RECLAMATION

Managing Water in the West

Draft Environmental Assessment

2011 Interim American River Division Water Service Contract Renewals for Placer County Water Agency and the City of Roseville

Central California Area Office, Folsom, California

U.S. Department of the Interior
Bureau of Reclamation
Technical Resources
Design, Estimating, and Construction Office
Denver, Colorado

September 2010

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The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Purpose and Need for Action

1.1 Introduction

On October 30, 1992, the President signed into law the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102-575) that included Title 34, the Central Valley Project Improvement Act (CVPIA). In accordance with Section 3404(c) of the CVPIA, the Bureau of Reclamation (Reclamation) proposes to execute two interim water service contracts. Interim renewal contracts (IRC) are undertaken under the authority of the CVPIA to provide a bridge between the expiration of the original long-term water service contract and the execution of a new long-term water service contract. The two water service contracts proposed for interim renewal are with the City of Roseville (Roseville) and Placer County Water Agency (PCWA). Roseville and PCWA are two of seven contractors within the American River Division of the Central Valley Project (CVP). The interim contracts would be renewed for a 26 month period. The term of the Roseville interim contract would extend from January 1, 2011 through February 28, 2013. The term of the PCWA contract would extend from January 1, 2012 through February 28, 2014. In the event a new long-term water service contract is executed, the interim water service contract then-in-effect would be superseded by the long-term water service contract and analyzed under a separate process.

Section 3409 of the CVPIA required that Reclamation prepare a programmatic environmental impact statement (PEIS) before renewing long-term Central Valley Project (CVP) water service contracts. The PEIS, completed on October 1999 and hereby incorporated by reference, analyzed the implementation of all aspects of CVPIA, contract renewal being one of many programs addressed by this Act. CVPIA Section 3404(c) mandated that upon request all CVP existing contracts be renewed. Implementation of other sections of CVPIA mandated actions and programs that require modification of previous contract articles or new contract articles to be inserted into renewed contracts. These programs include water measurement requirements (Section 3405(b)), water pricing actions (Section 3405(d)), and water conservation (Section 3405(e)). The PEIS evaluated CVP-wide impacts of long-term contract renewal at a programmatic level. Upon completion of contract renewal negotiations, the local effects of long-term contract renewals at the division level were evaluated in environmental documents that tiered from the PEIS.

Environmental documentation covering long-term renewal of American River Division water service contractors was completed in June 2005 (USBR, 2005). In addition to Roseville and PCWA, this documentation evaluated the effects of renewing long-term contracts for Sacramento County Water Agency, San Juan Water District, Sacramento Municipal Utility District, El Dorado Irrigation District, and East Bay Municipal Utility District. The Record of Decision for the American River Division long-term renewals was signed on February 28, 2006, one day prior to the beginning of a new contract year. Three of the seven American River Division contractors, San Juan Water District, El Dorado Irrigation District, and East Bay Municipal

Utility District were able to execute the long-term contracts prior to the beginning of the new contract year. The remaining Division contractors all had existing contracts in place that allowed for the continued delivery of water in the 2006 water year.

1.2 Purpose and Need

The purpose of the Proposed Action is to execute two interim contracts to continue delivery of CVP water to Roseville and PCWA until their new long-term contracts can be executed. Contract details are shown in Table 1-1. The term of the Roseville interim contract would be from January 1, 2011 through February 28, 2013. The term of the PCWA contract would be from January 1, 2012 through February 28, 2014.
Execution of these interim contracts are needed to provide the mechanism for the continued beneficial use of the water developed and managed by the CVP and for the continued reimbursement to the federal government for costs related to the construction and operation of the CVP by the nine contractors. Additionally, CVP water is essential to continue municipal viability for these contractors.

1.3 Scope

This EA has been prepared to examine the impacts on environmental resources as a result of the continued delivery of water to two contractors under the proposed IRCs. The water would continue to be delivered for municipal and industrial (M&I) purposes within Reclamation's existing water right place of use. The water would be delivered within the current contractor service area boundaries using existing facilities for a period of up to 26 months.

1.3.1 CVP Contract Service Areas

No changes to any contractor's CVP service area are part of the Proposed Action. Any request by an interim contractor to change its existing service area would be a separate federal action. Separate appropriate environmental compliance and documentation would be completed before Reclamation approves a land inclusion or exclusion to any CVP contractor's service area.

1.3.2 Purpose of Water Use

Use of contract water for M&I use under the proposed IRCs would not change from the M&I purpose of use specified in the existing contracts.

1.4 Potential Issues

Consistent with the environmental analyses for long-term contract renewals in the American River Division (USBR, 2005), this 2010 EA considers the potential effects of interim renewal contracts on the following resources:
- Water Resources
- Surface Water
- Groundwater

- Land Use
- Biological Resources
- Cultural Resources
- Indian Trust Assets
- Socioeconomic Resources
- Environmental Justice
- Global Climate Change
- Cumulative Impacts

Chapter 2
Alternatives Including the Proposed Action

2.1 Introduction

For purposes of this EA, the following requirements are assumed under each alternative:

A. Execution of each interim renewal contract will be implemented as separate action;
B. A 26 month interim renewal period is considered in the analysis;
C. The contracts would be renewed with existing contract quantities;
D. Reclamation would continue to comply with commitments made or requirements imposed by applicable environmental documents, such as existing biological opinions (BOs) including any obligations imposed on Reclamation resulting from re-consultations; and
E. Reclamation would implement its obligations resulting from Court Orders issued in actions challenging applicable BOs that take effect during the interim renewal period.

2.2 Alternative A: No Action

The No Action Alternative evaluated in this document is the execution of two interim renewal water service contracts between the United States and the CVP contractors (Table 2-1) with terms and conditions modeled after the Preferred Alternative of the CVPIA PEIS (Reclamation and FWS 2000) adapted to apply to an interim period. The No Action Alternative is the continued delivery of CVP water for up to three years under interim contracts that include the terms and conditions required by non-discretionary CVPIA provisions for long-term contracts. The only CVPIA provision which was incorporated into the Preferred Alternative of the Final PEIS and included in this No Action Alternative but not part of previous contracts is tiered water pricing. The CVPIA required the implementation of a tiered water pricing component for contracts with terms longer than three years. The tiered pricing component is the incremental amount to be paid for each AF of water delivered, and includes charges for water that would be collected and paid into the CVPIA Restoration Fund. The tiered pricing component for the amount of water delivered up to 80 percent of the contract total shall not be less than the established rates/charges determined annually by the Contracting Officer in accordance with the then-current applicable Reclamation water rate-setting policies for the contractor. The tiered pricing component for the amount of water delivered in excess of 80 percent of the contract total, but less than or equal to 90 percent of the contract total, shall equal one-half of the difference between the rate/charges established for the contractor and the M&I full cost rate. The tiered pricing component for the amount of water that exceeds 90 percent of the contract total shall equal the difference between (1) the rates/charges and (2) the applicable cost water rate. This is the described as the 80/10/10 pricing structure (80/10/10).

2.3 Alternative B: Proposed Action

The Proposed Action alternative evaluated in this document is the execution of two interim renewal water service contracts between the United States and the CVP contractors listed in Table 2-1. These contracts are the same as those included in the No Action Alternative except they do not contain any tiered pricing provisions. CVP water deliveries under the proposed IRCs can only be used within the individual contractors designated contract service area (see Exhibit A for service area maps). Contract service areas for the proposed IRCs have not changed from those that were considered in the evaluation of long-term contract renewals conducted in 2005 (USBR, 2005). The proposed IRC quantities (Table 2-1) remain the same as the respective contractors' existing water service contracts. Water can be delivered under the IRCs in quantities up to the contract total, although reduced quantities may be made available consistent with contract water shortage provisions in years when water supplies are limited. A sample proposed 2010 IRC is provided in Exhibit B of this document. The terms and conditions of the 2010 IRCs are incorporated by reference into the Proposed Action.

2.4 Comparison of Alternatives

The difference between the Proposed Action and the No Action Alternative is that the Proposed Action does not include tiered pricing. Section 3405(d) of the CVPIA does not require tiered pricing to be included in contracts of three years or less in duration. Therefore, if during the term of the IRC more than 80 percent of the contract total is delivered in any year, no incremental charges for water will be collected and paid to the Restoration Fund that year as would have happened under tiered pricing. Water delivery quantities would be the same for both alternatives.

Reclamation would continue to comply with commitments made or requirements imposed by applicable environmental documents, such as existing BOs including any obligations imposed on Reclamation resulting from re-consultations; and Reclamation would implement its obligations resulting from Court Orders issued in actions challenging applicable BOs that take effect during the interim renewal period. Table 2-2 below provides a comparison of the differences between the No Action Alternative and the Proposed Action as they related to many of the contract clauses. No service area boundaries would be changed as a result of the Proposed Action.

2.5 Alternatives Considered but Eliminated from Detailed Analysis

2.5.1 Nonrenewal of Interim Contracts

Non-renewal of existing contracts is considered infeasible based on Section 3404(c) of the CVPIA, which states that "…the Secretary shall, upon request, renew any existing long-term repayment of water service contract for the delivery of water from the CVP….". The nonrenewal alternative was considered, but eliminated from analysis in this 2010 EA because Reclamation as no discretion not to renew existing water service contracts.

