information Center, California State University Sacramento, Department of Anthropology.

Henn, W. and E. Sundahl. 1986. Shasta Lake Archaeological Sites Project: A Study of the Effects of Reservoir Drawdown. Submitted to the U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region. 1986.

Hickman, J.C. (ed). 1993. The Jepson Manual, Higher Plants of California. University of California Press. Berkeley, CA.

Hoar, W.S. 1976. Smolt Transformation: Evolution, Behavior and Physiology. J. Fish. Res. Bd Can. 33:1234-1252.

Hoffnagle, T., and A. Fivizani. 1990. Simulation of Plasma Thyroxine Levels by Novel Water Chemistry During Smoltification in Chinook Salmon (*Oncorhynchus tshawytscha*). Can J. Fish. Aquat. Sci. 43:1513-1517.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Non-Game Heritage Program. California Department of Fish and Game. Sacramento.

Institute of Transportation Engineers. 2002. http://www.ite.org/.

Interagency Ecological Program. 1999. Monitoring, Assessment, and Research on Central Valley Steelhead: Status of Knowledge, Review of Existing Programs, and Assessment of Needs. Technical Appendix to Comprehensive Monitoring Assessment and Research Program Recommendations for the Implementation and Continued Refinement of a Comprehensive Monitoring, Assessment, and Research Program Report. March 1999.

Iwamoto, R. 1982. Strain-photoperiod-temperature Interactions in Coho Salmon: Freshwater Growth, Smoltification and Seawater Adaptation. Ph.D. thesis, University of Washington, Seattle.

Iwata, M. and M. Tagawa. 1991. Effect of Thyroxine Surge on Kokanee Salmon Migration. Inducement of Downstream Migration by Thyroid Hormones. Zool. Sci. 8:1172.

Jones and Stokes Associates. 1993. Deer Creek Water Resources and Fishery Analysis. Prepared for El Dorado Hills Development Co. November 4, 1993.

Jones and Stokes Associates. 2000. Program Environmental Impact Report on Flood Control Improvements Along the Mainstem of the American River. Prepared for Sacramento Area Flood Control Agency, April 2000.

Jonsson, B., N. Jonsson, and L.P. Hansen. 1991. Differences in Life History and Migratory Behavior Between Wild and Hatchery-reared Atlantic Salmon in Nature. Aquaculture 98:69-78.

Kilgo, J.C., R.F. Labisky, and D.E. Fritzen. 1998. Influences of Hunting on the Behavior of White-tailed Deer: Implications for Conservation of the Florida Panther. Conservation Biology 12(6): 1359-1364.

Krausman, P.R., Wallace, M.C., Hayes, C.L., and D.W. DeYoung. 1998. Effects of Jet Aircraft on Mountain Sheep. Journal of Wildlife Management 62(4)L 1246-1254.

Kroeber, A.L. 1925. Handbook of the Indians of California. Bureau of American Ethnology Bulletin 78. Smithsonian Institute, Washington, D.C.

Larry Walker Associates, 1991. Sacramento Regional Wastewater Treatment Plant Master Plan Report. Task 400 Technical Memorandum No. 3: Background Water Quality. August 1992.

Lee, D.P. and I.L. Paulsen. 1999. Water Level Fluctuation Criteria for Black Bass in California Reservoirs. California Department of Fish and Game, Reservoir Research Management Project. Information Leaflet No. 12.

Leider, S.A., 1989. Increased Straying by Adult Steelhead Trout, *Salmo gairdneri*, Following the 1980 Eruption of Mount St. Helens. Environmental Biology of Fishes 24:219-229.

Leider, S.A., P.L. Hulett, J.L. Loch, M.W. Chilocote. 1990. Electrophoretic Comparison of the Reproductive Success of Naturally Spawning Transplanted and Wild Steelhead Trout Through the Returning Adult Stage. Aquaculture 88:239-252.

Lenihan, D.J., T.L. Carrell, S. Fosberg, L. Murphy, S.L. Rayl, and J.A. Ware. 1981. The Final Report of the National Reservoir Inundation Study, Volumes I and II. Submitted to the U.S. Department of the Interior, National Park Service, Southwest Cultural Resources Center, Santa Fe, New Mexico. 1981.

Lin, R. R. Rivas, G. Grau, S. Hishioka, and A. Bern. 1985. Changes in Plasma Thyroxine Following Transfer of Young Coho Salmon (*Oncorhynchus kisutch*) from Freshwater to Freshwater. Aquaculture 45, 381-382.

Lincoln, City of. 1999. Community Development Department. City of Lincoln Wastewater Treatment and Reclamation Facility Draft Environmental Impact Report. State Clearinghouse number 98122071. Lincoln, CA. Prepared by Jones & Stokes Associates, Inc. September 1999.

Lincoln, City of. 2000. Community Development Department. City of Lincoln Wastewater Treatment and Reclamation Facility Mitigation Monitoring Program. State Clearinghouse number 98122071. Lincoln, CA. Prepared by Jones & Stokes Associates, Inc. (JSA 99-8282). Sacramento, California. January 2000.

MARK Group. 1997. Geotechnical Data Review and Evaluation, American River Restoration and Pump Station Project, Auburn, CA. Technical Memorandum. Pleasant Hill, CA. November 3, 1997.

Mayer, K.E. and Laudenslayer, Jr., W.F. 1988. A Guide to Wildlife Habitats of California: Sacramento, CA, California Department of Forestry and Fire Protection. 1988.

McAliney, M. (ed.). 1993. Arguments for Land Conservation: Documentation and Information Sources for Land Resources Protection, Trust for Public Land, Sacramento, CA. 1993.

McCormick, D. and B. Bjoernsson. 1994. Physiological and Hormonal Differences Among Atlantic Salmon Parr and Smolts Reared in the Wild and Hatchery Smolts. Aquaculture 121: 235-244.

McEwan, D.R. 2001. Central Valley Steelhead. Contributions to the Biology of Central Valley Salmonids. California Department of Fish and Game Fish Bulletin 179. 1:1-43.

McIsaac, D.O., and T.P. Quinn. 1988. Evidence for a Heredity Component in Homing Behavior of Chinook Salmon (*Oncorhynchus tshawytscha*). Canadian Journal of Fisheries and Aquatic Sciences 45:2201-2205. 1988.

Milliken, R.T. 1994. Report on the 1994 Archaeological Excavation on the Skirt of the Souza Mound, Sac-42, Sacramento County, California. Prepared by Far Western Anthropological Research Group, Inc. Davis, CA, for the City of Sacramento.

Milner, A. M., and R. G. Bailey. 1989. Salmonid Colonization of New Streams in Glacier Bay National Park, Alaska. Aquaculture and Fisheries Management 20:179-192.

Montgomery Watson (MW) and Jones and Stokes Associates (JSA). 1995. Biological Data Report and Preliminary Section 7 Biological Assessment on VELB for the American River Watershed Investigation Project - Auburn Canyon Area. Prepared for the U.S. Army Corps of Engineers, Sacramento District. March 30, 1995.

MW, McLaughlin Water Engineers, John Anderson, Surface Water Resources. 1998. Basis of Design, Placer County Water Agency, U.S. Bureau of Reclamation American River Pump Station Project. Draft March 1998.

Moyle, P.B. 1976. Inland Fishes of California. University of California Press. Berkeley, CA. 1976.

Moyle and Nichols. 1973. Ecology of Some Native and Introduced Fishes of the Sierra Nevada Foothills in Central California. Copeia 1973.

Murray, D.P., and M.L. Rosenau. 1989. Rearing of Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) in Non-natal Tributaries of the Lower Fraser River, British Columbia. Trans. Am. Fish. Soc. 118:284-289.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grand, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California. U.S. Dept. Commer., NOAA Technical Memorandum NMFS-NWFSC-35, 443 p.

National Park Service. 1990. Economic Impacts of Protecting Rivers, Trails and Greenway Corridors. 1990 Edition.

Nishioka, S. G. Young, A. Bern, W. Jochimsen, and C. Hiser. 1985. Attempts to Intensify the Thyroxin Surge in Coho and King Salmon by Chemical Stimulation. Aquaculture 45:215-225.

National Marine Fisheries Service (NMFS). 1993. Biological Opinion for Winter-run Chinook Salmon. February 12, 1993.

NMFS. 1995. Amended Biological Opinion for Winter-run Chinook Salmon. 1995.

NMFS. 1997_. Status Review Update for Deferred and Candidate ESUs of West Coast Steelhead. Prepared by NMFS West Coast Steelhead Biological Review Team. [DATE]

NMFS. 1997_. Proposed Recovery Plan for the Sacramento River Winter-run Chinook Salmon. Southwest Region, Long Beach, California. August 1997.

Nordeng, H. 1971. Is the Local Orientation of Anadromous Fishes Determined by Pheromones? Nature (Lond.) 233:411-413.

Nordeng, H. 1977. A Pheromone Hypothesis for Homeward Migration in Anadromous Salmonids. Oikos 28:155-159.

Olendorf, Richard R., A. D. Miller, and R. N. Lehman. 1981. Suggested Practices for Raptor Protection on Power Lines. Published and Distributed for the Edison Electric Institute by Raptor Research Foundation, St. Paul, Minnesota.

Olsen, W.H. 1963. CA-BUT-212 Archeological Site Survey Record on File at the Northeast Information Center, Department of Anthropology, California State University, Chico.

Olsen, W.H., and F.A. Riddel. 1963. The Archeology of the Western Pacific Railroad Relocation, Oroville Project, Butte County, California. Department of Parks and Recreation Archeological Report No. 7.

Pacific Gas and Electric Company (PG&E). 1968. Power Purchase Contract. June 18, 1968.

Pascual, M., T. Quinn, and H. Fuss. 1995. Factors Affecting the Homing of Fall Chinook Salmon from Columbia River Hatcheries. Transactions of the American Fisheries Society 124:308-320.

Pascual, M., T.P. Quinn, and H. Fuss. 1995. Factors Affecting the Homing of Fall Chinook Salmon from Columbia River Hatcheries. Transactions of the American Fisheries Society 124:308-320, 1995.

Peak and Associates. 1978a. Archeological Investigation of Discovery Park and Captain Tiscornia Park (South Discovery Park) and the American River Parkway, Sacramento, CA Prepared for the County of Sacramento, Department of Parks and Recreation, Sacramento, CA.

Peak and Associates. 1978b. Cultural Resource Assessment of the American River Parkway Area. Report prepared for the County of Sacramento, Department of Parks and Recreation, Sacramento, CA.

Peterson, N.P. 1982. Immigration of Juvenile Coho Salmon (*Onchorynchus kisutch*) into Riverine Ponds. Can. J. Fish. Aquat. Sci. 39:1308-1310.

PKF Consulting. 1994. Analysis of the Economic Impacts of the Northern Central Rail Trail, Maryland Greenways Commission, Department of Natural Resources, Annapolis Maryland. June 1994.

Placer County 1994. Placer County Countywide General Plan/Final Environmental Impact Report, Volume I. Prepared by Crawford Multari & Starr, DKS Associates, Psomas and Associates, Jones & Stokes Associates, Recht Hausrath & Associates, J. Laurence Mintier & Associates, July 26, 1994.

Placer County Board of Supervisors. 1994b. Resolution Adopting the Auburn/Bowman Community Plan (GPA 285), resolution Number 94-175. June 21, 1994.

Placer County Water Agency (PCWA). 1993. Zone 1 Water System Master Plan, Volume 1 - Main Report; Volume 2 - Appendices. Prepared by Nolte and Associates. Sacramento, CA. February 1993.

PCWA. 1997. 1997 Urban Water Management Plan. Placer County Water Agency. Auburn, CA. March 1997.

PCWA. 1998. Memorandum from Einar Maisch to Placer County Water Agency Board of Directors. April 14, 1998.

PCWA. 2000. Placer County Water Agency Urban Water Management Plan. Prepared by Brown and Caldwell. December 27, 2000.

PCWA. 2001. Placer County Water Agency Surface Water Supply Update for Western Placer County. Discussion Paper. March 13, 2001.

PCWA and Northridge Water District. 1998. PCWA and NWD Groundwater Stabilization Project. Draft Environmental Impact Report. Prepared by Surface Water Resources, Inc. February 1998.

Quinn, T. 1993. A Review of Homing and Straying of Wild and Hatchery-produced Salmon. Fisheries Research 18:29-44.

Quinn, T. 1997. Homing, Straying, and Colonization. In: Genetic Effects of Straying of Non-native Hatchery Fish into Natural Populations: Proceedings of the Workshop. W.S. Grant, ed. U.S. Dep. Commer. NOAA Tech Memo. NMFS-NWFSC-30, 130p.

Quinn, T., E. Volk, and A. Hendry. 1999. Natural Otolith Microstructure Patterns Reveal Precise Homing to Natal Incubation Sites by Sockeye Salmon (*Oncorhynchus nerka*). Can. J. Zool. 77:766-775.

Raleigh, R.F., T. Hickman, R.C. Solomon, and P.C. Nelson. 1984. Habitat Suitability Information: Rainbow Trout. U.S. Fish and Wildlife Service, FWS/OBS-82/10.60. 1984.

Raleigh, R.F., W.J. Miller, and P.C. Nelson. 1986. Habitat Suitability Index Models and Instream Flow Suitability Curves: Chinook Salmon. U.S. Fish and Wildlife Service Biol. Rep. 82 (10.1222). 64 pp. 1986.

Regional Water Quality Control Board, Central Valley Region (RWQCB). 1994. Water Quality Control Plan (Basin Plan) for the California Water Quality Control Board, Central Valley Region, Sacramento River and San Joaquin River Basins. Third edition. 1994.

Reisenbichler, R. R., J. D. McIntyre, M.F. Solazzi, and W. W. Landino. 1992. Genetic Variation in Steelhead of Oregon and Northern California. Transactions of the American Fisheries Society 121:158-169.

Riddell, F.A. 1978. Maidu and Knokow. In California, Edited by R.F. Heizer, pp. 370-386. Handbook of North American Indians, vol. 8, W.C. Sturtevant, General Editor. Smithsonian Institution, Washington, D.C.

Rio Linda and Elverta Community Planning Area. 1996. Rio Linda and Elverta Planning Department, Rio Linda CA. Rio Linda and Elverta Community Plan.

Rodgers, H. John. 1980. Soil Survey of Placer County, California: Western Part. United States Department of Agriculture, Soil Conservation Service. 1980.

Sacramento Area Council Of Governments. 1999. Draft Environmental Impact Report on the Draft 1999 Metropolitan Transportation Plan, State Clearinghouse No. 99032024, May 1999.

Sacramento Area Flood Control Agency (SAFCA). 1998. Working Group Draft. Floodway Management Plan for the Lower American River. May 21, 1998.

SAFCA. 1999. Effects of Interim Reoperation of Folsom Dam and Reservoir on the Availability of Potential Splittail Spawning Habitat in the Lower American River. June 1999.

SAFCA and Reclamation. 1994. Interim Reoperation of Folsom Dam and Reservoir Final Environmental Impact Report/Environmental Assessment. Prepared by SAFCA, David R. Schuster, Water Resources Management, Beak Consultants Incorporated. December 1994.

Sacramento, City of. 1993. Sacramento River Parkway Plan. City of Sacramento Neighborhood Services Department. Department of Planning and Development. October 1993.

Sacramento County. 1985. American River Parkway Plan. Planning and Community Development Department. December 1985.

Sacramento County. 1992. Sacramento County General Plan Environmental Impact Report, 1992.

Sacramento County. 1993. Sacramento County General Plan Update. December 1993.

Sacramento County. 1996. Sacramento Wastewater Treatment Plant Master Plan Draft Environmental Impact Report. Sacramento County Department of Environmental Review and Assessment and Environmental Science Associates, Sacramento, CA.

Sacramento County. 1997. Sacramento Regional Wastewater Treatment Plant Expansion: Supplemental Environmental Impact Report. Prepared for the Sacramento Regional County Sanitation District by Brown and Caldwell Consulting Engineers. October 1997.

Sacramento County Water Agency and U.S. Bureau of Reclamation. 1997. Central Valley Project Water Supply Contracts Under Public Law 101-514 (Section 206). Draft Environmental Impact Statement Report. September 5, 1997.

Sacramento Metropolitan Air Quality Management District. 1994. Air Quality Thresholds of Significance. First Edition. 1994.

Sacramento Municipal Utility District. 1994. Draft Environmental Impact Report Rancho Seco Park Master Plan. SCH No. 9309246. January.

Sacramento Regional County Sanitation District. 1994a. Industrial Waste Pretreatment Program Annual Report, 1993. March 1994.

Sacramento Regional County Sanitation District. 1994b. Sacramento Regional Wastewater Treatment Plant Solids Disposal Facilities: 1993 Annual Monitoring Report. February 1994.

San Francisco Estuary Project. 1992. State of the Estuary: A Report on Conditions and Problems in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary.

San Francisco Estuary Project. 1993. Comprehensive Conservation and Management Plan. June 1993.

Sands, A., S.D. Sanders, R.F. Holland, V.I. Dains, and E.C. Beedy. 1985. American River Parkway Riparian Vegetation and Wildlife Testimony. Presented to Staff of the State Water Resources Control Board on behalf of Sacramento County, California. June 5, 1985.

Sawyer, C., P. McCarty, G. Parkin. 1994. Chemistry for Environmental Engineering. McGraw-Hill. Fourth Edition.

Sawyer, J.O. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society, Sacramento, CA.

Scheer, B.T. 1939. Homing Instinct in Salmon. Quart. Rev. Biol. 14(4): 408-430.

Schroeder, R., R. Lindsay, and K. Kenaston. 2001. Origin and Straying of Hatchery Winter Steelhead in Oregon Coastal Rivers. Transactions of the American Fisheries Society 130:431-441.

Scott, B. 1995. Cultural Resources Portion of Administrative Draft Report, American & Sacramento Rivers Project Task 4: Folsom Dam and Reservoir Permanent Reoperation. Jones & Stokes Associates, Inc. Sacramento. Prepared for the United States Army Corps of Engineers, Sacramento District.

Scott, M.L., J.M. Friedman, and G.T. Auble. 1996. Fluvial Process and the Establishment of Bottomland Trees. Geomorphology 14:327-339.

Scrivener, J. C. Brown, T.G. and Andersen, B.C. 1994. Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) Utilization of Hawks Creek, a Small and Non-natal Tributary of the Upper Fraser River. Can. J. Fish. Aquat. Sci. 51:1139-1146.

Shoji, T., H. Ueda, T. Ohgami, T. Sakamoto, Y. Katsuragi, K. Yamauchi, and K. Kurihara. 2000. Amino Acids Dissolved in Stream Water as Possible Home Stream Odorants for Masu Salmon. Chemical Senses 25:533-540.

Skinner, M.W. and B.M. Pavilik. 1994. Inventory of Rare and Endangered Vascular Plants of California. Fifth Edition. (Special Publication No. 1). California Native Plant Society, Sacramento, California.

Snider, W.M. and E. Gerstung. 1986. Instream Flow Requirements of the Fish and Wildlife Resources of the Lower American River, Sacramento County, California. California Department of Fish and Game, Stream Evaluation Report No. 86-1.

Snider, W.M., R.G. Titus, and B.A. Payne. 1997. Lower American River Emigration Survey: November 1994-September 1995. Final Report. California Department of Fish and Game, Environmental Sciences Division, Stream Evaluation Program. September 1997.

Sommer, T., R. Baxter, and B. Herbold. 1997. Resilience of Splittail in the Sacramento-San Joaquin Estuary. Transactions of the American Fisheries Society 126:961-976.

Stabell, O. 1992. Olfactory Control of Homing Behavior in Salmonids. Fish Chemoreception. London Chapman and Hall.

Stallings, Lisa & Associates. 1998. Preliminary Wetlands Delineation, American River Pump Station Project for Placer County Water Agency. September 9, 1998.

State Water Resources Control Board (SWRCB). 1995. Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary.

Stoddard, S.E. and D.A. Fredrickson. 1978. Supplementary Investigations into the Effects of Freshwater Immersion on Cultural Resources of the Lake Mendocino Reservoir Basin, Mendocino County, California.

Stromberg, J.C. 1995. Fremont Cottonwood Growth in Relation to American River Stream Flow and Groundwater Depth.

Stromberg, J.C. and D.T. Patten. 1991. Instream Flow Requirements for Cottonwoods at Bishop Creek, Inyo County, California. Rivers 2(1):1-11.

Sutterlin, A. and R. Gray. 1973. Chemical Basis for Homing of Atlantic Salmon (*Salmo salar*) to a Hatchery. Journal of the Fisheries Research Board of Canada. 30:985-989.

Surface Water Resources, Inc. (SWRI). 1996. Investigation of the Aquatic Ecology, Water Quality, and Hydrology of Deer Creek, El Dorado County, California. Prepared for the El Dorado Irrigation District by Surface Water Resources, Inc. December 1996.

SWRI. 1998. Technical Memorandum, Upstream Hydrologic Analysis. Placer County Water Agency American River Pump Station Project. Final Draft October 27, 1998.

SWRI. 2001. Aquatic Resources of the Lower American River: Baseline Report. Draft Report.

Tilson, M., A. Scholz, R. White, and H. Galloway. 1994. Thyroid-induced Chemical Imprinting in Early Life Stages and Assessment of Smoltification in Kokanee Salmon Hatcheries. 1993 Annual Report

Tilson, M., A. Scholz, R. White, and J. Hendrickson. 1995. Artificial Imprinting and Smoltification in Juvenile Kokanee Salmon: Implications for Operating Lake Roosevelt Kokanee Salmon Hatcheries. 1994 Annual Report.

Transportation Research Board, Highway Capacity Manual (HCM), Special Report 209, Third Edition, 1994.

U.S. Army Corps of Engineers (Corps). 1991. Existing Facilities and Wildlife Conditions for the Sacramento/Trinity River Reach, American River Reach, and Sacramento-San Joaquin Delta. Unnamed Report Excerpt.

U.S. Army Corps of Engineers and The Reclamation Board. 1992. Programmatic Environmental Impact Statement/Environmental Impact Report. Sacramento River Flood Control System Evaluation. Phases II - V. 1992.

U.S. Army Corps of Engineers. 1998. Streambank Protection for the Lower American River. Final Environmental Impact Report and Supplemental Environmental Impact Statement V for the Sacramento River Bank Protection Project. Prepared by Jones & Stokes Associates, Inc. Sacramento, CA. Prepared for United States Arm Corps of Engineers, Sacramento District, and the Reclamation Board, Sacramento, CA.

U.S. Bureau of Reclamation (Reclamation). 1991a. Planning Report/Final Environmental Statement. Shasta Outflow Temperature Control.

U.S. Bureau of Reclamation. 1991b. Appendices to Shasta outflow temperature control planning report/environmental statement. Part I - Fisheries.

U.S. Bureau of Reclamation. 1992. Biological Assessment for United States Bureau of Reclamation. Central Valley Operations.

U.S. Bureau of Reclamation. 1993. United States Bureau of Reclamation. American River Water Resources Investigation Technical team's Inventory and Recommendation for Wild and Scenic River Eligibility and Preliminary Classification. Final Report. 1993.

U.S. Bureau of Reclamation. 1996a. Preliminary Concept Plan, Restoration and Management of the Auburn Dam Site.

U.S. Bureau of Reclamation. 1996b. Letter from Thomas J. Aiken, Area Manager, to Bruce Krantz, District Superintendent, Department of Parks and Recreation. No Hands Bridge and Proposed Action - Cool Trail, Auburn State Recreation Area. February 23, 1996.

U.S. Bureau of Reclamation. 1996c. Letter from Thomas J. Aiken, Area Manager, to Jill Dampier, Supervising Park Ranger, Auburn State Recreation Area. Categorical Exclusion Checklist, Auburn to Cool Trail Corridor, Auburn Construction Site, Auburn. March 22, 1996.

U.S. Bureau of Reclamation. 1997a. Value Planning Study: Auburn Pumping Plant. December 19, 1997.

U.S. Bureau of Reclamation. 1997b. Central Valley Project Improvement Act Draft Programmatic Environmental Impact Statement. United States Department of the Interior, Bureau of Reclamation. Sacramento, California. September 1997.

U.S. Bureau of Reclamation. 2000. Value Planning, Final Report, Project: Auburn Pumping Plant. For Value Study Completed December 19, 1997. August 14, 2000.

U.S. Census Bureau. 2000a. Model-Based Income and Poverty Estimates for Sacramento County, California in 1997. November.

U.S. Census Bureau. 2000b. Model-Based Income and Poverty Estimates for Placer County, California in 1997. November.

U.S. Census Bureau. 2000c. Model-Based Income and Poverty Estimates for El Dorado County, California in 1997. November.

U.S. Department of Agriculture. 1995. U.S. Department of Agriculture Natural Resource Conservation Service. 1995. Soil Surveys for Sacramento County (unpublished data). Davis, CA.

U.S. Department of Transportation, Federal Highway Administration. 2000. FHWA Highway Noise Barrier Design Handbook.

U.S. Environmental Protection Agency. 1971. Bolt, Beranek, and Newman, Inc. Noise From Construction Equipment and Operations, Building, and Home Appliances. Washington. 1971.

U.S. Environmental Protection Agency. 1993. San Francisco Estuary Project Technical Reports.

U.S. Environmental Protection Agency Region IX. 2000. EPA Superfund Site Rancho Cordova, California, November 2000.

U.S. Fish and Wildlife Service, Reclamation, Hoopa Valley Tribe, Trinity County. 1999. Trinity River Mainstem Fishery Restoration Draft Environmental Impact Statement/Report. State Clearinghouse No. 1994123009. 1999.

U.S. Fish and Wildlife Service. 1967. Special Scientific Report Fisheries No. 550. Biology and management of the American Shad and status of the fisheries, Atlantic Coast of the United States

U.S. Fish and Wildlife Service. 1986. Recovery Plan for the Pacific Bald Eagle. Endangered Species Program. Portland, OR. 1986.

U.S. Fish and Wildlife Service. 1988. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates. United States Fish Wildlife Service Biological Report 82(11.82). 1988.

U.S. Fish and Wildlife Service. 1991. American River Watershed Investigation, detailed report on fish and wildlife resources. Fish and Wildlife Coordination Act Report. Ecological Services, Sacramento Field Office.