2.5.2 Reduction in Interim Contract Quantities

Reduction of contract water quantities due to the current delivery constraints on the CVP system was considered in certain cases, but rejected from the analysis of interim renewal contracts for several reasons: First, the Reclamation Project Act of 1956 and the Reclamation Project Act of 1963 mandate renewal of existing contract quantities when beneficially used. Irrigation and M&I uses are beneficial uses recognized under federal Reclamation and California law. Reclamation has determined that the contractors have complied with contract terms and the requirements of applicable law. It also has performed water needs assessments for all the CVP contractors to identify the amount of water that could be beneficially used by each water service contractor. In the case of each IRC contractor, the contractor's water needs equaled or exceeded the current total contract quantity. Second, the analysis of the PEIS resulted in selection of a Preferred Alternative that required contract renewal for the full contract quantities and took into account the balancing requirements of CVPIA (p. 25, PEIS ROD). The PEIS ROD acknowledged that contract quantities would remain the same while deliveries are expected to be reduced in order to implement the fish, wildlife, and habitat restoration goals of the Act, until actions under CVPIA 3408(j) to restore CVP yield are implemented (PEIS ROD, pages 26-27). Therefore, an alternative reducing contract quantities would not be consistent with the PEIS ROD and the balancing requirements of CVPIA. Third, the shortage provision of the water service contract provides Reclamation with a mechanism for annual adjustments in contract supplies. The provision protects Reclamation from liability from the shortages in water allocations that exist due to drought, other physical constraints, and actions taken to meet legal or regulatory requirements. Reclamation has relied on the shortage provisions to reduce contract allocations to IRC contractors in most years in order to comply with Section 3406(b)(2) of the CVPIA. Further, CVP operations and contract implementation, including determination of water available for delivery, is subject to the requirements of BOs issued under the Federal ESA for those purposes. If contractual shortages result because of such requirements, the Contracting Officer has imposed them without liability under the contracts. Fourth, retaining the full historic water quantities under contract provides the contractors with assurance the water will be made available in wetter years and is necessary to support investments for local storage, water conservation improvements and capital repairs. Therefore, an alternative reducing contract quantities would not be consistent with Reclamation law or the PEIS ROD, would be unnecessary to achieve the balancing requirements of CVPIA or to implement actions or measure that benefit fish and wildlife, and could impede efficient water use planning in those years when full contract quantities can be delivered.

Table 2-1 Contracts Considered for Interim Renewal

CVP CONTRACTOR	CONTRACT QUANTITY (ACRE-FEET)	PURPOSE OF USE	CONTRACT TERM	2011 IRC CONTRACT NUMBER
City of Roseville	32,000	M & I	1/1/2011 – 2/29/2013	14-06-200-3474-IR1
Placer County Water Agency	35,000	M & I	1/1/2012 – 2/29/2014	14-06-200-5082-IR1

Table 2-2 Comparison of Contract Provisions

IRC Provision	**No Action Alternative Based on PEIS Preferred Alternative**	**Proposed Action – Negotiated Contract**
Definitions:		
Category 1 and Category 2	Tiered Pricing as in PEIS	No Tiered Pricing and No definition of Category 1 and Category 2
Contract Total	Contract Total described as Total Contract	Assumes maximum entitlement
M&I water	Not addressed as definition – Addressed within an article – Article assumes obtaining a rate for M&I when delivered	Assumes provision of water for irrigation of land in units less than or equal to five acres as M&I water unless Contracting Officer is satisfied use is irrigation
Terms of contract – right to use contract	Assumes that contracts may be renewed	Assumes that contracts will be renewed if Contractor has been compliant with contract
	Assumes convertibility of contract to a 9(d) contract same as existing contracts	Similar to No Action Alternative but preserves positions re: convertibility to 9(d) contract
Water to be made available and delivered to the contractor	Assumes water availability in accordance with existing conditions	Similar to No Action Alternative but makes it more explicit that water to be made available is subject to operational constraints
	Assumes compliance with BOs and other environmental documents for contracting	Similar to No Action Alternative; Requires contractor to be within legal authority to implement.
Rates and method of payment for water	Assumes Tiered Pricing is total water quantity; assumes advanced payment for rates for two months; payment only for water taken	Same as No Action Alternative in terms of payment and take or pay, however tiered pricing is not applicable to contracts less than 3 years
Application of payments and adjustments	Assumes credits or refunds	Similar to No Action Alternative except requires $1,000 or greater overpayment for refund
Opinions and determinations	PEIS recognizes that CVP will operate in accordance with existing rules; opinions will not be arbitrary, capricious or unreasonable	Same as No Action Alternative with additional clarifications on the right to seek relief and legal effect of section
Coordination and cooperation	Not addressed	Assumes that communication, coordination and cooperation between CVP operations and users should participate in CVP operational decision making discussions; however, parties retain exclusive decision-making authority

Operation and maintenance by non-federal entity	Assumes that CVP will operate in accordance with existing rules and no additional changes to operation responsibilities	Similar to No Action Alternative; however, recognizes role of certain operating Non-Federal Entity/Entities
Resolution of disputes	Not addressed	Assumes a Dispute Resolution Process
Changes in contractor's service area	Assumes no change in CVP water service areas absent Contracting Officer consent	Assumes changes to limit rationale used for non-consent and sets time limit for assumed consent
Confirmation of contract	Assumes Court confirmation of contract for assurance relating to validity of contract	No requirement for court confirmation of contract on contracts of short duration

Note: Table 2-2 contains a summary of many but not all of the terms and conditions of the referenced contracts. The above table is also generally descriptive of contract provisions within the predominantly irrigation contract forms; however, for the precise contract language and an exact comparison, the specific contracts should be referenced.

CHAPTER 3
Affected Environment and Environmental Consequences

3.1 Introduction

Roseville and PCWA are contained within the American River Division of the CVP along with five other water districts as shown in Exhibit B. The areas within Roseville's and PCWA's district boundaries where CVP water is served (CVP Service Area) are provided in Exhibit B. Roseville's district and CVP Service Area boundaries are the same. PCWA's district boundary encompasses the entire, 1,500 square-mile boundary of Placer County, ranging from the rim of the Sacramento Valley on the west to the Sierra Nevada and Lake Tahoe on the east. PCWA's CVP Service Area is limited to the western portions of their overall district boundary.

The resources and issues included in this chapter were identified through a review of NEPA guidance documents, and through the prior scoping process used as part of the long-term contract renewal process. The resources and issues described in this chapter are as follows.

- Surface Water Resources and Facilities (including Water Quality)
- Groundwater (including Water Quality)
- Land Use, Demographics, and Sociological Resources
- CVP Water Supply Costs, Agricultural Economics, and Regional Economics
- Fishery and Wildlife Resources
- Recreation
- Cultural Resources
- Indian Trust Assets
- Air Quality
- Soils
- Visual Resources
- Environmental Justice
- Secondary Growth Impacts

This EA does not analyze resources for which it would be reasonable to assume impacts could not occur. Specifically, potential effects to transportation, noise, hazards and hazardous material, public services, utilities, and service systems are not analyzed because they were not identified as significant issues during scoping and it would not be reasonable to assume that 26 month interim renewals of water service contracts could result in impacts to these resources or services.

The analysis period for this EA is for the 26 month period from the end of the current contracts through the duration of the proposed interim contracts. The 26 month duration allows the interim contracts to expire at the end February consistent with Reclamation's standard contract water year.

3.2 Irreversible and Irretrievable Commitments of Resources

NEPA Section 102(C)(v) requires federal agencies to consider to the fullest extent possible irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. The proposed action will be the renewal of existing contracts and does not involve construction or use of resources except water. There is no commitment of nonrenewable resources, and the proposed action will not commit future generations to permanent use of natural resources.

3.3 Relationship between Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

NEPA Section 102(C)(iv) requires all federal agencies to disclose the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity. These water delivery contracts are temporary (of 40 years or less), yet results in long-term benefits to the sustainability and reliability of agricultural production and economic growth. Long-term productivity would be enhanced through the water supply that sustains agricultural economics, social benefits, and the long-term productivity of urban and rural populations by providing CVP water.

3.4 Surface Water Resources, Quality, and Facilities

The Affected Environment description of surface water is limited to major streams and water supply facilities that are directly affected by CVP water supplies in the American River Division. American River Division CVP water users rely upon water diverted from the American and Sacramento rivers and groundwater. However, this analysis focuses on the diversion of the CVP water and streams within Roseville's and PCWA's CVP service areas that receive water from the American River. Therefore, this discussion is limited to the American River watershed within or adjacent to Sacramento and Placer Counties.

3.4.1 Affected Environment Operations of the CVP can affect flows of the American River, Sacramento River, Stanislaus River, Delta, and deliveries of CVP and State Water Project (SWP) water to users located south of the Delta. The overall description of the affected environment of the Delta, other CVP water service contractors, and SWP water service contractors is presented in detail in the PEIS and only summarized below.

3.4.1.1 Upper American River Watershed. The upper American River consists of four major sub-basins upstream of Folsom Lake: North Fork, Middle Fork, South Fork, and Rubicon River, a tributary of the South Fork. The reach of the American River downstream of Folsom Lake is described as the Lower American River.