U.S. Fish and Wildlife Service. 1992. Shaded Riverine Aquatic Cover of the Sacramento River System: Classification as Resource Category 1 Under the Fish and Wildlife Service Mitigation Policy.

U.S. Fish and Wildlife Service. 1994. Technical/Agency Draft Sacramento-San Joaquin Delta Native Fishes Recovery Plan.

U.S. Fish and Wildlife Service. 1995a. Draft Anadromous Fish Restoration Plan, A Plan to Increase Natural Production of Anadromous Fish in the Central Valley of California. Prepared for the Secretary of Interior under authority of the CVPIA. With assistance from the Anadromous Fish Restoration Core Group. 1995.

U.S. Fish and Wildlife Service. 1995b. Working Paper on Restoration Needs: Habitat restoration Actions to Double Natural Production of Anadromous Fish in the Central Valley of

U.S. Fish and Wildlife Service. 1996. American River Water Resources Investigation, Draft Fish and Wildlife Coordination Act Report: A Detailed Report of Fish and Wildlife Resources. Ecological Services, Sacramento Field Office. 106 pp

United States Fish and Wildlife Service. 1996. Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes. United States Department of the Interior, Fish and Wildlife Service, Region 1. November 26, 1996.

U.S. Fish and Wildlife Service. 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle. Sacramento Fish and Wildlife Office. July 9, 1999.

U.S. Fish and Wildlife Service. 1997. Guidance on Site Assessment and Field Surveys for California Red-Legged Frog.

U.S. Fish and Wildlife Service, Reclamation, Hoopa Valley Tribe, and Trinity County. 1999. Trinity River Mainstem Fishery Restoration Draft Environmental Impact Statement/Report. State Clearinghouse No. 1994123009. 1999.

U.S. Fish and Wildlife Service. 2000. American River Basin Cumulative Analysis Species Lists. March 2000.

U.S. Fish and Wildlife Service and National Marine Fisheries Service (NMFS). 1998. Endangered Species Consultation Handbook. Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act. March 1998.

U.S. Fish and Wildlife Service, NMFS, and California-Nevada Chapter of the American Fisheries Society (AFS). 2001. Biological Assessment Workshop with Tools for Expediting Section 7 Consultations. Santa Rosa, California. March 28, 2001.

Utter, F.M. 1991. Biochemical Genetics and Fishery Management: An Historical Perspective. Journal of Fish Biology 39 (Supplement A): 1-10.

Vesilind, P.A., J.J. Peirce, and R. Weiner. 1988. Environmental Engineering. Butterworth-Heinemann. 1988.

Waechter, S.A. 1992. Folsom Reservoir Reoperation Study, El Dorado, Placer, and Sacramento Counties, California" Cultural Resources Survey. Submitted to United States Army Corp of Engineers, Sacramento, Far Western Anthropological Research Group. Inc.

Waechter, S.A. 1993. Final Report on a cultural Resources Inventory of a portion of the Folsom Reservoir Study area. Submitted to the United States Department of the Interior, Bureau of Reclamation, Sacramento. Far Western Anthropological Research Group, Inc.

Waechter, S.A., and S.D. Mikesell. 1994. Research Design for Prehistoric, ethnographic, and historic cultural resources at Folsom Reservoir, California. Prepared for the USDI Bureau of Reclamation, Sacramento. Far Western Anthropological Research Group, Inc., and JRP Historical Consulting Services, Davis.

Walburg, C.H., and P.R. Nichols. 1967. Biology and management of the American shad and status of the fisheries, Atlantic coast of the United States, 1960. USFWS Special Sci. Rep. - Fisheries No. 550.

Walker T. and A. Hasler. 1949. Detection and Discrimination of Odors of Aquatic Plants by the Bluntnose Minnow (*Hyborhynchus notatus*). Physiol. Zool. 22:45-63.

Wang, J.C.S. 1986. Fishes of the Sacramento-San Joaquin Estuary and Adjacent Waters, California: A Guide to the Early Life Histories. Interagency Ecological Study Program for the Sacramento-San Joaquin Estuary. Technical Report #9.

Ware, J.A. 1989. Archaeological Inundation Studies: Manual for Reservoir Managers. Prepared for the U.S. Army Corps of Engineers, Washington D.C.

Water Education Foundation. 1992. Layperson's Guide to the American River. R. Schmidt Sudman, Editor; J.K. Hartshorn, author.

Water Forum. 2000. Water Forum Agreement and Action Plan. Developed by Stakeholder Representatives for Adoption by Their Governing Boards. January 2000.

Watson, C. 1985. Assessment of Channel and Riparian Vegetation Conditions, Lower American River, California. Prepared in association with: Biosystems Analysis, Inc. and Williams, Kondolf, Swanson. Unpublished technical report. 73 pp., plus appendices. September 1985.

Weisenberger, M.E., Krausman, P.R., Wallace, M.C., DeYoung, D.W., and O.E. Maughan. 1996. Effects of Simulated Jet Aircraft Noise on Heart Rate and Behavior of Desert Ungulates. Journal of Wildlife Management 60(1): 52-61.

Western Area Power Administration (WAPA). 2000. Sierra Nevada Regional Office Green Book. Post-2004 Power Marking Plan, Base Resource. July 2000.

Western Governor's Association. 1988. Western Governor's Association Open Lands Initiative. 1998. http://www.westgov.org/wga/initiatives/tpl/sec3.htm

Woodward, L., and J.M. Smith. 1977. History - Lower American River, Volume I. Report prepared for the Sacramento Museum and History Commission and the County of Sacramento, Department of Parks and Recreation, Sacramento, CA.

Wooster, T.W., and R.H. Wickwire 1970. A Report on the Fish and Wildlife Resources of the Yuba River to be affected by the Marysville Dam and Reservoir and Marysville Afterbay and Measures Proposed to Maintain these Resources. California Department of Fish and Game, Environmental Services (Administrative Report No. 70-4). Sacramento, CA.

Youngson, A. F., L. P. Hansen, W. C. Clarke, R. L. Saunders, and J. E. Thorpe. 1989. Thyroid Hormones in Migrating Salmon. Aquaculture 82: 319-327.

Youngson, A.F. and T.H. Simpson. 1984. Changes in Serum Thyroxine Levels During Smolting in Captive and Wild Atlantic Salmon (*Salmo salar L.*) Journal of Fish Biology 24: 29-39.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1988. California's Wildlife, Volume I, Amphibians and Reptiles. California Department of Fish and Game. May 2, 1988.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1990. California Statewide Relationships System. The Resources Agency, California Department of Fish and Game, Sacramento, CA.

Personal Communications

Anderson, John. 1998. Water Resource Architect. Telephone conversation. June 1998.

Barngrover, B. 1997. California Department of Fish and Game. Personal communication.

Cambell, Rod. 2002. Director of Community Development, City of Lincoln. Personal communication. March 28, 2002.

Coke, Russel. 2001. Auburn Transportation Department. Telephone conversation. January 17, 2001.

Dampier, J. 1998. Supervising State Park Ranger American River District, Auburn State Recreation Area. Telephone conversation. June 23, 1998.

Geiger, Steve. 1998. Associate Planner, City of Auburn. Written communication: Excerpts of the City of Auburn General Plan Draft and Final Environmental Impact Reports. August 1998.

Hall, Roderick. 1997. U.S. Bureau of Reclamation. Telephone conversation. November 1997.

Hiscox, J. 1997. California Department of Fish and Game, Fishery Biologist, Region II. Telephone conversation regarding fish species at project site. September 25, 1997.

Hiscox, J. 2000. California Department of Fish and Game. Email dated August 11, 2000.

Kaufman, John T. 1998. McLaughlin Water Engineers, Ltd. Telephone conversation. July 23, 1998.

Kerdus, Kathy. 1998. Planning Director, Town of Loomis. Written communication. August 1998.

Landau, Ken. 1998. Personal communication.

Lee, D. 1998. Personal communication.

Lehr, S. 1997. California Department of Fish and Game, Fishery Biologist, Region II. Telephone conversation regarding fish species present at the project site. January 10, 1997.

Maisch, Einar. 1998. Placer County Water Agency. Telephone conversation. August 17, 1998.

Manolis, T. 1998. Sacramento Area Birds Records Committee. Personal communication. 1998.

Matson, Mike. 1998a. Montgomery Watson. Personal communication. June 30, 1998.

Matson, Mike. 1998b. Montgomery Watson. Memorandum to R. Lind dated November 5, 1998.

McLaughlin, R. 1998. McLaughlin Water Engineers, Ltd. Personal communication. October 1998.

Micheaels, Jim. 2002. California Department of Parks and Recreation. Personal communication.

Miners, J. 1998. Placer County Diversion of Environmental Health. Telephone conversation. July 30, 1998.

Nelson, J. California Department of Fish and Game, Fishery Biologist, Region II. Phone conversation regarding fish screen issues and fish species that occur in the project area. September 26, 1997.

Oda, D. 2000. California Air Resources Board. Personal communication.

Placer County Public Works. 2001. Personal communication.

Reed, T. 1998. Auburn Whitewater Recreation Officer. Auburn State Recreation District. Telephone conversation with J. Hall. June 23, 1998.

Sanford, W. 1997. U.S. Bureau of Reclamation. Telephone conversation. October 1997.

Sanford, W. 1998. U.S. Bureau of Reclamation. Telephone conversation. July 16, 1998.

Stork, Ron. 2002. Friends of the River. Personal communication. __________.

Smith, T. 2002. Ayres and Associates. Telephone conference with J. Hinds of SWRI.

Toy, Mal. 1997. Placer County Water Agency. Telephone conversation. 1997.

Toy, Mal. 1998. Placer County Water Agency. Telephone conversation. July 1998.

Vintze, Dave. 1998. Associate Air Quality Planner. Placer County Air Pollution Control District. Telephone conversation. July 1998.

Vintze, Dave. 2002. Associate Air Quality Planner. Placer County Air Pollution Control District. Personal communication. February 2002.

Vonich, Pete. 1998. U.S. Bureau of Reclamation. Personal communication. July 10, 1998.

Warren, Jack. 1998. Placer County Water Agency. Personal communication. 1998.

West, Jim. 2001. U.S. Bureau of Reclamation. Personal communication.

White, A. 2002. Personal communication. March 27, 2002.

Williams, B. 1998. Audubon Society. Personal communication. April 14, 1998.

Glossary

Acre-foot (AF): A quantity or volume of water covering one acre to a depth of one foot (43,560 cubic feet).

Anadromous: Fish that spend a part of their lifecycle in the sea and return to freshwater streams to spawn.

Backwater: Water turned back in its course by an obstruction, an opposing current, or the tide.

California Environmental Quality Act (CEQA): Act requiring California public agency decision-makers to document and consider the environmental impacts of their actions. Also requires an agency to identify ways to avoid or reduce environmental damage and to implement those measures where feasible, and provides a means to encourage public participation in the decision-making process.

Central Valley Project (CVP): The CVP is a multi-purpose project operated by Reclamation that stores and transfers water from the Sacramento, San Joaquin, and Trinity river basins to the Sacramento and San Joaquin valleys. The CVP was authorized by Congress in 1937 for water supply, hydropower generation, flood control, navigation, fish and wildlife, recreation, and water quality control purposes. The CVP service area extends about 430 miles through much of California's Central Valley, from Trinity and Shasta reservoirs in the north to Bakersfield in the south.

Cooperating Agency: Any federal agency other than the lead agency that has jurisdiction by law or special expertise with respect to the environmental impacts expected to result from a proposed project.

Cumulative Impacts: For National Environmental Policy Act (NEPA) purposes, cumulative impacts are defined in Council of Environmental Quality (CEQ) Regulations (40 CFR 1508.7) as follows: "Cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Under CEQA, the cumulative impact of several projects is the change in the environment that results from the incremental impact of the project when added to other, closely related past, present, or reasonably foreseeable probable future projects.

Dewater: To remove water.

Diversion: The removing or turning of water from its natural channels.

Dredging: Widening or deepening of water channel by removing sand, mud, silt, or gravel. Dredging can be accomplished by using suction pumps or mechanical scrapers.

Effects: CEQA Guidelines Definition 15358 states: "Effects" and "impacts" are synonymous. Effects include: (1) Direct or primary effects which are caused by the project and occur at the same time and place. (2) Indirect or secondary effects which are caused by the project and are later in time or further removed in distance, but are still reasonably foreseeable. Indirect or secondary effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems. (3) Effects analyzed under CEQA must be related to a physical change.

Emigrate: To migrate or move from one habitat to another; in the case of anadromous fish such as salmon, to migrate or move in a downstream direction from freshwater riverine systems to estuarine and marine systems as juveniles.

Endangered Species Act (ESA): State and federal laws, which authorize and publish the process for the protection of habitats and populations of species threatened with extinction. The stated purposes of the ESAs are to provide conservation of the ecosystems upon which endangered and threatened species depend and to establish and implement a program to conserve these species.

Entrainment: Process by which fish are pulled through or around the fish screen face and carried into the intake channel.