The North Fork watershed is almost 400 square miles and extends from above Blue Canyon to the confluence of Middle Fork upstream of Folsom Lake. Average annual runoff from the North Fork was about 600,000 acre-feet (af) since 1946, as measured at the North Fork Dam. The Lake Valley Canal diverts a small portion of the flow from the North Fork into the Bear River basin.

Other portions of the flow are diverted from the North Fork to serve local areas along Interstate 80. PCWA also has water rights on the North Fork.

The Middle Fork watershed includes over 550 square-miles and includes several significant tributaries. Average annual runoff from the Middle Fork is about 800,000 af, as measured downstream of Oxbow Powerplant. Flows occur in all months, including relatively moderate flows in summer months due to releases from numerous hydropower facilities in the Middle Fork watershed. PCWA constructed three reservoirs on the upper and middle reaches of the Middle Fork: French Meadows Reservoir (L.L. Anderson Dam) and Interbay Dam as part of the Middle Fork Project. PCWA also constructed Ralston Afterbay near the confluence of the Rubicon River and the Middle Fork as a re-regulating reservoir for the Middle Fork Project. The Oxbow Powerplant was constructed by Pacific Gas & Electric Company (PG&E) on the Middle Fork downstream of the Rubicon River and upstream of the confluence with the North Fork. On the Rubicon River, SMUD constructed numerous reservoirs and PCWA constructed Lower Hell Hole Dam downstream of the SMUD reservoirs. Water from the Bear River is also diverted through PG&E and PCWA facilities into Middle Fork.

The South Fork watershed includes over 600 square-miles and has an average annual runoff of about 1,000,000 af, as measured downstream of Chili Bar Dam. Flows occur in all months, including relatively moderate flows in summer months due to releases from numerous reservoirs in the South Fork watershed. PG&E and EID operate systems that divert water from Echo Lake sub-basin of Lake Tahoe and Pyramid Creek into the South Fork. PG&E and EID also hold water rights on the South Fork and divert water into their systems, including Chili Bar Reservoir and Weber Reservoir, respectively. SMUD constructed the Upper American River Project including the Union Valley Reservoir, Junction Reservoir, and Ice House Reservoir.

Water from Sly Park Creek, a tributary of the Consumnes River, is also diverted by EID to serve areas located in the American River watershed.

3.4.1.2 Lower American River Watershed

. The Lower American River consists of the river from Folsom Lake to the confluence of the American and Sacramento rivers. The flow regime in the Lower American River is controlled by the flows into Folsom Lake and released at Folsom Dam. Average annual inflows into Folsom Lake are about 600,000 af from the North Fork, 800,000 af from the Middle Fork, and 1,000,000 af from the South Fork. Average flows downstream of Folsom Dam at Fair Oaks are approximately 2,650,000 af.

Folsom Dam is a multi-purpose water storage facility on the American River about 26 miles upstream of the confluence with the Sacramento River and is part of the American River Division of the CVP. The American River Division also includes a power plant , the re-regulating reservoir (Lake Natoma) formed by Nimbus Dam, and the Auburn-Folsom South Unit (Folsom South Canal). The American River Division used to include the Sugar Pine Unit and Sly Park Unit that have been transferred to Foresthill Public Utility District and El Dorado Irrigation District, respectively.

Folsom Lake storage is relatively small (975,000 af) as compared to the range of annual flows and the water demands in the watershed. Under the current water rights entitlements, there are

approximately 510,000 af of local water rights and 410,000 af of CVP Water Service Contract water that could be delivered to American River users, primarily in the summer, as compared to 2,600,000 af of average annual flow. Because the reservoir volume is approximately equal to the amount of water delivered each year and most of the stream flow enters the reservoir prior to the summer urban water demand in the watershed, it is an operational challenge to meet the multiple demands on Folsom Reservoir storage including instream fisheries needs in the Lower American River and water flow needs in the Delta.

Reclamation holds both direct diversion and storage rights on the American River and uses them in combination to deliver water to local users under CVP water service contracts and to meet downstream regulatory requirements and water demands within and south of the Delta. Reclamation facilities are also used to deliver non-project water to senior water rights holders, including EID, PCWA, PG&E, SMUD, City of Folsom, San Juan Water District, State of California, City of Sacramento, Carmichael Water District, and Sacramento Suburban Water District. Many of these water rights holders take delivery from Folsom Lake. Most of the municipal/industrial flows do not return to the American River system because municipal wastewater effluent flows are discharged into another watershed or directly into the Sacramento River. Specific information about the Roseville and PCWA water service contracts is presented below.

3.4.2 Flow Requirements for the American River. Water rights decisions, downstream water quality control requirements, flood control criteria, fisheries protection requirements (including minimum instream flows and ramping criteria), carryover storage targets, recreation, and power production directly or indirectly influence the flows in the Lower American River. Minimum instream flows upstream of Folsom Lake are primarily influenced by Federal Energy Regulatory Commission licenses.

Minimum flows in the Lower American River have been established to protect fisheries. The SWRCB Decision 893 (D-893) was issued in 1958 and requires minimum flows below Nimbus Dam (re-regulating reservoir below Folsom Lake) and at H Street on the American River. As part of the water rights permits for Auburn Dam, the SWRCB issued Decision 1400 (D-1400) to supersede D-893 if Auburn Dam had been constructed. The minimum flow recommendations were further developed by the Water Forum (2004). Reclamation currently uses this minimum flow schedule as outlined in June 4, 2009 National Marine Fisheries Service Biological Opinion on the Long-term Operations of the Central Valley Project and State Water Project (CVP/SWP Operations BO). Actual baseline releases equaling the minimum flow requirement is not a common occurrence as water needs and other downstream regulatory demands are met. Additional releases are typically added to the baseline flows with water made available from the 800,000 acre feet of water annually dedicated to fish and wildlife through §3406 (b)(2) of the CVPIA.

As part of the Anadromous Fish Restoration Plan (AFRP) program under CVPIA, objectives to decrease water temperatures and increase spawning, incubation, rearing, and emigration habitat for fall-run Chinook salmon and steelhead in the Lower American River were developed. Recently, the Lower American River Task Force (a group of agencies and interests that are affected by conditions along the lower American River) completed a Baseline Report and

subsequent evaluations to consider flow fluctuation issues. Results from these studies and others were used in describing operating criteria to protect fisheries and continue to meet water demands as part of the Biological Assessment and Endangered Species Act consultation on the Continued Long-term Operations of the Central Valley Project and the State Water Project (USBR, 2008).

3.4.3 Water Quality. The upper reaches of the Sacramento and American rivers have high quality water with low concentrations of constituents. As the water flows through the watershed, constituents enter the water as part of the sediment load or as dissolved chemicals. Temperatures also rise as the water flows downstream and enters the reaches near or on the valley floor. Constituents enter the water from both point sources, such as wastewater treatment plant effluent, and non-point sources, such as sediment from erosion.

Water quality of the American River at Folsom Lake and downstream to the confluence with the Sacramento River remains relatively high. Water quality is within Regional Water Quality Control Board requirements the majority of time even though the river receives urban runoff flows. Water quality of the Sacramento River at Sacramento has higher concentrations of dissolved inorganic nitrogen and phosphorous than the American River due to runoff from cultivated land. Sediment loads are high in both rivers during increasing storm flows and slowing decline following the peak storm flows.

The July 2003 "Freeport Regional Water Project Draft EIR/EIS" indicates that concentrations of most constituents regulated by the Regional Water Quality Control Board in the American River downstream of Nimbus Dam and in the Sacramento River near the confluence with the American River are less than regulatory requirements. Temperatures and dissolved oxygen in both the Sacramento and American rivers within the study area vary on a seasonal basis. Additionally, the lower American River is listed as an impaired water body for organochlorine pesticides, mercury, and toxicity. The Sacramento River near the American River is listed as an unimpaired water body for diazinon, mercury, and toxicity.

3.4.4 Temperature Control Methods at Folsom Dam. Temperatures in the Lower American River are regulated to the extent possible through integrated management of the coldwater pool in Folsom Lake. The extent, duration, and magnitude to which downstream temperatures can be managed depends upon the starting volume of cold water available in the spring, penstock shutter operations, reservoir water surface elevation, M & I intake temperature control device operations, and air temperatures. Historically, the cold water pool was accessed in the fall to support spawning of fall-run Chinook salmon. With the listing of steelhead trout as a threatened species, operations were modified to maintain a temperature target in the summer to support rearing juvenile steelhead.

The existing diversions at Folsom Dam include: the intake to the Folsom Dam Pumping Plant that serves Roseville, Folsom, Folsom State Prison, and San Juan Water District; and the EID pumping plant intake. Downstream releases from Folsom Dam can be made through the Folsom Power Plant, the river outlet works, and the spillway gates. All releases and discharge structures are or can be used as part of the annual cold water pool management plan. The balancing of the demands on the cold water has required establishment of a summer temperature target at Watt Avenue based on the operations schedule and starting volume of cold water. Releases from the

Folsom Dam river outlet works have also been used to access cold water beneath the Folsom Dam Power Plant penstock intake elevation at the onset of fall-run Chinook salmon spawning season in late October-November.

Reclamation has installed a Temperature Control Device (TCD) on the Folsom Pumping Plant intake that allows selective temperature withdrawal capability. The TCD allows water to be withdrawn from reservoir elevations where temperatures exceed those that are needed to meet the downstream summer temperature targets. A TCD delivery temperature approximately 2ºF higher than the temperature of Folsom Reservoir releases required to meet a downstream Watt Avenue target temperatures is used.

The intakes to the Folsom Dam Power Plant were constructed with nine water release shutters that allow withdrawals at different elevations to improve temperatures at the Nimbus Fish Hatchery and releases to Lake Natoma. The initial shutter configuration allowed the top two shutters to be independently opened and the remaining seven shutters operated as one unit (a "1-1-7" configuration). These shutters were modified to become a "3-2-4" configuration to improve downstream temperature control capability. Routine periodic reservoir temperature profiles are taken to understand temperature stratification in Folsom Reservoir. This information is used along with operational forecasts to implement the cold water pool management strategy during real-time operations. Shutters are raised as necessary to meet downstream temperature targets. Selective blending of water from different elevations is used in concert with the power production schedule to optimize the use of the cold water pool. The spillway gates have also been used in the spring to make flood control releases that would ordinarily been made from the river outlet works thereby conserving cold water for future use.

The goal for the lower American River at Watt Avenue is to the extent possible, be less than 65 ºF during the late spring and summer to protect steelhead incubation and below 60 ºF in the fall months to protect fall-run Chinook salmon spawning and incubation. However, it is not possible to fully meet both of these goals during years when the cold water pool volume is limited. Reclamation submits an annual temperature management plan to the NMFS each spring that describes the utilization of the seasonally available cold water to meet Watt Avenue temperature targets. Achievable downstream temperature targets are reviewed and set each year based on the availability of cold water resources and operational requirements. Annual targets have ranged between 65 ºF and 68 ºF since the program to use cold water to support steelhead began. In every year, all available cold water has been accessed and fully used by the time reservoir temperatures cool to less than 60 ºF in mid-to-late November.

3.4.5 Flood Flow Requirements for the Lower American River. There have been at least nine large floods in the Sacramento area since the construction of Folsom Dam: 1955, 1963, 1964, 1969, 1970, 1980, 1982, 1986, and 1997. During the 1986 storm, Folsom Dam releases rose to 130,000 cfs and significant levee damage occurred along the Lower American River. Following that event, the Corps of Engineers and the Sacramento Area Flood Control Agency (SAFCA) considered the need for additional flood storage. However, reservation of additional storage would reduce the carry-over storage required by users in the system. In the late 1990s, Reclamation and SAFCA worked with the Corps of Engineers to adopt a variable flood control volume. The modified flood control criteria reserves 400,000 to 670,000 af of flood control

space that that varies based on storage in Folsom Lake and in three upstream reservoirs (Lower Hell Hole, Union Valley, and French Meadows reservoirs).

3.4.6 Central Valley Project Operational Requirements that Influence American River Operations. The CVP is operated as an integrated system with reservoirs on the American, Sacramento, Trinity, Stanislaus, and San Joaquin rivers. The combined flows from the CVP facilities and the SWP facilities on Oroville, as well as other tributary flows, are conveyed in the Sacramento River to provide Delta outflow or water for users located south of the Delta, as described in the PEIS.

Reclamation operates the CVP to provide flood control on the Sacramento River, water to water rights holders downstream of the CVP facilities, water to meet regulatory requirements, water to CVP water service contractors, water for fish and wildlife purposes, hydropower generation, and recreation. There are specific water rights holders and Water Service Contractors that must be served from specific CVP facilities due to geographic locations. For example, water diverted for Water Service Contractors at Folsom Dam must be provided by flows from the American River. However, flows to serve Delta export requirements can be provided by Shasta Lake, Folsom Lake, Friant Dam, or New Melones Reservoir.

Both CVP and SWP use the Sacramento River for conveyance and divert from the southern Delta. Therefore, the operations of the CVP and SWP are regulated in a cooperative manner by the SWRCB. The operation of the CVP is affected by the provisions of several regulatory requirements and agreements including SWRCB orders, the Coordinated Operations Agreement (COA), biological opinions, and CVPIA. The COA identifies the sharing arrangements between the CVP and the SWP to meet Delta requirements. Both water projects provide water in accordance with specified ratios for in-basin users and Delta water quality. When all of these requirements are met, "excess" water is available for export to users of both projects located south of the Delta. The COA specifies the conditions for the CVP and SWP to store and export as much water as possible within physical and contractual limits.

In 1993, NOAA Fisheries issued a Winter-Run Chinook Salmon Biological Opinion, which addresses modifications to the long-term CVP operational plan to avoid jeopardizing the continued existence of the Sacramento River winter-run Chinook salmon. The winter-run biological opinion primarily effected CVP operations of Shasta Lake, Keswick Dam, and Trinity River diversions. However, the CVP sometimes relies upon releases from Folsom Lake to help meet biological opinion requirements in other parts of the system. In 1993, the Service also issued a Delta smelt Biological Opinion that among other provisions reduced Delta outflow in April and May to reduce entrainment and entrapment of Delta smelt.

The CVPIA Section 3406(b)(2) program defined how 800,000 af of CVP water can be used, including reductions in Delta exports and instream flow goals for the Lower American River.

Subsequent to adoption of CVPIA, the SWRCB adopted Decision 1641 (D-1641) to provide water quality goals and beneficial use objectives for the Sacramento, Stanislaus, and San Joaquin rivers and the Delta. D-1641 established western Delta water quality standards and objectives that vary monthly and with water year types. Flows are released from CVP and SWP reservoirs,

including Folsom Lake, to increase freshwater Delta outflow and reduce salinity intrusion to meet the salinity goals, including a goal referred to as "X2" (i.e., 2 parts per thousand salinity, or approximately 3,000 microsiemens (electric conductivity, or EC) measured one meter above the channel bottom) as measured at Chipps Island and Roe Island). In wetter years, the X2 position can require large amounts of water to be released from CVP and SWP reservoirs immediately following wet periods. Because Folsom Lake is the closest reservoir to the Delta, frequently water is released from Folsom Lake for several days or a week until waters released from Oroville Reservoir and Shasta Lake can flow into the Delta. This has the potential to reduce storage capabilities of Folsom Lake.

3.5 CVP Water Service Contractors in the American River Division

The American River Division includes Sacramento County Water Agency (Zone 40 and City of Folsom), San Juan Water District, Sacramento Municipal Utility District, City of Roseville, PCWA, El Dorado Irrigation District, and East Bay Municipal Utility District. As part of the long-term contract renewal process, Reclamation completed a needs assessment to ensure the quantity of water to be contracted for can be put to use.

3.5.1 City of Roseville. The City of Roseville has no water rights. The City of Roseville entered into a contract with the Federal government to obtain CVP water from Folsom Lake. The contract provides up to 32,000 af/year for irrigation and municipal/industrial uses. The Roseville service area includes the incorporated city, although two small areas within the city are served by other purveyors. Doctor's Ranch, a newly completed development project immediately northwest of the city, negotiated a 300 af supply from the City of Roseville. San Juan Water District serves the southeastern corner of the city (east of Sierra College Boulevard). PCWA is projected to serve the northeastern area of the City which was recently annexed as part of the Stoneridge Specific Plan Project.

To provide adequate water supplies during peak flow demand periods and to meet future annual average water demands, the City of Roseville purchases up to 22,000 af from PCWA. In addition, the City of Roseville is considering negotiating with Placer County Water Agency for an additional 10,000 af of water. The City would need a Warren Act contract to convey at least a portion of this non-CVP water through CVP facilities.

All water delivered to City of Roseville is diverted from Folsom Lake through the Folsom Pumping plant and associated pipelines. The water is treated by the Roseville water treatment plant.

The City of Roseville has considered numerous methods to reduce the water demand, including conservation and recycling. In 1991, the City of Roseville adopted the Roseville Water Conservation and Drought Management Plan to respond to drought. The City of Roseville also uses groundwater during dry periods and to meet peak daily demands.

3.5.2 Placer County Water Agency. PCWA holds water rights on the Middle Fork American River, the Rubicon River and some tributaries for irrigation, domestic and commercial purposes, and for the generation of electrical energy. PCWA also purchases water from Pacific

Gas & Electric Company water that originates in the south Yuba River; and, Fordyce Creek and Rollins Reservoir on the Bear River via Lake Spaulding. Of the 120,000 af of water rights on the American River, PCWA maintains subcontracts for 25,000 af with San Juan Water District, up to 30,000 af with the Roseville, and up to 29,000 af is sold to Sacramento Suburban Water District in wetter years when the water is available. All of these deliveries would be made through the Folsom Pumping Plant. The remainder of PCWA's water rights supply is utilized within their district boundaries and is diverted at a pumping plant on the North Fork of the American River just upstream from Folsom Reservoir.

PCWA maintains a CVP water service contract with the Federal government for up to 35,000 af although no delivers have been made to date. This water quantity is assumed in the analyses to be delivered at the North Fork Pumping plant along with the remainder of their water rights water. The CVP water will be used after PCWA demand for all of their water rights water develops and additional delivery infrastructure is constructed. Any action to provide the additional supporting infrastructure would be subject to independent analysis and review and is not part of the action considered in these analyses. PCWA is not expected to take delivery of any CVP water supply during the duration of any interim contract.