Fish and Wildlife Coordination Act (FWCA): The FWCA and related acts express the policy of Congress to protect the quality of the environment as it affects the conservation, improvement, and enjoyment of fish and wildlife resources. Under the FWCA, any federal agency that proposes to control or modify any body of water, or to issue a permit allowing control or modification of a body of a body of water, must first consult with U.S. Fish and Wildlife Service and state fish and game officials.

Flow: The volume of water passing a given point per unit of time. Same as streamflow.

Fry: Lifestage of fish between the egg and fingerling stages.

Groundwater: Water contained beneath the land surface of the earth that can be collected with wells, or drainage galleries, or water that flows naturally to the earth's surface via seeps or springs.

Gully Erosion: Soil removed by water flows sufficient to cause the formation of defined channels.

Homing Cue: A chemical or physical environmental characteristic which salmonids use to find and recognize their natal streams.

Immigrate: To migrate or move from one habitat to another; in the case of anadromous fish such as salmon, to migrate or move in an upstream direction from estuarine and marine systems to freshwater riverine systems as adults.

Impact Indicators: Changes to the environment that point to a potential impact.

Impacts: Under CEQA Guidelines, “Impacts” and “Effects” are synonymous. See "Effects" for a complete description.

Imprinting: In the salmonids, the process of learning the odor of the natal stream as a juvenile.

Keyway: The specific section of canyon wall and floor where a structure is attached.

Lead Agency: CEQA Guidelines Definition 15367 states: “Lead Agency” means the public agency, which has the principal responsibility for carrying out or approving a project. For this project, Placer County Water Agency (PCWA) is the State (local) lead agency and the U.S. Bureau of Reclamation (Reclamation) is the Federal lead agency.

Mainstem: The principal channel of a river.

Mid-Channel Diversion Alternative: The major features that would be constructed for the Mid-Channel Diversion Alternative include the water diversion/intake structure, including a fish screen and debris rack; water transmission pipelines; a new pump station and wetwell, placed above the 100-year flood level; all-weather access roads; and power lines. This alternative would place the diversion/intake facility within the currently dewatered section of the river channel. Additionally, the bypass tunnel would be closed and the river redirected into the restored river channel.

Middle Fork Project (MFP): PCWA constructed and operates the MFP, a multi-purpose project providing water for irrigation, domestic, and commercial purposes, and for generation of electricity. The primary facilities of the MFP are located on the Middle Fork of the American River and its tributary, the Rubicon River. French Meadows and Hell Hole reservoirs are the primary storage facilities. The MFP also has five diversion dams, five power plants, diversion and water transmission facilities, five tunnels, and related facilities. Water is stored and released through a system of tunnels and power plants before being released into the Middle Fork of the American River.

Mortality: The rate or proportion of deaths.

National Environmental Policy Act (NEPA): Directs federal agencies to prepare an environmental impact statement for all major federal actions, which may have a significant effect on the human environment. States that it is the goal of the federal government to use all practicable means, consistent with other considerations of national policy, to protect and enhance the quality of the environment. Requires all federal agencies to consider the environmental impacts of their proposed actions during the planning and decision-making processes.

No Action/No Project Alternative: For purposes of this EIS/EIR, if the lead agencies do not construct a new year-round diversion and pump station facility for the American River diversion, the No Action/No Project Alternative would occur. Under this alternative, Reclamation would continue annual installation and removal of the seasonal pumps at the existing location and maintain responsibility for the operation and maintenance of the facilities.

Odorant: The chemical compounds in a stream, which produce a stream odor.

Olfactory Response: The process of "smelling" caused by the interaction between odorous chemical components of an environment and the odor receptors of an organism.

Redd: A depression dug by spawning salmon in gravel into which eggs are laid.

Responsible Agency: CEQA Guidelines 16381 states "Responsible Agency" means a public agency, which proposes to carry out or approve a project, for which a lead agency is preparing or has prepared an environmental impact report or negative declaration. For the purposes of CEQA, the term "responsible agency" includes all public agencies other than the lead agency, which have discretionary approval of a project.

Rill Erosion: Soil removed by small amounts of flowing water.

Riparian: Vegetation located on the banks of a stream, river, lake, or pond.

Sedimentation: Soil or gravel transported by water from other streams and bodies of water that settle out of the water and are deposited.

Sheet Erosion: Wearing away of a thin layer of land surface.

Significance Criteria: Qualitative or quantitative criteria used to determine the significance of an impact.

Silt: Loose sedimentary material with rock particles.

Spawning: To produce/deposit eggs.

Special-Status Species: Any species listed or proposed for listing under the ESA.

State Water Project (SWP): The SWP supplies water to the San Francisco Bay Area, San Joaquin Valley, and southern California. Initial SWP facilities were completed in 1973; however, certain project facilities have been in operation since 1962. They include 18 reservoirs, 17 pumping plants, 8 hydroelectric power plants, and 550 miles of aqueducts and pipelines. Oroville Reservoir on the Feather River is the principal reservoir of the SWP and has a capacity of 3.5 million AF. From Oroville Reservoir, water flows through three hydroelectric power plants before continuing down the Feather and Sacramento rivers to the Delta.

Turbidity: Suspended matter in water that causes the scattering or absorption of light rays and a cloudy appearance.

Upstream Diversion Alternative: The major features that would be constructed for the Upstream Diversion Alternative include the water diversion/intake structures, including fish screen and debris rack; water transmission pipelines, a new pump station, placed above the 100-year flood level; all-weather access roads; power lines; and safety features. The Upstream Diversion Alternative would site the diversion intake structure upstream of the bypass tunnel inlet. Locating the diversion upstream of the bypass tunnel would not require channel restoration or tunnel closure.

American River Pump Station Project

Final
Environmental Impact Statement/
Environmental Impact Report

Appendix A

Auburn State Recreation Area
Prefire Management Plan

U.S. Bureau of Reclamation

Placer County Water Agency

June 2002

STATE OF CALIFORNIA - THE RESOURCES AGENCY GRAY DAVIS, GOVERNOR

DEPARTMENT OF FORESTRY
AND FIRE PROTECTION
Nevada-Yuba-Placer Ranger Unit
13760 Lincoln Way Auburn Ca. 95603
(530) 823-4904

January 30, 2002

Dear Recipient:

Enclosed are the first components of the Auburn State Recreation Area Prefire Management Plan. This document was created to address a specific Wildland/Urban Interface problem adjacent to the City of Auburn. This document at the time of distribution is in the early stages of completion and is an evolving plan, which will serve as a guide for future fire prevention activities in the Auburn State Recreation Area. The California Department of Forestry and Fire Protection, California Department of Parks and Recreation, and the United States Bureau of Reclamation will be moving forward with the plan therefore, early release of this document is approved.

Tony Clarabut
Unit Chief
Nevada-Yuba-Placer Unit

By: Fred Lopez

Fred Lopez
Fire Captain Specialist
Nevada Yuba Placer Ranger Unit

Auburn State Recreation Area
Prefire Management Plan

(1-29-02)

PCWA-043

Table of Contents

DEFINITIONS

Wildland Urban Interface or Interface = The geographical meeting point of two diverse system, wildland and structures. At this interface, structures and vegetation are sufficiently close that a wildland fire could spread to structures or a structure fire ignite vegetation.

Intermix or Wildland Intermix = Interspersing of developed land with wildland, where there are no easily discernible boundaries between the two systems. An example would be what a real estate brochures describe as "ranchettes" or "weekend farmers" homes. Poses more problems in wildland fire management than interface.

Defensible Space = Adequate space (free from flammable vegetation) between structures and flammable vegetation, which allows firefighters a safe working area within which to attack an oncoming fire.

Fuel Break = A divide of expanses of fuels into smaller units. Native vegetation is modified so that fire burning into them can be more readily and safely controlled. The fuel type is changed to another that offers less resistance to control efforts.

Fire Break = An area cleared of flammable fuels to mineral soil, which is used as a wildfire control line, where a fire's progress is stopped.

ABREVIATIONS

BOR or Reclamation = United States Bureau of Reclamation

DPR or CSP = California Department of Parks and Recreation

CDFFP or CDF = California Department of Forestry and Fire Protection

BLM = Unites States Bureau of Land Management

USFS = Unites States Forest Service

ASRA = Auburn State Recreation Area

WUI = Wildland/Urban Interface

AUBURN DAM AND STATE RECREATION AREA
FIRE MANAGEMENT PLAN

Introduction

This paper introduces the purpose and the need for a Comprehensive Fire Management plan for The Auburn Dam and Reservoir Project lands. It also discusses a Fire Management Planning Strategy that has been developed by representatives of the California Departments of Forestry and Fire Protection (CDF), California Department of Parks and Recreation (DPR), and The United States, Bureau of Reclamation (Reclamation). The development of certain elements of the fire planning strategy have been closely coordinated with the City of Auburn Fire Department and with a representative of The United States, Bureau of Land Management (BLM).

Background

Reclamation is responsible for the management of The Auburn Dam and Reservoir Project lands, a project originally authorized by Congress in 1965. The total acreage within the project boundary is 42,000 acres. Of this, Reclamation has ownership for approximately 26,000 acres. The remaining acreage is owned by BLM, the United States Forest Service, and private parties. DPR and CDF have management authority over all Project lands through cooperative agreements with Reclamation. The total lands are known as the Auburn State Recreation Area and are operated by the State of California as a state recreation area.

Project lands within the American River watershed are largely comprised of two large river drainages, the North and Middle Forks of the American River that have carved over fifty miles of canyons within both Placer and El Dorado counties. Much of this area runs adjacent to the communities of Auburn and Foresthill, along with other residential developments. The oak-chaparral environment within this area can be highly combustible under certain dry conditions and the risk of wildland fires is a major concern as residential and visitor use activity continues to increase.

Because of these concerns, Reclamation is working with CDF and DPR to develop a Comprehensive Fire Management Plan for the Project Area. The development of this plan and its implementation is being greatly enhanced through appropriate coordination with local counties, communities, fire safe councils and other interest groups and jurisdictions. It may be appropriate to include both BLM and USFS lands within the Comprehensive Fire Plan. Funding mechanisms for the development of the Comprehensive Fire Management Plan have been identified as critical and needs further investigation.

The managing partners initiated the fire planning process for the ASRA lands in the summer of 2000. However, with the advent of a dry year in 2001, and the resulting high fire danger, concerns of local community leadership have reached high levels. In response, the managing partners are moving quickly to identify and implement appropriate actions. These actions are focusing on Reclamation Lands that interface with private property where certain priority conditions may exist.

A priority condition of great concern for the managing partners is residential density associated with these interface lands, such as the canyon rim adjoining the City of Auburn. It has been in response to this concern that the managing partners have focused on the Fuels Management Element of the Comprehensive Fire Plan for those interface lands.

A Fuels Management Action Plan has been developed, to not only be responsive to fire management concerns of the local interface areas, but also to be consistent with the broader goals and objectives of a comprehensive fire management plan for the ASRA. This plan will work to preserve and restore the natural resources and protect the cultural resources of the area. It is the intent of this strategy to implement the Fuels Management Action Plan for the priority interface lands, as soon as possible, consistent with the broader goals and objectives of the Comprehensive Plan. A major component for implementation is the selection of appropriate Demonstration projects to help ensure the viability of any fuels management activities.

It is vital to identify appropriate goals and objectives as a first step in the development of a comprehensive fire plan. The following is the product of much discussion, as the agencies integrated the needs for both fire protection and resource management.

FIRE PLAN
GOALS AND OBJECTIVES

Goal:

To protect human life and both public and private resources by reducing the risk and hazard of wildland fire within the American River Canyon by practicing management strategies that promote the preservation and restoration of natural resources and protection of cultural resources.

Objective:

Mitigate fire danger in order to:

- Enhance public safety
- Protect natural and cultural resources
- Provide for recreational opportunities
- Conduct cost effective maintenance of features and facilities

PLAN IMPLEMENTATION STRATEGIES
FOR RECLAMATION LANDS

To insure the effectiveness of this fire management program, a planning strategy has been developed that compliments and augments fire planning and management activities of local communities, jurisdictions and Fire Safe Councils.

I. **Fire Prevention:** Almost all fires that start on the Reclamation lands in the American River Canyon are directly caused by human activity. As public use and other activities increase on Reclamation lands, the probability of fire ignitions also increases. Fire prevention activities on Reclamation lands include:

   A. Education.

   B. Public information.

   C. Visitor and Resource Management actions:

      1. Placement of structures and facilities.

      2. Area closures to vehicle and/or visitor access.

      3. Other uses as appropriate.

   D. Area patrols and other law enforcement activities.

II. **Fire Safe Practices for Urban/Wildland Interface Lands:** The single most effective practice to reduce the spread of wildland fire and help prevent damage to structures is to create areas of reduced and/or modified fuels. This strategy includes practices utilized by local communities and landowners adjacent to Reclamation land using the following components:

   A. Defensible Space: The area extending from a structure out to between 30 and 100 feet creating an area where fuels that allow fire to spread from the wildland to a structure or a structure to the wildland to be more easily controlled.

   B. Education: Through local fire departments, local Fire Safe Councils, and other activities.

   C. Inspections: Coordinate with State and local government to encourage defensible space regulations, and appropriate regulations for new construction.

   D. Assistance Programs: Help to identify and support fuel modification activities that encourage and assist landowners in the creation and maintenance of defensible space, (i.e. Chipper Program, mulching, composting).

III. **Fuel Management:** Reduction of wildland fuels in strategic locations will enhance fire suppression activities and provide increased firefighter safety. Fuels management activities will occur on (1) Reclamation lands adjacent to other properties that enhance defensible space activities, (2) on Reclamation lands adjacent to public access roads and trails, and (3) on Reclamation core lands to increase wildlife habitat benefits and increase water values.

* Fuel reduction techniques include: hand tools and mechanical equipment, prescribed burns, biological controls and chemical application will be available for use to reduce or modify fuels as appropriate.

FUELS MANAGEMENT PRESCRIPTIONS FOR INTERFACE LANDS

Fuel modification within interface lands is critical for reducing the potential for a costly and damaging fire. The following prescriptions can be utilized for fuel management in three distinct geographic areas, or zones, within the interface.

The three zones are as follows:

1. Defensible Space: This is the area closest to structures and is defined as being within 30 to 100 feet of existing buildings or improvements. To be Fire Safe, this area should be considered to be the leanest in terms of flammable vegetation. In addition to the Shaded Fuel Break prescription treatments described below, all annual grasses are to be maintained to below 4 inches in height. Branches overhanging structures are to be removed along with any portion of vegetation within 10 feet of the outlet of any chimney or stovepipe. Dead wood and branches within the zone and leaves and needles on roofs are also to be removed.

2. Defensible Landscape: This is the area outside the Defensible Space zone (>30 to 100 feet from structures) where the land manager has decided to implement fuel management. This will increase the effectiveness of fuel management activities implemented within the Defensible Space Zone. The Shaded Fuel Break prescription treatments described below can be used as the guideline for fuel management within this zone.

3. Shaded Fuel Break: This is a strategic location along a ridge, access road, or other location where fuels have been modified. The width of the shaded fuel break is usually 100 to 300 feet depending on the site. This is a carefully planned thinning of dense vegetation, so fire does not easily move from the ground into the overhead tree canopy. A shaded fuel break is not the removal of all vegetation in a given area. Fire suppression ground and air resources can utilize this location to suppress wildland fires. Any fuel break by itself will not stop a wildland fire. It is a location where the fuel has been modified to increase the probability of success for fire suppression activities. Ground resources can use the location for direct attack. Air resources may use the location for fire retardant drops. The Shaded Fuel Break prescription treatments described in this document is the guideline for fuel management within this zone.

FUELS MANAGEMENT ACTION PLAN
Greater Auburn Interface Area

This action plan lays out a process for implementing fire management strategies for Reclamation lands that interface with the Greater Auburn Area. The urban/wild land interface area identified as a priority starts at or about Shirland Tract, running east along the north canyon rim of the American River along Reclamation property lines up stream to approximately the Foresthill Bridge within Placer County.

This interface area will be divided into manageable sections based generally on geographical and location characteristics. Project Priority Selection Criteria will then be applied to these sections and a priority list will be developed. Each section will then be evaluated and a Fuel Break Prescription will be tailored to meet specific resource and fire management needs for the selected section. Appropriate National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) documentation will be completed prior to fuels management. Implementation will be accomplished through coordination and in partnership with local entities.

On-going or long-term maintenance of these project sites is a significant issue that needs to be addressed as part of this fire management strategy. Local partnerships will need to play an important roll in this regard.

As an initial step, a demonstration project or projects will be planned to demonstrate the effectiveness of these implementation strategies and the Priority Selection Criteria. The selection of demonstration projects will be done in close coordination and partnership with local entities. A similar process as to the one mentioned above will be used to evaluate and select appropriate fuel management program for any demonstration sites on Reclamation lands before project implementation will occur.

Project Selection Criteria

- **Residential density**: Higher numbers of people living within the interface project area receive a high priority. Density of existing private property development is a high priority.

- **Defensible Space Activities:** An action or commitment by private property owners to reduce or modify the type or amount of vegetative fuel that will help prevent fire to move from a structure to the wildland, or the wildland to a structure.

- **Project Costs and Funding:** Project costs should include labor and equipment, management and administration for the planning, implementation, and on-going maintenance and oversight of a proposed project. Funding of a proposed project must cover the cost of the whole project and must be identified prior to initiating the planning phase of the project. Project funding may come from grants, in-kind labor, matching funds, etc. A project will not be pursued until funding sources have been identified.

- **Local Partnerships:** Partnerships with local communities, counties and other local organizations are extremely important to the success of fuels management activities. Partnerships can be in the form of cost sharing or in-kind services and other local support. Partnerships will receive a higher priority.

- **Topography:** Topography has a direct relationship to the speed of wildland fire spread. The steeper the slope the faster the fire spread and the higher the priority. The ideal location to create a fuel break is at the break-over point from the canyon wall to the ridge top.

- **Fuel Characteristics:** Wildland fuel density and arrangement has a particular effect on the spread of wildland fire. By the removal of light flashy fuels, thick dead and/or live fuels, and ladder fuels from the landscape reduces the risk of catastrophic fire. High fuel density areas will receive a high priority.

- **Strategic Location and Accessibility:** Modifying fuel density from areas next to access roads and structures allow firefighting personnel to gain access and to more safely and efficiently control the advance of a wildland fire. Project areas that provide for strategic locations and accessibility will receive a higher priority.

- **Complexity of Environmental Review:** Generally, the environmental review and compliance process should be without unresolved conflicts or highly controversial environmental effects. Project actions not having adverse effects on unique or sensitive geographical, cultural or biological resources such as wetlands, historical features or endangered species, etc., will have a higher priority.

- **Project Maintenance and Administration:** To ensure the success of a project, an on-going maintenance program for the project site must be identified. Maintenance of a project site includes regular monitoring, and sustaining the integrity of the site through use of various vegetation management techniques. Administration of project maintenance includes coordinating and implementing the defined maintenance program, distribution of the funds to support the program, and monitoring on-going defensible space activity. Projects with an identified maintenance and administrative component will receive a higher priority.

- Other factors may be considered for project site selection as they are identified.

The decision-making processes will be accomplished by the representatives of the managing partners, (the Technical Team). Members of the Technical Team are responsible for coordinating with appropriate agency personnel, as needed, in order to ensure representation of their agency's position given a particular issue. Project decisions will be made by a consensus of the Technical Team. Should a Technical

Team member have a dissenting opinion for any action, no further project action will be taken until the issue can be resolved. Decisions may be elevated if appropriate.

Project Administration will continue as it currently exists. The CDF remains responsible for fire prevention and suppression activities on Reclamation lands as stated in the Cooperative Agreement. The California State Parks and Recreation maintains responsibilities for recreation and resource management on Reclamation lands as identified in its cooperative agreement. Funding and appropriate staff time to coordinate and administer this action plan should be made available from existing resources under these cooperative agreements.

Desired Project Benefits

Fuel break land treatments in wildland / urban interface areas include many benefits, some of which, tend to be intangible in nature. The true test of success resulting from fuel breaks on interface lands occurs after a wildfire has occurred. What life, property and natural resources were saved? What tactical advantage did firefighting resources encounter during the extinguishing of the fire? These questions are futuristic and may only be projected prior to wildfire.

The subsequent results are desired during and after interface fire protection projects are completed.

A. Public Safety:

Reduced fuel loading on fuel break lands produces a less intense fire behavior which allows firefighting crews to make a stand, either offensively or defensively, on fuel break lands. The result is a more effective effort to protect the lives of citizens living in the fire's path along with residential and commercial structures. The fuel loading on fuel break lands will change from fuel models of 4 and 6, which have approximately 13 tons per acre and 6 tons per acre respectively, to fuel models of 1,2, and 3, which have approximately .74 tons/ac, 4 tons/ac and 3 tons/ac. On an "average day" in the summer, the flame lengths from fuel model 4 on the fuel break lands, as they are now (without treatment), would support flame lengths of approximately 26 feet and a fireline intensity of 6784 Btu/ft/s. On fuel break lands without treatment the current fuel model 6 flame lengths would be approximately 8 feet with a fireline intensity of 415 Btu/ft/s. The resulting fuel models of 1,2 and 3 after treatment will support flame lengths of 6, 9 and 15 feet with fireline intensities of 327 Btu/ft/s, 797 Btu/ft/s and 2278 Btu/ft/s.

B. Education:

Fire protection projects, such as fuel breaks, most often involves the need to create the fuel break on private lands which, creates a situation where communities become directly involved with public agency sponsored projects. During the cooperative process between agency and community an education process occurs. There becomes an awareness of the need for private landowners to participate in wildfire protection projects. Landowners are in direct contact with agency representatives who explain first hand, the why and how projects, such as fire defense projects are implemented. Landowners will become informed regarding wildfire behavior, land use planning concerns, and environmental protection issues. The education will occur resulting from public presentations and participation solicitation. Brochures, interpretive demonstration sites, newsletters and other activities will be a part of the education process which, will result in a better understanding of fuel break projects.

C. Protection of Natural Resources:

Fuel break lands create habitat edge effects which, benefit species that rely on edge and open canopy habitats. The fuel break will allow firefighting resources to quickly extinguish fires spreading from structural improvements to the wildlands, thus protecting the balance of ASRA lands from devastating fire. When fire does burn fuel break areas, the fuels consumed involve ground fuels such as grass, low lying brush and duff. In turn, the tree species remain with a very low mortality. Without fuels reduction, all of the vegetation on site becomes available to burn, in short, all vegetation on site is destroyed. With the resulting fuel load reduction, water yields on fuel break lands will increase by 35% assuming an average annual rainfall of 35" (USFS, Faust 1979). Plant species diversity and recruitment of new growth will be promoted by fuel break development.

D. Protection of Cultural Resources:

During fuel break establishment, cultural resources will be identified and recorded. On fuel break lands cultural resources can be protected as a result of less severe fire intensity. Fuel break lands encounter lower burn duration, resulting in cultural resources encountering less fire. Additionally, if circumstances permit, cultural resources can be protected by retaining vegetation as barriers.

E. Conduct Cost Effective Maintenance of Features and Facilities:

Once fuel loads are reduced on fuel break lands, the maintenance of those lands becomes less costly than the initial establishment. Costs may average $400.00 per acre to treat whereas costs may involve approximately $200.00 per acre to maintain (Handcrew estimates). Additionally, the improvements within the area will be protected thus resulting in maintenance costs rather that replacement costs in event of wildfire impingement. Existing parking areas, roads, canals, trails and other such features will be incorporated into the fuel break planning process in order to reduce costs and be more efficient.

SHADED FUEL BREAK PRESCRIPTION FOR BUREAU OF RECLAMATION LANDS OF THE AUBURN STATE RECREATION AREA

This is a defensible location to be used by fire suppression resources to reduce the hazard of wildland fires. Any fuel break by itself will **NOT** stop a wildland fire. It is a location where the fuel has been modified to increase the probability of success for fire suppression activities. Ground resources can use the location for direct attack. Air resources may use the location for fire retardant drops.

Prescription

The intent of the fuel break is to create a fuel model or vegetative arrangement where wildfire reduces intensity as it burns into the fuel break. A ground fire, burning grass and leaf duff is the desired fire behavior. An arrangement which, provides the desired fire behavior effects, involves an area where ladder fuels are removed and tree or brush canopies will not sustain fire, and where the contiguous fuels arrangement is interrupted.

This general arrangement allows fire and resource managers to retain a species diversity of individual younger, middle aged and older plants, which allows the opportunity for an uneven aged vegetative type, without compromising the project objectives. For example, young saplings of individual oaks or conifers may be retained, although, they may be under the desired diameter, they may not contribute to undesired fire behavior effects. Additionally, it may be necessary to cull a few trees in a thick stand of conifers over the desired diameter in order to improve forest health. It is important to remember that this prescription is a guide, not an absolute. Site specific prescriptions may be developed later for individual projects which, all will be in accordance with the project objectives.

Implementation consists of removing or pruning trees, shrubs, brush, and other vegetative growth on the project area as prescribed. All work will be accomplished by use of hand crews, biological treatment or mechanical equipment; supported by chippers and/or burning as determined appropriate on a case-by-case basis. The preferred width of a shaded fuel break along a ridge top or adjacent to one is approximately 300 feet

Trees up to the 6-inch diameter at breast height (dbh) class are eligible for removal under this prescription. However, larger hazardous snags may be removed. Due to operational needs, it may be necessary to remove an occasional tree with a dbh larger than 6 inches based on forest health and project objectives. Individual trees under 6-inch bdh may be retained for diversity and if they do not disrupt project objectives. This will only be done on a case-by-case basis after proper review by all agencies.

Threatened and endangered plant and animal species, such as elderberry and other sensitive species, shall not be removed or treated, or otherwise adversely affected, within any shaded fuel break.

Cultural resources are a major resource and will be protected.

1. Understory fuels:

Understory fuels over 1 foot in height are to be removed in order to develop vertical separation and low horizontal continuity of fuels. Individual plants or pairs of plants may be retained provided there is a horizontal separation between plants of 3 to 5 times the height of the residual plants and the residual plants are not within the drip lines of an overstory tree.