Water conservation in PCWA includes consideration of water meters, water conserving designs, landscape conservation measures, and use of recycled wastewater.

3.6 Water Supplies for Other Water Users in the American River Division

In addition to the CVP water service contractors listed above, there are other water users on the American River that do not use CVP water. There are four major users that directly divert water from the American River or CVP facilities: City of Sacramento, Carmichael Water District, Folsom Prison, and California Department of Parks and Recreation.

The City of Sacramento has one of the oldest water rights on the American River. This pre-1914 water right provides for delivery from both the American and Sacramento rivers. The total water right includes up to 326,800 af. The City diverts water from the American River between the Howe Avenue and J Street bridges, in the Sacramento River near the confluence of the American and Sacramento rivers, and in the Sacramento River south of the American River confluence. The City and Reclamation have developed operating agreements to provide for Reclamation to release adequate amounts of water for the City to divert water from Folsom Lake for use by the City.

Carmichael Water District also has a pre-1914 water right on the American River and diverts water from the American River near Fair Oaks. The Carmichael Water District provides water to portions of the unincorporated areas of northern Sacramento County.

Folsom State Prison has a water right for 4,000 af on the American River that is diverted from Folsom Lake.

The State of California has a water right for up to 5,000 af on the American River diverted at Folsom Lake. The water is primarily used for irrigation and other needs at recreational facilities at and near Folsom Lake.

3.6.1 El Dorado County Water Agency. El Dorado County Water Agency and the Federal government are negotiating a long-term CVP water service contract under P.L. 101-514. Under this proposed contract, up to 15,000 af of CVP water would be provided to EID and Georgetown Divide Public Utility District. The diversions would be located in Folsom Lake or on the American River upstream from Folsom Lake.

P.L. 101-514 does not specify how much of the up to 15,000 af would be allocated to EID and Georgetown Divide Public Utility District. Ongoing environmental analyses will evaluate impacts and benefits of this proposed contract and the appropriate allocation of water between the two agencies. Because the environmental documentation is not complete and the contracts have not been adopted, this EA does not address the contract for this 15,000 acre-feet under the PL 101-514 in the primary alternatives. However, the cumulative impact of this future contract is described in Section 5 of this EIS.

3.7 Wastewater Treatment and Disposal for Water Users of the American River Division Water

Wastewater treatment and disposal practices also affect water quality and water supplies. Wastewater from several of the CVP water service contractors (City of Folsom, San Juan Water District, and Zone 40) and the City of Sacramento and other surrounding unincorporated areas is collected by the local agencies and conveyed and treated by facilities owned and operated by Sacramento Regional County Sanitation District. The Sacramento Regional County Sanitation District wastewater treatment plant is located near Freeport. Most of the effluent is discharged to the Sacramento River. A portion of effluent is used for wetlands restoration and water recycling. The operations of the wastewater treatment plant will be coordinated with the Freeport Regional Water Project to minimize conflicts between beneficial uses in the Sacramento River near Freeport.

Wastewater from Roseville and portions of the county served by PCWA including South Placer Municipal Utility District (Loomis and Rocklin area), Placer County Sewer Maintenance District No. 2 (Granite Bay area), Placer County/Sunset Area (north of Roseville), Lincoln, Penryn, and Newcastle is treated at one of two City of Roseville treatment plants with effluent discharged to Dry Creek or Pleasant Grove Creek. Approximately 6,000 af/year will be recycled for irrigation of golf courses.

Other areas served by PCWA, including Auburn, also provide wastewater treatment. The City of Auburn wastewater treatment plant effluent is discharged to Auburn Ravine and eventually flows into the Sacramento River upstream of the confluence with the American River. Both communities have implemented water recycling programs.

3.8 Response to Existing Reduction in Water Supply Reliability

During dry years when CVP water supplies are reduced, Roseville and PCWA rely upon water rights, conjunctive use with groundwater, conservation, and/or recycling to meet water demands. Overuse of groundwater during long droughts could cause a serious overdraft. In areas where groundwater generally is not available, severe water conservation requirements have been implemented, such as limitation of outdoor irrigation and increasing water rates for users of large volumes of water.

As municipal growth continues within contractor CVP service areas as agricultural and vacant land is converted to municipal uses. In these areas, the water demands are similar, however, return flows are greater and seepage into the groundwater is less from municipal uses as compared to agricultural uses.

3.9 Environmental Consequences

The effects of Alternative 1 on surface water resources are compared to conditions under the No Action Alternative.

3.9.1 Alternative 1: No Action. The No Action Alternative represents the future conditions with interim contract renewals with most CVPIA provisions. The No Action Alternative includes tiered pricing. Roseville will utilize up to their full CVP contract quantity during the two year interim contract period. PCWA will not take any deliveries of their CVP contract supply. Reclamation will operate the overall CVP system to meet all regulatory requirements, downstream water needs, and environmental requirements. Tiered pricing is not expected to reduce or otherwise impact delivery quantities or patterns.

3.9.2 Alternative 2: Proposed Action. Alternative 2 does not include tiered pricing. Roseville will utilize up to their full CVP contract quantity during the two year interim contract period. PCWA will not take any deliveries of their CVP contract supply. Reclamation will operate the overall CVP system to meet all regulatory requirements, downstream water needs, and environmental requirements. Water delivery quantities and patterns will be the same as in the No Action Alternative. Therefore, there will be no impacts to water resources.

3.9.3 Cumulative Affects. The execution of interim renewal contracts with Roseville and PCWA would not result in cumulative adverse impacts to surface water resources, quality, or facilities when considered in combination with future projects. These issues were evaluated as part of the PEIS. That analysis indicated that future projects, including future water transfer projects, may improve CVP water supply reliability. Overall water supply reliability in the future would be slightly less than under Affected Environment conditions because water rights users located along the Sacramento and American rivers are projected to divert more water in the future to serve projected municipal growth. As more water rights water is diverted, the water available for CVP water use is reduced and the frequency that the system as a whole is operated to meet regulatory standards increases.

3.10 GROUNDWATER RESOURCES AND GROUNDWATER QUALITY

Groundwater is used in portions of the American River Division. This section focuses on groundwater resources affected by CVP operations of the American River Division.

3.10.1 Affected Environment

3.10.1.1 Groundwater Use in Portions of Sacramento, Placer, and El Dorado Counties served by the American River Division of the Central Valley Project.

Alluvium deposits can be found throughout the Sacramento Valley basin in the form of alluvial fans, stream channel deposits, and flood plain deposits. These vast deposits are the source of most of the groundwater pumped in the Sacramento Valley, including the American River watershed. The depth to usable groundwater ranges from 1,000 feet near the base of the foothills to 3,000 feet in the downtown Sacramento area.

The useable groundwaters in the aquifers under the American River Division are divided into a shallow aquifer zone and an underlying deeper aquifer zone. The deeper aquifer is separated from the shallow aquifer by a discontinuous clay lens. Groundwater wells withdraw from both aquifers.

Aquifer recharge of the basin has historically occurred from deep percolation, infiltration from stream beds, and subsurface inflow along basin boundaries. Most of the recharge in the American River watershed occurs along the foothills. Groundwater historically has seeped from the aquifer to the American and Consumnes rivers in portions of the American River Division. However, there are portions of the watershed with overdraft conditions in which groundwater flows from the rivers to the adjacent groundwater. There are three areas of significant overdraft in the American River Division. In northern Sacramento County, groundwater use has increased significantly over the past 50 years as urban areas grew. Similar cones of depression have occurred in the vicinity of Zone 40 and in the Galt area. Groundwater availability is severely limited due to the presence of bedrock and related geological conditions near and within the City of Folsom; central Placer County east of Roseville; and throughout El Dorado County.

Groundwater quality in the American River Division is relatively good. The lower aquifer has poorer water quality than the upper aquifer due to seepage of constituents from agricultural and urban activities. Elevated levels of iron and manganese occur in the area south of the City of Sacramento. High levels of iron and manganese do not pose a health hazard but may result in odor, taste, and color problems and staining of plumbing fixtures and laundry. Local treatment is provided for some groundwater. Arsenic and radon have also been measured in the groundwater in the study area, although not at levels exceeding the current drinking water standards. Degradation of groundwater quality in Sacramento County can occur as groundwater levels decline and potential in-migration of poorer quality groundwater from the deeper aquifer occurs.

Areas with identified contamination are located in some portions of the study area. Four sites have been designated as U.S. Environmental Protection Agency Superfund sites: Aerojet Corporation, Mather Air Force Base, McClellan Air Force Base, and Sacramento Army Depot. Contamination has also been identified at and near the Kiefer Landfill in southeast Sacramento County, a historic Pacific Gas & Electric Company site near Old Sacramento, Southern Pacific Railroad yards in downtown Sacramento and in the City of Roseville, and the Union Pacific

Railroad yard in Sacramento south of State Highway 50. A portion of the contamination from the Aerojet Corporation site has adversely affected water quality near Rancho Cordova, and was recently discovered in wells north of the American River within the Carmichael Water District. Therefore, the wells serving the Rancho Cordova area will be abandoned and a portion of the Zone 40 surface water supply will be used to serve this area.

3.10.2 Environmental Consequences

The effects of Alternative 2 on groundwater resources are compared to conditions under the No Action Alternative.

3.10.2.1 Alternative 1: No Action. The No Action Alternative represents the future conditions with contract renewals with most CVPIA provisions including tiered pricing. Roseville does not rely on groundwater at this time and will utilize up to their full CVP contract quantity during the two year interim contract period. PCWA will not take any deliveries of their CVP contract supply. Reclamation will operate the overall CVP system to meet all regulatory requirements, downstream water needs, and environmental requirements. Tiered pricing is not expected to reduce or otherwise impact delivery quantities or patterns.

3.10.2.2 Alternative 2: Proposed Action. Alternative 2 does not include tiered pricing. Roseville will utilize up to their full CVP contract quantity during the two year interim contract period. PCWA will not take any deliveries of their CVP contract supply. Reclamation will operate the overall CVP system to meet all regulatory requirements, downstream water needs, and environmental requirements. Water delivery quantities and patterns will be the same as in the No Action Alternative. Therefore, there will be no impacts to groundwater resources.

3.10.2.3 Cumulative Affects. The interim renewals of Roseville and PCWA CVP contracts would not result in cumulative adverse impacts to groundwater resources, quality, or facilities when considered in combination with future projects.

3.11 LAND USE, DEMOGRAPHICS, AND SOCIOLOGICAL RESOURCES

The information presented below is primarily based upon environmental documentation completed for Reclamation, Water Forum Proposal, and federal, state, and local agencies. Land use for a region is described for communities either served by CVP water or within the vicinity of communities served by CVP water, such as communities considered in the Water Forum Proposal.

For each existing CVP water service contractor, information was compiled from the California Department of Conservation, Division of Land Resource Protection Farmland Mapping and Monitoring Program (2000) and was compared to land use, population, and sociological resource (housing and employment) projections developed by local agencies within the CVP service area.

3.11.1 Affected Environment

3.11.1.1 City of Roseville. The City has the largest active rail yard in the western states. The rail yard is a notable physical element that separates portions of the city. The City of Roseville's Planning Area includes approximately 20,045 acres of incorporated land plus an additional 4,378 acres that are outside of the city limits, but within the city's sphere of influence. The city has designated the following planned land uses on 17,650 acres of incorporated land: 8,281 acres of residential; 1,784 acres of commercial; 931 acres of office; 2,042 acres of industrial; and 4,612 acres of other uses (public/parks/open space). In addition, there are 1,028 acres of road and highway rights-of-way and easements, and 183 acres for the Pleasant Grove Wastewater Treatment Plant (City of Roseville, 2002)..

The 1992 General Plan (as amended in 2002) indicates that approximately 50 percent of the land designated for residential, commercial, office, industrial, and open space land uses has not been developed yet. Of the 17,650 acres designated by the city, 8,738 acres remain undeveloped, comprised of: 1,638 acres of residential; 740 acres of commercial; 480 acres of office; 1,268 acres of industrial; and 4,612 acres of public/parks/open space (City of Roseville, 2002).It is estimated that, as of 2003, the Roseville service area comprised a total of 18,668 acres (USBR, 2003). As indicated above, the City of Roseville plans that urban uses would increase to about 13,038 acres, and other uses (including public/parks/open space) would be about 4,612 acres, for a total of 17,650 acres.

3.11.1.2 Population and Sociological Resources. The population of the City of Roseville in 1992 was 50,308. City of Roseville population grew at an annual average rate of 6.2 percent between 1980 and 1990. Much of that growth occurred during the latter part of the decade and may be attributed to in-migration of families seeking relatively affordable housing (City of Roseville, 1992). The California Department of Finance estimates the January 1, 2002 city population at 85,800. SACOG estimates year 2015 population for the City of Roseville at 109,460 (SACOG, 2001).

As of the third quarter of 1990, the City of Roseville had an employment base of approximately 22,030 jobs. The highest 1990 employment sector was commercial, followed by office employment, and industrial activities. Employment growth in Roseville was expected to occur mainly in the retail trade, service, construction and manufacturing sectors. In particular, electronic manufacturing was expected to continue to grow at a high rate (Roseville, 1992).

In 1991, there were an estimated 18,901 dwelling units in the City of Roseville. The average household size, based on the 1990 Census, was 2.54 persons per household. Vacancy rates for housing in Roseville varied between 5.39 percent and 7.54 percent between 1980 and 1991 (Roseville, 1992).

SACOG estimates that there were 33,568 housing units in the City of Roseville in 2000, and projects that there will be 49,674 housing units in the City in 2025 (SACOG, 2002).

3.11.1.3 Placer County. Placer County comprises approximately 1,500 square miles (960,090 acres). A portion of southwestern Placer County is served or could be served by water from the American River by Placer County Water Agency. The Placer County Water Agency service area encompasses approximately 132,679 acres. Unincorporated areas west of Roseville

and Rocklin and near Sheridan could be served American River water by Placer County Water Agency. This area is primarily agricultural with lot sizes of at least 40 acres/parcel (Placer County, 1994).

As of 2000, approximately 19 percent of Placer County's total land area was devoted to agricultural use (California Department of Conservation, 2002a). Most of the County's agricultural activities are located within southwestern Placer County, and the southeastern portion of the County is the focus for urban development. As of 2001, there were 44,745 acres of land enrolled in Williamson Act contracts (California Department of Conservation, 2003). A majority of the County's prime farmland is located west and east of the City of Lincoln.

Land located in the foothill regions, between the elevations of 300 and 2,000 feet, is predominantly used for grazing. Livestock and poultry are the most valuable agricultural products of the County (Water Forum, 1999). Placer County's 1994 General Plan Update projected that by 2044, most of the county's new development will occur within the cities of Lincoln, Rocklin, Roseville, and Auburn (Placer County, 1994).

It is estimated that, in 2000, Placer County comprised 41,448 acres of urban uses and 180,472 acres of agriculture or open space land uses (California Department of Conservation, 2002a).

As of 2003, Placer County Water Agency's service area included 132,779 acres (USBR, 2003). Placer County Water Agency in 1998 included 25,250 acres of urban uses and 107,429 acres of agricultural and open space uses. Urban uses in Placer County Water Agency are expected to increase to about 56,640 acres and agriculture/open spaces would decrease to 76,039 acres**.** This total area includes the lands currently served by water from the Bear and Feather rivers. It is possible that American River water could be delivered to many areas within Placer County Water Agency, however, transmission facilities would need to be constructed.

The City of Rocklin was incorporated in 1893. The planning area for the City of Rocklin is 21 square miles, which includes the 12 square-mile area within the city limits. Approximately 47 percent of the acreage within the planning area is designated residential; 8 percent is commercial; 9 percent is industrial; 12 percent is recreation/conservation; 4 percent is public/quasi-public; and 20 percent is planning reserve (City of Rocklin, 1991).

The City of Auburn City limits in 1992 included 4,830 acres. Due to the city's terrain, over half of the area is vacant and undeveloped. The city's proposed sphere of influence in 1992 was 17,700 acres. Existing land uses in 1992 include approximately 20 percent residential, 4 percent commercial, 1 percent industrial, 5 percent public/quasi-public, 7 percent for streets, and 61 percent vacant land (City of Auburn, 1994).

The City of Lincoln is currently updating its General Plan; the 1988 General Plan is currently still in effect. The Lincoln planning area comprises approximately 19,500 acres, with the city limits containing approximately 4,000 acres. Approximately 19 percent of the planning area is designated residential; 19 percent is designated industrial; 2 percent is designated commercial; 6 percent is designated parks and public facilities/schools; 24 percent is designated urban reserve; and 30 percent is designated agricultural (City of Lincoln, 1988).

The Town of Loomis was incorporated on December 17, 1984. This community has a rural character with large residential lots, a downtown area, and open space (Town of Loomis, 2003).

3.11.1.4 Population. In 1990, the U.S. Bureau of Census estimated Placer County's population at 172,796. The California Department of Finance projected a 38 percent increase in Placer County population between 1990 and 2000 (City of Roseville, 1992). The California Department of Finance estimated the County population as of July 1, 2000 was 251,800 (California Department of Finance, 2001), estimates the January 1, 2002 County population at 265,700. SACOG estimates year 2015 population in the County at 376,240, and at 415,335 in 2025 (SACOG, 2001b).

For the City of Auburn, SACOG estimated the 2000 population at 11,920 and the 2025 population at 17,350; for the City of Lincoln, the 2000 population was estimated at 12,900 and the 2025 population was estimated at 57,875. For the Town of Loomis, the 2000 population was estimated at 6,075 and the 2025 population was estimated at 10,360. For the City of Rocklin, the 2000 population was estimated at 37,670 and the 2025 population was estimated at 70,490. SACOG estimated the unincorporated portion of Placer County to have a 2000 population of 87,410 and a 2025 population of 147,280 (SACOG, 2001b).

3.11.1.5 Sociological Resources. The 2000 Placer County labor force consisted of 124,800 people; the unemployment rate was 3.2 percent. Employment opportunities in Placer County exist within all economic sectors. Employment sectors in the county which were expected to grow include retail trade, construction, and manufacturing (Roseville, 1992). As of 2000, civilian employment was estimated at 120,800 (California Department of Finance, 2002d).