2. Mid-story fuels:

Trees up to the 6-inch dbh may be removed. Exception to this size limit shall be trees that have significant defect and/or which do not have a minimum of a 16-foot saw log or trees, such as saplings, that do not present an undesirable effect. Live but defective trees larger than the 6-inch dbh providing cavities for obvious wildlife use will be retained.

Trees shall be removed to create horizontal distances between residual trees from 20 feet between trunks up to 8 to 15 feet between tree crown drip lines. Larger overstory trees (> 6-inches dbh) do count as residual trees and, in order to reduce ladder fuels, shall have vegetation within their drip lines removed. *Prune branches off of all residual trees from 8 to 10 feet off the forest floor, not to reduce the live crown ratio below 1/2 of the height of the tree.*

Criteria for residual trees (up to < 6-inch dbh):

Conifers: Leave trees that have single leaders and thrifty crowns with at least 1/3 live crown ratio.

Conifer leave tree species in descending order:

Sugar pine
Ponderosa pine
Douglas fir
Knob-cone Pine
Gray Pine
White fir
Incense cedar

Intolerant to shade species have a higher preference as leave trees because their seed will be less likely to germinate in the understory.

3. Snags:

Snags are a conduit for fire during a wildland fire. However, they also provide excellent wildlife habitat in their natural state. The following is the criteria of when snags shall be retained:

18-inch diameter class or larger and not more than 30 feet in height which are not capable of reaching a road or structure provided there is a separation of least 100 feet between snags.

Hardwood trees: Leave trees that have vertical leaders and thrifty crowns with at least 1/3 live crown ratio.

Hardwood leave tree species in descending order:

Valley Oak
Big Leaf Maple
Blue Oak
Black Oak
Madrone
Live Oaks

Brush: It is desirable to remove as much brush as possible within the shaded fuel break area. However, if individual plants or pairs of plants are desired to be left, leave plants with the following characteristics: young plants less than 5 feet tall and individual or pairs of plants that are no more that 5 feet wide.

From a fuels management perspective the following are brush leave species in descending order:

Category 1
Dogwood
Redbud

Category 2
Toyon
Buckeye
Coffeeberry
Lemmon Ceanothus
Buck brush (Wedge leaf ceanothus)

Category 3
Whitethorn
Deer brush
Manzanita
Chamise
Yerba Santa
Poison Oak
Scrub Oak

Non-native species (such as olive, fig, etc.) will be considered on a case- by- case basis.

4. Wetlands:

Wetlands and riparian areas will not be adversely affected for treatment and ground operations.

5. Watercourse and Lake Protection Zone (WLPZ):

To provide mitigation for riparian associated species and to reduce the potential risk of habitat fragmentation, the following will apply:

WLPZ widths and operational limitations shall be in conformance and consistent with Title 14, California Code of Regulations, 936.5, Procedures for Determining Watercourse and Lake Protection zone Widths, as approved by the California Board of Forestry.

916.5, 936.5, 956.5 Procedures for Determining Watercourse and Lake Protection Zone Widths and Protective Measures [All Districts]

TABLE I

Procedures for Determining Watercourse and Lake Protection Zone Widths and Protective Measures[1]								
Water Class Characteristics or Key Indicator Beneficial Use	1) Domestic supplies, including springs, on site and/or within 100 feet downstream of the operations area and/or 2) Fish always or seasonally present onsite includes habitat to sustain fish migration and spawning.		1) Fish always or seasonally present offsite within 1000 feet downstream and/or 2) Aquatic habitat for nonfish aquatic species. 3) Excludes Class III waters that are tributary to Class I waters.		No aquatic life present, watercourse showing evidence of being capable of sediment transport to Class I and II waters under normal high water flow conditions after completion of timber operations.		Man-made watercourses, usually downstream, established domestic, agricultural, hydroelectric supply or other beneficial use.	
Water Class	Class I		Class II		Class III		Class IV	
Slope Class (%)	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection Measure
					[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]		[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]	
<30	75	BDG	50	BEI	See CFH		See CFI	
30-50	100	BDG	75	BEI	See CFH		See CFI	
>50	150[2]	ADG	100[3]	BEI	See CFH		See CFI	

1 – See Section 916.5(e) for letter designations application to this table.
2 – Subtract 50 feet width for cable yarding operations.
3 – Subtract 25 feet width for cable yarding operations.

Class I watercourse (Fish bearing):

Exclude from equipment operations (except on existing roads) and remove one thousand hour and smaller sized dead fuels ($\leq$ 5 inches in diameter).

Class II watercourse (Aquatic habitat for non-fish aquatic species):

No treatment of overstory and the treatment of understory will not reduce vegetative cover below 50%. One thousand-hour and smaller sized dead fuels ($\leq$ 5 inches in diameter) will be removed. Ground based equipment will not operate within the zone except on existing roads. Prune residual trees.

Class III watercourse (No aquatic life present):

Full shaded fuel break prescription will be implemented but no ground-based equipment will operate within exclusion zones except on existing roads.

BRUSH FIELD PRESCRIPTION FOR BUREAU OF RECLAMATION LANDS OF THE AUBURN STATE RECREATION AREA

Implementation consists of removing or pruning brush, and other vegetative growth on the project area. All work will be accomplished by use of heavy equipment, masticator and/or hand crews supported by chippers and/or burning.

Due to operational needs tree canopies may need to be thinned, pruned or modified as part of the brush field fuel break prescription. This will only be done on a case by case basis after proper review by all involved agencies.

Threatened and endangered plant and animal species, such as elderberry and other sensitive species, shall not be removed or treated, or otherwise adversely affected.

Cultural resources are of a major concern in any area where they may exist. These resources will be protected.

Prescription:

Brush: It is desirable to remove as much brush as possible within the brush field fuel break area. However, if individual plants or pairs of plants are desired to be left, leave plants with the following characteristics: young plants less than 5 feet tall and individual or pairs of plants that are no more that 5 feet wide. The distance between residual plants shall be 3 to 5 times the height of the residual plants. Three (3) times the height distance for slopes less than 30%, five (5) times for slopes equal to or greater than 30%.

The width of the brush field fuel break shall normally be 300 feet.

From a fuels hazard perspective the following are brush leave species in descending order:

Category 1
Dogwood
Redbud

Category 2
Toyon
Buckeye
Coffeeberry
Lemmon Ceanothus
Buck brush (Wedge leaf ceanothus)

Category 3
Whitethorn
Deer brush
Manzanita

Chamise
Yerba Santa
Poison Oak
Scrub Oak

Non-native species (such as olive, fig, etc.) will be considered on a case by case basis.

Wetlands:

Wetlands and riparian areas will not be adversely affected for treatment and ground operations.

Watercourse and Lake Protection Zone (WLPZ):

To provide mitigation for riparian associated species and to reduce the potential risk of habitat fragmentation, the following will apply:

WLPZ widths and operational limitations shall be in conformance and consistent with Title 14, California Code of Regulations, 936.5, Procedures for Determining Watercourse and Lake Protection zone Widths, as approved by the California Board of Forestry.

916.5, 936.5, 956.5 Procedures for Determining Watercourse and Lake Protection Zone Widths and Protective Measures [All Districts]

TABLE I

Procedures for Determining Watercourse and Lake Protection Zone Widths and Protective Measures[1]								
Water Class Character-istics or Key Indicator Beneficial Use	1) Domestic supplies, including springs, on site and/or within 100 feet downstream of the operations area and/or 2) Fish always or seasonally present onsite includes habitat to sustain fish migration and spawning.		1) Fish always or seasonally present offsite within 1000 feet downstream and/or 2) Aquatic habitat for nonfish aquatic species. 3) Excludes Class III waters that are tributary to Class I waters.		No aquatic life present, watercourse showing evidence of being capable of sediment transport to Class I and II waters under normal high water flow conditions after completion of timber operations.		Man-made watercourses, usually downstream, established domestic, agricultural, hydroelectric supply or other beneficial use.	
Water Class	Class I		Class II		Class III		Class IV	
Slope Class (%)	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection Measure
					[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]		[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]	
<30	75	BDG	50	BEI	See CFH		See CFI	
30-50	100	BDG	75	BEI	See CFH		See CFI	
>50	150[2]	ADG	100[3]	BEI	See CFH		See CFI	

1 – See Section 916.5(e) for letter designations application to this table.
2 – Subtract 50 feet width for cable yarding operations.
3 – Subtract 25 feet width for cable yarding operations.

Class I watercourse (Fish bearing):

Exclude from equipment operations (except on existing roads) and remove one thousand hour and smaller sized dead fuels (≤ 5 inches in diameter).

Class II watercourse (Aquatic habitat for non-fish aquatic species):

No treatment of overstory and the treatment of understory will not reduce vegetative cover below 50%. One thousand-hour and smaller sized dead fuels (≤ 5 inches in diameter) will be removed. Ground based equipment will not operate within the zone except on existing roads. Prune residual trees.

Class III watercourse (No aquatic life present):

Brush field prescription will be implemented but no ground-based equipment will operate within exclusion zones except on existing roads.

GRASS FIELD PRESCRIPTION FOR BUREAU OF RECLAMATION LANDS OF THE AUBURN STATE RECREATION AREA

Implementation consists of mowing and possibly re-establishing native grass species on the project area. All work will be accomplished by use of heavy equipment, and/or hand crews.

Threatened and endangered plant and animal species, such as elderberry and other sensitive species, shall not be removed or treated, or otherwise adversely affected.

Cultural resources are of a major concern in any area where they may exist. These resources will be protected.

Prescription:

Grass: Grass fuel breaks shall be a minimum of 300 feet wide. All grasses are to be maintained below four (4) inches in height just after the grasses cure cut in early summer.

Wetlands:

Wetlands and riparian areas will not be adversely affected for treatment and ground operations.

Watercourse and Lake Protection Zone (WLPZ):

To provide mitigation for riparian associated species and to reduce the potential risk of habitat fragmentation, the following will apply:

WLPZ widths and operational limitations shall be in conformance and consistent with Title 14, California Code of Regulations, 936.5, Procedures for Determining Watercourse and Lake Protection zone Widths, as approved by the California Board of Forestry.

916.5, 936.5, 956.5 Procedures for Determining Watercourse and Lake Protection Zone Widths and Protective Measures [All Districts]

TABLE I

Procedures for Determining Watercourse and Lake Protection Zone Widths and Protective Measures[1]								
Water Class Character-istics or Key Indicator Beneficial Use	1) Domestic supplies, including springs, on site and/or within 100 feet downstream of the operations area and/or 2) Fish always or seasonally present onsite includes habitat to sustain fish migration and spawning.		1) Fish always or seasonally present offsite within 1000 feet downstream and/or 2) Aquatic habitat for nonfish aquatic species. 3) Excludes Class III waters that are tributary to Class I waters.		No aquatic life present, watercourse showing evidence of being capable of sediment transport to Class I and II waters under normal high water flow conditions after completion of timber operations.		Man-made watercourses, usually downstream, established domestic, agricultural, hydroelectric supply or other beneficial use.	
Water Class	Class I		Class II		Class III		Class IV	
Slope Class (%)	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection Measure
					[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]		[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]	
<30	75	BDG	50	BEI	See CFH		See CFI	
30-50	100	BDG	75	BEI	See CFH		See CFI	
>50	150[2]	ADG	100[3]	BEI	See CFH		See CFI	

1 – See Section 916.5(e) for letter designations application to this table.
2 – Subtract 50 feet width for cable yarding operations.
3 – Subtract 25 feet width for cable yarding operations.

Class I watercourse (Fish bearing):

Exclude from equipment operations (except on existing roads) and remove one thousand hour and smaller sized dead fuels (≤ 5 inches in diameter).

Class II watercourse (Aquatic habitat for non-fish aquatic species):

No treatment of overstory and the treatment of understory will not reduce vegetative cover below 50%. One thousand-hour and smaller sized dead fuels (≤ 5 inches in diameter) will be removed. Ground based equipment will not operate within the zone except on existing roads. Prune residual trees.

Class III watercourse (No aquatic life present):

Grass field prescription will be implemented but no ground-based equipment will operate within exclusion zones except on existing roads.

MAINTENANCE PRESCRIPTIONS FOR BUREAU OF RECLAMATION LANDS OF THE AUBURN STATE RECREATION AREA

Once fuels have been modified within an area, maintenance activities should be planned and implemented on a regular basis to keep the effectiveness of the original treatment. If no maintenance activities occur, the effectiveness of the original treatment will diminish every year, potentially yielding no net effect within 5 years. The necessary maintenance activities will be minimal if implemented on an annual basis.

The original prescription treatment should be followed for maintenance. Possible fuel reduction techniques to be utilized for maintenance include the following:

Hand Work: Use of hand tools by crews or individuals. This technique is labor intensive and potentially expensive (>$1000 per acre). Impacts to soils are negligible.

Mechanical Work: Use of heavy equipment such as masticators and/or bulldozers. This technique is moderately expensive (as low as $400 per acre) but limited by topography (to slopes less than 50%) and not appropriate for most watercourse and lake-protection zones and excessively wet soils.

Chemical Controls: Use of California registered herbicides. This is the most cost-effective technique. Implementation usually requires one or two individuals for ground application. This technique has negligible soil effects but may not be appropriate for certain areas such as riparian zones, watercourses, and areas of listed plants.

Prescribed Browsing: Use of goats in a controlled setting to browse within appropriate areas to reduce fuel levels. Browsing goats can be an effective tool to control grasses and low growing vegetation, when controlled properly, can have little impact to the environment. Costs may vary.

Prescribed Burning: The use of planned and controlled burning operations to reduce fuel levels. Control lines are established prior to burning. Burning and Air Pollution permits are required to conduct these operations. This technique varies in cost per acre depending on complexity of project. Burning is becoming more difficult to complete due to air regulations.

American River Pump Station Project

Final
Environmental Impact Statement/
Environmental Impact Report

Appendix B

Contract Between the United States and Placer County Water Agency Related to American River Pumping Plant and Associated Facilities

U.S. Bureau of Reclamation **Placer County Water Agency**

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

Placer County
Water Agency

June 2002

Contract No. 02-LC-20-7790

DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
Central Valley Project, California

CONTRACT BETWEEN THE UNITED STATES
AND
PLACER COUNTY WATER AGENCY
RELATED TO
AMERICAN RIVER PUMPING PLANT AND ASSOCIATED FACILITIES

THIS CONTRACT, made this ___ day of ____________________ 2002, in pursuance generally of the Act of June 17, 1902 (32 Stat. 388), and acts amendatory or supplementary thereto, including, but not limited to, the acts of August 26, 1937 (50 Stat. 844), as amended and supplemented, August 4, 1939 (53 Stat. 1187), as amended and supplemented, all collectively hereinafter referred to as the Federal Reclamation law, between THE UNITED STATES OF AMERICA, hereinafter referred to as the UNITED STATES, and Placer County Water Agency, hereinafter referred to as the AGENCY, a political subdivision of the State of California, duly organized, existing and acting pursuant to the laws thereof, including, but not limited to, the Placer County Water Agency Act; with its principal place of business in Auburn, California;

WITNESSETH, That:

EXPLANATORY RECITALS

WHEREAS, the UNITED STATES has constructed and is operating the Central Valley Project, California for diversion, storage, carriage, distribution and beneficial use, for flood control, irrigation, municipal, domestic, industrial, fish and wildlife mitigation, protection and restoration, generation and distribution of electric energy, salinity control, navigation and other beneficial uses, of waters of the Sacramento River, the American River, the Trinity River, and the San Joaquin River and their tributaries; and

WHEREAS, in 1963, the AGENCY obtained the right to divert certain flows of the American River pursuant to water right permits for the AGENCY=s Middle Fork Project, which permits were issued by the California State Water Rights Board, which has been succeeded by the State Water Resources Control Board; and

WHEREAS, pursuant to those rights, the AGENCY secured land and constructed diversion, year-round pumping and conveyance facilities in the American River canyon near Auburn, California for the purposes of diverting water under its permits and conveying it to and through the Auburn Ravine Tunnel, also known as the Auburn Tunnel or Ophir Tunnel, for use within the AGENCY=s Service Area; and

WHEREAS, in 1965, the UNITED STATES authorized a water project known as the Auburn-Folsom South Unit (AAuburn Dam@), and, in furtherance of said project, desired to acquire the land upon which the AGENCY=s pumps and conveyance facilities were located; and

WHEREAS, the UNITED STATES has modified the American River canyon to construct the Auburn-Folsom South Unit (AAuburn Dam@), and some of those modifications have created unstable land features; and

WHEREAS, under threat of condemnation by the UNITED STATES, the AGENCY entered into a Land Purchase Contract (14-06-859-308) with the UNITED STATES, transferring the AGENCY=s land and facilities in the American River canyon to the UNITED STATES, and as partial consideration for the taking of this property, the UNITED STATES agreed to provide a water supply to the AGENCY until the Auburn Dam was completed; and

WHEREAS, at the time the Land Purchase Contract was negotiated and executed, the Auburn Dam Project, as then designed, was expected to enable the AGENCY to obtain water from the American River by gravity flow through the Auburn Ravine Tunnel, without the necessity of pumping; and

WHEREAS, pursuant to the Land Purchase Contract (14-06-859-308A), the UNITED STATES has, for many years, annually installed a seasonal pumping station and conveyance facilities to enable the AGENCY to pump water from the American River into the Auburn Ravine Tunnel during summer months, and

WHEREAS, the AGENCY has determined that it now requires year-round pumping to meet its water supply obligations to its customers; and

WHEREAS, the parties have recognized that yearly installation of seasonal pumps and facilities no longer satisfies the UNITED STATES= obligation under the Land Purchase Contract; and

WHEREAS, the parties have recognized that yearly installation of seasonal pumps and facilities is inefficient and costly to the UNITED STATES; and

WHEREAS, the parties now propose to construct a year-round pumping facility which fully satisfies the UNITED STATES= obligations under the Land Purchase Agreement, to replace the AGENCY=s original pumping facility; and

WHEREAS, the parties now desire to enter into a new contract, which will supersede the Land Purchase Agreement regarding issues of cost-sharing, operations and maintenance of the new pump station to deliver 50 cfs which is the obligation of The UNITED STATES, and up to a total of 100 cfs, the remainder of which would be the responsibility of the

AGENCY.

NOW, THEREFORE, in consideration of the mutual and dependent covenants herein contained, it is hereby mutually agreed by the parties hereto as follows:

Definitions

1. When used herein, unless otherwise distinctly expressed or manifestly incompatible with the intent hereof, the term:

(a) AAuburn Ravine Tunnel@ shall mean that existing 12-foot diameter tunnel through the ridge separating Auburn, California from the American River and used to convey water from the American River to the tunnel=s outlet in Auburn Ravine. The Auburn Ravine Tunnel is also referred to from time to time as the Ophir Tunnel or Auburn Tunnel.

(b) ACalendar Year" shall mean the period January 1 through December 31, both dates inclusive;

(c) ALand Purchase Contract@ shall mean the agreement entered into between the UNITED STATES and the AGENCY, identified as Contract No. 14-06-859-308 and dated July 25, 1972, as amended, modified and supplemented by the Supplemental Agreement to Land Purchase Contract, identified as Contract No. 14-06-859-308a and dated May 25, 1979;

(d) AProject@ shall mean the installation of a permanent diversion intake, pumping station, electric facilities, electric transmission lines, water conveyance facilities, access roads, and all ancillary facilities necessary to allow the AGENCY to divert the water of the American River to the Auburn Ravine Tunnel, on a year-round basis, until the Auburn Dam is completed;

(e) AService Area@ shall mean the area to which the AGENCY is entitled to deliver its water rights water from the American River for beneficial use;

(f) ASecretary@ or AContracting Officer@ shall mean the Secretary of the UNITED STATES Department of the Interior or her duly authorized representative;

(g) AYear@ shall mean the period from and including March 1 of each Calendar Year through the last day of February of the following Calendar Year.

Organization of Contract

2. Upon execution of this Contract by both parties, and until the AGENCY approves a Notice of Completion of Construction of the Project facilities, Articles 1 and 2 and Sections A and D shall apply. Upon approval by the Agency of a Notice of Completion of Construction issued by the UNITED STATES and until the AGENCY accepts title to the Project facilities and the related real property interests, Section A shall on longer be applicable; instead, Articles 1 and 2 and Sections B and D shall apply. Upon transfer of title to the Project facilities and the related real property interests to the AGENCY and thereafter, Section B shall no longer apply: instead, Articles 1 and 2 and Sections C and D shall apply for the remaining life of this contract.

SECTION A.

CONSTRUCTION OF PROJECT FACILITIES

Upon execution of this contract by both parties and until such time as the AGENCY has approved a Notice of Completion of Construction of the Project facilities, the following provisions shall apply:

Project Facilities to be Constructed

3. (a) Project facilities to be constructed pursuant to this Contract shall enable the AGENCY to divert water from the American River near Auburn, California into its Auburn

Ravine Tunnel on a year-round basis. Project facilities shall be defined by the drawings and technical specifications for the construction of the Placer County Water Agency American River Pump Station (APump Station@), once they are approved by the parties, and shall include, but not be limited to:

(1) A screened intake structure of sufficient size to allow diversion of not less than 225 cubic feet per second (Acfs@) of water from the American River;

(2) A year-round pipeline of sufficient capacity to convey to the Pump Station such water as is diverted from the intake;

(3) A pumping station of sufficient capacity to allow future increase of diversions to an instantaneous rate of 225 cfs;

(4) Pumps of sufficient capacity to allow instantaneous diversion of 100 cfs of water from the American River, with adequate backup electrical power and pumping facilities as may be dictated by prudent design guidelines.

(5) A discharge pipe capable of delivering up to 100 cfs from the Pump Station into the Auburn Ravine Tunnel;

(6) All-weather roads sufficient to enable the AGENCY to conduct all necessary operation, maintenance**,** repair and reconstruction of the Project and the Auburn Ravine Tunnel. Such roads, adjacent slopes and associated surface water runoff control facilities shall be designed and constructed so that the roads remain unobstructed and last indefinitely.

(b) All Project facilities shall be designed to meet both parties' specifications, at a minimum.

(c) (1) The UNITED STATES shall be responsible for construction of all

Project facilities and their proposed locations.

(2) The AGENCY shall review and approve the proposed locations of all Project facilities and shall approve the configuration and designs of any Project facilities; and any submissions, change orders and the Notice of Completion of Construction issued by the United States for the Project facilities.

Project Costs

4. (a) Except where costs are made the responsibility of the AGENCY under the express terms of this contract, the UNITED STATES shall be responsible for the reasonable and necessary costs associated with the Project, including:

(1) The design of the Project facilities;

(2) The preparation of all necessary environmental documentation and implementation and monitoring of any necessary mitigation measures;

(3) All required construction, management, construction inspection and construction engineering services;

(4) All on site grading, road construction, stabilization work, runoff control, restoration and revegetation work;

(5) Required river gradient control structures;

(6) All safety facilities; and

(7) The cost of the diversion structure, conveyance pipeline to the Pump Station, the Pumps, the Pump Station and the discharge pipeline to the Auburn Ravine Tunnel, all sized for 100 cfs capacity. The AGENCY shall pay the incremental costs of materials and construction necessary to enable the facilities to deliver water at rates in excess of 100 cfs.

Such payments by the AGENCY shall be made in advance of construction of any such facilities by The UNITED STATES.

(8) The cost of parallel facilities as detailed in Article 5, herein.

UNITED STATES= Obligation to Continue Water Deliveries

5.. Reclamation shall sequence construction of Project facilities and/or construct parallel temporary facilities as required to continue American River water deliveries during the period from June 15 through September 15 and during scheduled PG&E maintenance outage periods.

Notice of Completion

6. Upon substantial completion of construction of all Project facilities, the UNITED STATES shall issue a Notice of Completion of Construction. Upon the AGENCY's approval of said Notice, which approval shall not be unreasonably withheld, Section A of this contract shall no longer apply.

End of Section A.

SECTION B.

OPERATIONS AND MAINTENANCE OF PROJECT FACILITIES

Upon approval by the AGENCY of a Notice of Completion of Construction of Project facilities issued by the UNITED STATES, and until the transfer of Project facilities and related property interests to the AGENCY, the provisions in Section A, AConstruction of Project Facilities,@ shall no longer be applicable. Instead, provisions of Articles 1 and 2 and Sections B and D shall apply:

Operations and Maintenance

7. (a) Upon approval by the AGENCY of the Notice of Completion of Construction issued by the UNITED STATES, the AGENCY, without expense to the UNITED STATES, shall care for, operate, and maintain the Project facilities in full compliance with the terms of this contract and regulations and instructions furnished by the Contracting Officer, and in such manner that said Project facilities will remain in good and efficient conditions.

(b) The AGENCY shall promptly make any and all repairs to the Project facilities being operated by the AGENCY which are necessary for proper care, operation, and maintenance. In case of neglect or failure of the AGENCY to make such repairs within 60 days following written notification, the Contracting Officer may cause the repairs to be made, and the cost thereof shall be paid by the AGENCY as prescribed by the Contracting Officer.

(c) No substantial change shall be made by the AGENCY in any of the Project facilities without first obtaining the written consent of the Contracting Officer.

(d) (i) The AGENCY agrees to indemnify the UNITED STATES for, and hold the UNITED STATES and all of its representatives harmless from, all damages resulting from suits, actions, or claims of any character brought on account of any injury to any person or property arising out of any act, omission, neglect, or misconduct in the manner or method of performing any construction, care, operation, maintenance, supervision, examination, inspection, or other duties of the AGENCY required under this Article 5 regardless of who performs those duties. (ii) Within thirty (30) days of receipt by either party of any claim for liability arising from actions within the scope of this contract, the party receiving the claim shall notify the other party of such claim and provide a copy of the claim to the other party, if it is in written form. Nothing in this article shall be construed to limit the right of either party to assert such affirmative defenses and file such cross complaints as may be appropriate in relation to any claim affecting the liability of such party.

(e) In the event the AGENCY is found to be operating the Project facilities in violation of this contract, then upon the election of the Contracting Officer, the UNITED STATES may take over from the AGENCY, the care, operation, and maintenance of the transferred facilities by giving written notice to the AGENCY of such election and of the effective date thereof. Thereafter, during the period of operation by the UNITED STATES, the AGENCY shall pay to the UNITED STATES annually, in advance, the cost of operation and maintenance of such facilities as prescribed in notices from the Contracting Officer to the AGENCY. Such facilities may be retransferred to the AGENCY in the manner originally transferred.