The estimated housing stock in 1990 was 77,879, composed of single-family units (61,482), multi-family units (10,821), and mobile homes and trailers (5,576). In 2001, the housing stock was estimated at 111,075. From 1990 to 2000, the housing vacancy rate declined from 17.7 percent to 12.8 percent. Housing authorizations in the County in 2000 were 6,379 units, composed of 4,745 single-family units and 1,634 multi-family units. The median home price in December 2000 was $251,000 (California Department of Finance, 2002d). Persons per household in 2000 were estimated at 2.63 (U.S. Census Bureau, 2003d). The average household size in Placer County between 1990 and 2000 was 2.7 persons (Placer County, 2003).

SACOG projects that housing units in Placer County will increase from 98,730 in 2000 to 175,039 in 2025 (SACOG, 2001b). In addition, SACOG projects that housing units in the City of Auburn will increase from 5,486 in 2000 to 7,998 in 2025; from 5,287 in 2000 in the City of Lincoln to 23,212 in 2025; from 2,240 in the Town of Loomis in 2000 to 3,852 in 2025; from 13,972 in 2000 in the City of Rocklin to 26,899 in 2025; and from 37,913 units in 2000 in unincorporated Placer County to 64,523 units in 2025 (SACOG, 2001b).

3.12 Environmental Consequences

3.12.1 Alternative 1: No Action. Under the No Action Alternative, it is anticipated that growth would continue to occur as described in the county general plans, projections by the

Department of Finance, City of Roseville, Placer County Water Agency, and Reclamation. The use of CVP water service contracts is not the sole factor driving growth and land use change. Demographic, economic, political, and other factors, independent of the water supply availability are causing changes with direct and indirect effects to land use that are beyond the range of Reclamation's responsibilities. All of the interim contract renewal actions are within the range of existing conditions. This includes the area of use, types of use, range of river flows, and reservoir fluctuations.

3.12.2 Alternative 2: Proposed Action. Land use and water supply facilities operations in the American River Division under Alternative 2 would be identical to conditions under the No Action Alternative. Therefore, there are no environmental impacts of this alternative as compared to the No Action Alternative.

3.12.3 Cumulative Affects. The interim contract renewals in the American River Division would not result in cumulative adverse impacts to land use resources when considered in combination with future projects. These issues were evaluated as part of the PEIS and other environmental documents completed for the local agencies and Reclamation. That analysis indicated that future projects, including future water transfer projects, may improve CVP water supply reliability. These types of programs would modify water supply reliability but not change long-term CVP contract amounts or deliveries from within the historical ranges. Therefore, land use would not change under any of the alternatives.

3.13 FISH AND AQUATIC HABITAT

Aquatic resources potentially affected by the project are associated with streams and lakes in the upper American River Basin (above Folsom Lake), Folsom Lake, Lake Natoma, the Lower American River, Cirby and Linda creeks, the Sacramento River, and Sacramento-San Joaquin Delta (Delta).

3.13.1 Affected Environment

This section provides an overview of fish resources and aquatic habitats that occur within these areas.

3.13.1.1 Upper American River Basin. Several storage reservoirs have been constructed in the upper basin upstream of Folsom Lake, providing a variety of lake environments interspersed with stream environments throughout the upper American River Basin.

The North Fork American River above Folsom Lake contains both free-flowing stream habitat and reservoir habitat (Lake Clementine) that are suitable for warmwater fish production. Although coldwater species (e.g., trout) are present, low flows and high temperatures during the summer favor warmwater fish production. Cooler water temperatures exist in the Middle Fork American River during the summer and fall, and provide more favorable conditions for coldwater species. Both warmwater and coldwater species are found in the Middle Fork American River. The South Fork American River provides aquatic habitats similar to those found

in the North Fork American River. High water temperatures during the summer and fall may limit production of coldwater species.

Native species that occur in the upper basin include hitch (*Lavinia exilicauda*), Sacramento sucker (*Catostomus occidentalis*), riffle sculpin (*Cottus gulosus*) and Sacramento pikeminnow (*Ptychocheilus grandis*). Several warmwater species have been introduced in the upper basin, including smallmouth bass (*Micropterus dolomieu*), bullhead (*Ictalurus* spp.), and several varieties of sunfish (*Lepomis* spp.). The upper basin's coldwater sport species include introduced brown trout (*Salmo trutta*), and rainbow trout (*Oncorhynchus mykiss*). Brown trout and rainbow trout were stocked in the past, and a population of brown trout remains although they are no longer stocked. Rainbow trout are stocked into streams and reservoirs in the upper basin at a variety of sizes. These trout are stream spawners, and therefore, do not reproduce within the reservoirs. However, some spawning by these species may occur in the stream sections above the reservoirs.

3.13.1.2 Folsom Lake. Folsom Lake is characterized by strong thermal stratification, which generally begins in April following the spring snowmelt runoff period and extends into November when inflow becomes influenced by winter rains. Thermal stratification establishes a warm surface water layer, a middle water layer (the thermocline) characterized by rapidly decreasing temperature with increasing depth, and a bottom, coldwater layer within the reservoir. In terms of aquatic habitat, the warm upper layer of Folsom Lake provides habitat for warmwater fishes, whereas the reservoir's lower layers form a "coldwater pool" that provides habitat for coldwater fish species throughout the summer and fall portions of the year. Hence, Folsom Lake supports a two-story fishery during the stratified portion of the year, with warmwater species using the upper, warmwater layer and coldwater species using the deeper, colder portion of the reservoir. During the winter rainy season and spring runoff period, high inflows contribute to a mixed reservoir condition with a more uniform temperature profile.

Native species that occur in the reservoir include hardhead (*Mylopharodon conocephalus*) and Sacramento pikeminnow (*Ptychocheilus grandis*). However, introduced largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), spotted bass (*Micropterus punctulatus*), bluegill (*Lepomis machrochirus*), crappie (*Pomoxis* spp.), and catfish (*Ictalurus* spp.) constitute the primary warmwater sport fisheries of Folsom Lake. The reservoir's coldwater sport species include brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), kokanee salmon (*Oncorhynchus nerka*), and chinook salmon (*Oncorhynchus tshawytscha*). Brown trout were stocked into the reservoir in the past, and a population of brown trout remains although they are no longer stocked. Rainbow trout are stocked into Folsom Lake by Department of Fish and Game at multiple sizes, including catchable size (2 fish/pound). Kokanee salmon are stocked as fingerlings. Chinook salmon reared at the Feather River Hatchery are stocked into Folsom Lake as part of Department of Fish and Game Inland Chinook Salmon Program. Trout and salmon are stream spawners, and therefore, do not reproduce within the reservoir. However, some spawning by one or more of these species may occur in the American River upstream of Folsom Lake.

Folsom Lake is usually subject to substantial reductions in surface elevation from late spring and summer until inflows increase during the winter rainy season and during the spring runoff period. Fluctuations in water-surface elevation that occur during nesting periods can result in nest

abandonment and adversely affect both spawning and juvenile survival of some resident warmwater fish species. Periods of concern vary among species depending on the spawning period. Largemouth and smallmouth bass spawn primarily in April and May, while peak spawning for sunfish and catfish generally occurs in late-May and June.

The coldwater pool in Folsom Lake is not only important to the reservoir's coldwater fish species, but also to fall-run chinook salmon and steelhead in the Lower American River. Seasonal releases from the reservoir's coldwater pool provide cooler water temperatures in the Lower American River that support annual in-river production of these salmonid species. Any reduction in the reservoir's coldwater pool reduces the volume of cold water that is available to be released in any given year into the Lower American River to benefit the river's chinook salmon and steelhead populations. The annual coldwater pool is not large enough to facilitate coldwater releases during the warmest months (July-September) and to provide maximum thermal benefits to Lower American River steelhead and coldwater releases during October and November that would maximally benefit fall-run chinook salmon immigration, spawning, and incubation. Consequently, optimal management of the reservoir's coldwater pool on an annual basis is an important consideration in providing the maximum thermal benefits to both fall-run chinook salmon and steelhead.

3.13.1.3 Lake Natoma. Lake Natoma was constructed to serve as a regulating afterbay with the ability to provide stable flows in the Lower American River, even with fluctuating Folsom Lake power generation flow releases. Consequently, water surface elevations in Lake Natoma typically fluctuate up to 3 feet on a daily and weekly basis (CDEC published hourly elevation data, 1994 through 2000). During most of the year, Lake Natoma receives controlled (non-flood) releases from Folsom Lake.

Lake Natoma supports many of the same fish species found in Folsom Lake (i.e., rainbow trout, bass, sunfish, and catfish). Some recruitment of warmwater and coldwater fishes likely comes from Folsom Lake. In addition, the Department of Fish and Game stocks catchable-size rainbow trout into Lake Natoma annually. Lake Natoma's limited primary and secondary production and daily elevation fluctuations are believed to reduce the size and annual production of many of its fish populations, relative to Folsom Lake (USFWS, 1991).