Grant of Real Property Interest

8. Within 12 months of the AGENCY's approval of the UNITED STATES Notice of Completion of Construction of the Project facilities, or as soon thereafter as practicable, the UNITED STATES shall grant to AGENCY title to the Project facilities, and a recordable indefeasible easement, easements, or other interest in lands, in a form acceptable to the County of Placer, sufficient to provide AGENCY with permanent, year-round access to all Project facilities and to the Auburn Ravine Tunnel, for maintenance, operation, enlargement, repair, reconstruction, and, if necessary for continued reliable operation, for relocation of Project facilities, and for electrical power lines necessary to operate and maintain the Project. Said real property interests shall include sufficient rights to allow the AGENCY access to the river for

future construction and operation of facilities to divert water pursuant to its appropriative rights under its Middle Fork Project, and also to allow diversion and conveyance of a total of 25 cfs of American River flows to Georgetown Divide Public Utility District, pursuant to PL 101-514, from the Project intake, diversion, conveyance and pumping facilities if and when such conveyance is necessary.

End of Section B.

SECTION C.

TRANSFER OF PROJECT FACILITIES

Upon acceptance by the AGENCY of Title to the Project facilities , the provisions in Section A. AConstruction of Project Facilities@ and Section B. AOperations and Maintenance of Project Facilities,@ shall no longer be applicable. Instead, the provisions of Articles 1 and 2 and Sections C and D will be effective throughout the remaining life of this Contract.

<u>Obligations of the Parties Following Transfer of Project Facilities</u>

9. (a) Upon acceptance of title to Project facilities and easements by the AGENCY, the AGENCY shall have sole responsibility for operation, maintenance, repair and reconstruction of such Project facilities, including any damage caused by any previous disturbance to the American River canyon related to construction of Auburn Dam. The UNITED STATES shall be relieved of its obligation to provide pumping of water to the AGENCY as set forth in the Land Purchase Contract.

(b) The UNITED STATES shall cooperate and assist the AGENCY in the AGENCY's efforts to fully access, divert and utilize its water entitlements under its water rights.

(c) The UNITED STATES shall retain, beyond the date on which AGENCY accepts title to Project facilities, all responsibility for ensuring public safety associated with public access to or use of the water within the American River canyon and the land surrounding the Project, including those areas within and upstream of the Project facilities site that have been affected by the UNITED STATES' Auburn Dam project.

Future Projects

10. (a) In the event that the UNITED STATES makes or permits changes to the course or channel of the American River or to the American River canyon slopes, features or improvements other than as provided for in Article 9 above, which change or impair the AGENCY=s ability to divert or pump water from the American River, UNITED STATES shall assist AGENCY in AGENCY=s efforts to modify, construct or adjust, as necessary and to AGENCY=s satisfaction, the Project facilities constructed pursuant to this Agreement so that the AGENCY shall continue to have access to American River water in the same amount, and at the same rate, as it had prior to such changes. Such assistance shall include any necessary modification to AGENCY=s real property rights granted pursuant to Article 8 herein above, expeditious design review of proposed facilities, and assistance in obtaining prompt environmental review and permits as may be needed to avoid or minimize disruption in AGENCY=s water supply.

(b) The UNITED STATES= obligations under this Agreement shall continue, notwithstanding any transfer of title or possession to its lands within the American River canyon, unless and until the AGENCY agrees in writing to delegation of such obligations to a third party or release of such obligations.

(c) Notwithstanding the provisions of Article 9 (a), in the event that the UNITED STATES constructs a dam and reservoir in the American River canyon that inundates or otherwise impairs the operation of the Project facilities, the UNITED STATES shall have the obligation, without cost to the AGENCY, to relocate, replace or modify the Project facilities to assure their continued enjoyment and use by the AGENCY. If a dam is constructed, the AGENCY may salvage any structures or equipment from Project Facilities without payment to the UNITED STATES. The UNITED STATES shall cooperate and assist the AGENCY in AGENCY=s efforts to fully access, divert and utilize its water entitlements under its water rights,

SECTION D.

GENERAL PROVISIONS

Hazardous Material

11. (a) The AGENCY shall comply with all applicable Federal, State, and local laws and regulations, and Reclamation policies and instructions, existing or hereafter enacted or promulgated, concerning any hazardous material that will be used, produced, transported, stored, or disposed of on or in lands, waters, or facilities owned by the UNITED STATES or administered by Reclamation.

(b) "Hazardous material" means any substance, pollutant or contaminant listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 43 U.S.C. § 1901, et seq., and the regulations promulgated pursuant to that Act.

(c) To the extent provided by law, the AGENCY may not allow contamination of lands, waters or facilities owned by the UNITED STATES or administered by Reclamation by hazardous materials, thermal pollution, refuse, garbage, sewage effluent, industrial waste, petroleum products, mine tailings, mineral salts, pesticides (including but not limited to, the misuse of pesticides), pesticide containers, or any other pollutants.

(d) The AGENCY shall report to Reclamation, within 24 hours of becoming aware of its occurrence, any event which may or does result in pollution or contamination adversely affecting lands, water or facilities owned by the UNITED STATES or administered by Reclamation.

(e) Any intentional violation of any of the provisions of this Article shall constitute grounds for initiation of the procedure for immediate termination of this contract and shall make the AGENCY liable for the cost of full and complete remediation and/or restoration of any Federal resources or facilities that are adversely affected as a result of the violation.

(f) The AGENCY agrees to include the provision contained in paragraphs (a) through (e) of this Article in any subcontract or third party contract it may enter into pursuant to this contract.

(g) The UNITED STATES agrees to provide information necessary for the AGENCY, using reasonable diligence, to comply with this Article.

Notices

12. Any notice, demand, or request authorized or required by this contract shall be deemed to have been given, on behalf of the AGENCY, when mailed, postage prepaid, or delivered to the Area Manager, Central California Area Office, Bureau of Reclamation, 7794 Folsom Dam Road, Folsom, California 95630-1799, and on behalf of the UNITED STATES, when mailed, postage prepaid, or delivered to the Board of Directors of the Placer County Water Agency, P.O. Box 6570, Auburn, California 95604. The designation of the addressee or the address may be changed by notice given in the same manner as provided in this Article for other notices.

Contingent on Appropriation or Allotment of Funds

13. The expenditure or advance of any money or the performance of any obligation of the UNITED STATES under this contract shall be contingent upon appropriation or allotment of funds. Absence of appropriation or allotment of funds shall not relieve the AGENCY from any obligations under this contract. No liability shall accrue to the UNITED STATES in case funds are not appropriated or allotted.

Officials not to Benefit

14. No Member of Congress or official of the AGENCY shall benefit from this contract other than as a water user or landowner in the same manner as other water users or landowners.

Assignment Limited - Successors and Assigns Obligated

15. The provisions of this contract shall apply to and bind the successors and assigns of the parties hereto, but no assignment or transfer of this contract or any right or interest therein shall be valid until approved in writing by the Contracting Officer.

Books, Records, and Reports

16. The AGENCY shall establish and maintain accounts and other books and records pertaining to administration of the terms and conditions of this contract, including the AGENCY's financial transactions and other matters that the Contracting Officer may require. Reports thereon shall be furnished to the Contracting Officer in such form and on such date or dates as the Contracting Officer may require. Subject to applicable Federal laws and regulations, each party to this contract shall have the right during office hours to examine and make copies of the other party's books and records relating to matters covered by this contract.

Clean Air and Water

17. (a) The AGENCY agrees as follows:

(1) To comply with all the requirements of Section 114 of the Clean Air Act, as amended (42 U.S.C. 1857, et seq.,as amended by Public Law 91-604) and Section 308 of the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq., as amended by Public Law 92-500), respectively, relating to inspection, monitoring, entry, reports, and information, as well as other requirements specified in Section 114 and Section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the execution of this contract.

(2) That no portion of the work required by this contract will be performed in a facility listed on the Environmental Protection Agency List of Violating Facilities on the date when this contract was executed unless and until the EPA eliminates the name of such facility or facilities from such listing.

(3) To use its best efforts to comply with clean air standards and clean water standards at the facility where the contract work is being performed.

(4) To insert the substance of the provisions of this article into any nonexempt subcontract, including this paragraph (a)(4).

(b) The terms used in this article have the following meanings:

(1) The term "Air Act" means the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Public Law 91-604).

(2) The term "Water Act" means Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Public Law 92-500).

(3) The term "clean air standards" means any enforceable rules,

regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted pursuant to the Air Act or Executive Order 11738, an applicable implementation plan as described in Section 110(d) of the Clean Air Act (42 U.S.C. 1857c-5(d)), an approved implementation procedure or plan under Section 111(c) or Section 111(d), respectively, of the Air Act (42 U.S.C. 1857c-6(c) or (d)), or an approved implementation procedure under Section 112(d) of the Air Act (42 U.S.C. 1857c-7(d)).

(4) The term "clean water standards" means any enforceable limitation, control, condition, prohibition, standard, or other requirement which is promulgated pursuant to the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by Section 402 of the Water Act (33 U.S.C. 1342), or by local government to ensure compliance with pretreatment regulations as required by Section 307 of the Water Act (33 U.S.C. 1317).

(5) The term "comply" means compliance with clean air or water standards. Comply shall also mean compliance with a schedule or plan ordered or approved by a court of competent jurisdiction, the Environmental Protection Agency or an air or water pollution control agency in accordance with the requirements of the Air Act or Water Act and regulations issued pursuant thereto.

(6) The term "facility" means any building, plant, installation, structure, mine, vessel or other floating craft, location, or site of operations, owned, leased, or supervised by a contractor or subcontractor, to be utilized in the performance of a contract or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location or site shall be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are collocated in one geographical area.

Equal Employment Opportunity

18. During the performance of this contract, the AGENCY agrees as follows:

(a) The AGENCY will not discriminate against any employee or applicant for employment because of race, color, religion, sex, disability, or national origin. The AGENCY will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, disability, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The AGENCY agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this nondiscrimination clause.

(b) The AGENCY will, in all solicitations or advertisements for employees placed by or on behalf of the AGENCY, state that all qualified applicants will receive consideration for employment without discrimination because of race, color, religion, sex, disability, or national origin.

(c) The AGENCY will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice to be provided by the Contracting Officer, advising the said labor union or worker's representative of the AGENCY's commitments under Section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The AGENCY will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(e) The AGENCY will furnish all information and reports required by said amended Executive Order and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Contracting Officer and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the AGENCY's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated, or suspended, in whole or in part, and the AGENCY may be declared ineligible for further Government contracts in accordance with procedures authorized in said amended Executive Order, and such other sanctions may be imposed and remedies invoked as provided in said Executive Order, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(g) The AGENCY will include the provisions of paragraphs (a) through (g) in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of said amended Executive Order, so that such provisions will be binding upon each subcontractor or vendor. The AGENCY will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event the AGENCY becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the AGENCY may request the UNITED STATES to enter into such litigation to protect the interests of the UNITED STATES.

Compliance with Civil Rights Laws and Regulations

19. (a) The AGENCY shall comply with Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d), Section 504 of the Rehabilitation Act of 1973 (P.L. 93-112, as amended), the Age Discrimination Act of 1975 (42 U.S.C. 6101, et seq.), Title II of the Americans with Disabilities Act of 1990 if the entity is a State or local government entity [Title III if the entity is a non-government entity], and any other applicable civil rights laws, as well as with their respective implementing regulations and guidelines imposed by the U.S. Department of the Interior and/or Bureau of Reclamation.

(b) These statutes require that no person in the UNITED STATES shall, on the grounds of race, color, national origin, disability, or age, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving financial assistance from the Bureau of Reclamation. By executing this contract, the AGENCY agrees to immediately take any measures necessary to implement this obligation, including permitting officials of the UNITED STATES to inspect premises, programs, and documents.

(c) The AGENCY makes this agreement in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property discounts, or other Federal financial assistance extended after the date hereof to the AGENCY by the Bureau of Reclamation, including installment payments after such date on account of arrangements for Federal financial assistance which were approved before such date. The AGENCY recognizes and agrees that such Federal assistance will be extended in reliance on the representations and agreements made in this article and that the UNITED STATES reserves the right to seek judicial enforcement thereof.

(d) Complaints of discrimination against the AGENCY shall be investigated by the Contracting Officer=s Office of Civil Rights.

Certification of Nonsegregated Facilities

20. The AGENCY hereby certifies that it does not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not permit its employees to perform their services at any location under its control, where segregated facilities are maintained. It certifies further that it will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it will not permit its employees to perform their services at any location under its control, where segregated facilities are maintained. The AGENCY agrees that a breach of this certification is a violation of the Equal Employment Opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas,

parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, disability, or otherwise. The AGENCY further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Employment Opportunity clause; that it will retain such certifications in its files; and that it will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

> A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Employment Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually). Note: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the day and year first above written.

THE UNITED STATES OF AMERICA

By: ___________________________________

Regional Director, Mid-Pacific Region

Bureau of Reclamation

(SEAL)

PLACER COUNTY WATER AGENCY

By: ___________________________________

Chair

Attest:

____

Secretary