Because of Lake Natoma's small size and the magnitude of Folsom Lake outflow, water flowing through Lake Natoma can be significantly warmed by 3° F to 7° F. Water temperatures of releases into the Lower American River from Lake Natoma are dependent on a number of factors, including inflow rate, meteorological conditions, and degree of stratification within Lake Natoma. As the lake elevation fluctuates, Nimbus Dam releases are comprised of varying amounts of surface waters. If the lake is stratified, elevation fluctuations lead to varying release temperatures.

3.13.1.4 Lower American River. The lower 23 miles of the American River (below Nimbus Dam), including backwaters and dredge ponds, supports at least 40 fish species, half of which are game fish (USFWS, 1991). Common species include chinook salmon, steelhead, American shad (*Alosa sapidissima*), rainbow trout, striped bass (*Morone saxatilis*), bass, carp (*Cyprinus carpio*), Sacramento pikeminnow, Sacramento sucker, and hardhead (*Mylopharodon*

conocephalus). A number of species are of primary management interest due either to their declining population or their importance to recreational and/or commercial fisheries. Anadromous species that are important for recreational and commercial uses include fall-run chinook salmon, steelhead, striped bass, and American shad.

Use of the American River by three special-status species – fall-run chinook, steelhead, and splittail is briefly described below. More detailed information on the use of the lower American River by special-status species and other species of management interest is included in the descriptions of individual species.

The Lower American River provides spawning and rearing habitat for fall-run chinook salmon and steelhead only below Nimbus Dam. Chinook salmon spawn almost exclusively in the 10 miles of river immediately below Nimbus Dam, and mostly in the upper 5 miles. Habitat concerns for Chinook salmon include sub-optimal flows and water temperatures (in some years), a limited area of suitable spawning gravels, and various components of rearing habitat (in- and over-water object cover, run-riffle-pool composition). High water temperatures during the fall can delay the onset of spawning by Chinook salmon, and river water temperatures can become unsuitably high for juvenile salmon rearing during the spring.

Steelhead spawning takes place on smaller gravels and is more widely distributed in the Lower American River than Chinook salmon spawning. The longer rearing period renders this species particularly sensitive to high water temperatures in the summer and early fall, but they may also be affected by other habitat features such as availability of cover and spawning gravels. In the summer and fall of some low carryover storage years, temperatures in the Lower American River may exceed the tolerance of juvenile steelhead.

Splittail spawn over flooded vegetation, therefore spawning could occur in the lower reaches of the American River. Although spawning has not been verified in the Lower American River, potentially suitable habitat exists. There is a nearly linear relationship between flows and area of potential spawning habitat for splittail in the Lower American River (SAFCA 1999). Increased flows increase the amount of flooded area available for splittail spawning. Temperature is of lesser concern for splittail as they prefer warmer temperatures than either steelhead or chinook salmon.

Water temperature in the Lower American River depends on the rate and temperature of releases from Folsom Lake. The coldwater pool is managed to provide appropriate temperatures for anadromous salmonids. However, the small size of the coldwater pool, particularly in dry years, can impede attainment of suitable water temperatures during certain periods of the year.

3.13.1.5 Dry Creek Watershed. The Dry Creek watershed encompasses the City of Roseville's service area and surrounding lands. Cirby Creek and its tributary, Linda Creek, are tributaries of Dry Creek, which drains to the East Main Drainage Canal and enters the Sacramento River near the confluence with the Lower American River.

The Dry Creek watershed is urbanized, which has resulted in degraded conditions for fish. Low flows and high stream temperatures are common, particularly in dry years, and act to limit the distribution of anadromous salmonids within the drainage.

Fish communities in the Dry Creek watershed are dominated by exotics such as mosquito fish (*Gambusia affinis*), bullhead, sunfish, bass (*Micropterus* spp.) and golden shiner (*Notemigonus crysoleucas*), and temperature-tolerant native fish, such as Sacramento sucker, hitch, and Sacramento pikeminnow. Both chinook salmon and steelhead are known to spawn and rear in the Dry Creek drainage in Miners Ravine and Secret Ravine. Surveys in Cirby and Linda creeks have found juvenile or yearling chinook salmon and steelhead and may indicate that these species rear in these streams in an opportunistic fashion when flows and temperatures are suitable. Successful spawning of anadromous salmonids has not been documented in Cirby or Linda creeks (Roseville, 1998).

3.13.1.6 Sacramento River. The Sacramento River serves as an important migration corridor for anadromous fish moving between the ocean and/or Delta and upper river/tributary spawning and rearing habitats. The upper portion of the river provides a diversity of aquatic habitats, including fast-water riffles and shallow glides, slow-water deep glides and pools, and off-channel backwater habitats. The lower Sacramento River is predominantly channelized, leveed, and bordered by agricultural lands. Aquatic habitat in the lower Sacramento River is characterized primarily by slow-water glides and pools, is depositional in nature, and has reduced water clarity and habitat diversity, relative to the upper portion of the river.

More than 30 species of fish are known to use the Sacramento River. Of these, a number of both native and introduced species are anadromous. Anadromous species include chinook salmon, steelhead, green and white sturgeon, striped bass, and American shad. The upper Sacramento River is of primary importance to native anadromous species, and currently is used for spawning and early lifestage rearing, to some degree, by all four runs of chinook salmon (fall, late-fall, winter, and spring) and steelhead. Consequently, various lifestages of the four runs of chinook salmon and steelhead can be found in the upper Sacramento River throughout the year. Other Sacramento River fish are considered resident species, which complete their lifecycle entirely within freshwater, often in a localized area. Resident species include rainbow and brown trout, largemouth and smallmouth bass, channel catfish, sculpin, pikeminnow, Sacramento sucker, hardhead, and common carp (Reclamation, 1991b). The majority of the fish species found in the upper Sacramento River also occur in the lower river, although some species only use the lower river as a migratory pathway to and from upstream spawning and rearing grounds. In contrast, the lower river supports some fish species that make little to no use of the upper river (upstream of RM 163).These species include Sacramento splittail, delta smelt, and striped bass.

The Sacramento River joins with several other rivers and numerous sloughs to form the Delta and ultimately empties into the San Francisco Bay. The Delta and San Francisco Bay make up the largest estuary on the west coast. Its importance to fisheries is illustrated by the more than 120 fish species that rely on its unique habitat characteristics for one or more of their lifestages. Fish species found in the Delta include anadromous species, as well as freshwater, brackish water, and saltwater species. Delta inflow and outflow are important for species residing primarily in the Delta (e.g., delta smelt and longfin smelt) (USFWS, 1994) as well as juveniles of

anadromous species (e.g., chinook salmon) that rear in the Delta prior to ocean entry. Seasonal Delta inflows affect several key ecological processes, including: (1) the migration and transport of various lifestages of resident and anadromous fishes using the Delta (San Francisco Estuary Project 1992); (2) salinity levels at various locations within the Delta as measured by the location of X2 (i.e., the position in kilometers eastward from the Golden Gate Bridge of the 2 ppt near-bottom isohaline); and (3) the Delta's primary (phytoplankton) and secondary (zooplankton) production.

3.13.2 Species of Primary Management Interest. Species of primary management interest in the Sacramento and American Rivers consist of species that are listed or candidates for listing under the state or federal Endangered Species Acts. In addition to these status, several species are of management interest because of their commercial or recreational importance. The following describes the life history, habitat requirements and distribution the fish species of primary management interest in the project area, as presented in Table 3-1.

TABLE 3-1
FISH SPECIES OF PRIMARY MANAGEMENT INTEREST IN THE PROJECT AREA

Species	Status	Project Area Occurrence
Central Valley winter-run chinook salmon *Onchorhynchus tshawytscha*	Federal – E State – E	Sacramento River and Delta
Central Valley spring-run chinook salmon *Onchorhynchus tshawytscha*	Federal – T State – T	Sacramento River and Delta
Central Valley fall/late fall-run chinook salmon *Onchorhynchus tshawytscha*	Federal – C State – CSC	Fall run: American and Sacramento Rivers, Delta Late Fall-run: Sacramento River and Delta
Central Valley steelhead *Onchorhynchus mykiss*	Federal – T State – none	American and Sacramento Rivers, Delta
Delta smelt *Hypomesus transpacificus*	Federal – T State – T	Delta
Green sturgeon *Acipenser medirostris*	Federal – C State – CSC	Sacramento River and Delta
Splittail *Pogonichthys macrolepidotus*	Federal – T State – CSC	American and Lower Sacramento Rivers, Delta
Striped bass[a] *Morone saxatilis*	Federal – none State – none	American and Lower Sacramento Rivers, Delta
American shad[a] *Alosa sapidissima*	Federal – none State – none	American and Lower Sacramento Rivers, Delta

E – Listed as endangered under the federal or state Endangered Species Acts
T – Listed as threatened under the federal or state Endangered Species Acts
C – Candidate for listing as threatened or endangered under the federal or state Endangered Species Acts
CSC – California Species of Special Concern
[a] Species of management interest for recreational fishing

3.13.2.1 Chinook Salmon. Four runs of chinook salmon (i.e., fall-run, late-fall-run, winter-run, and spring-run) occur in the Sacramento River system. Only fall-run occur in the lower American River. These runs are described below.

3.13.2.2 Fall-run Chinook Salmon. The fall run of chinook salmon is currently the largest run of chinook salmon in the Sacramento River system, and the primary run of chinook salmon using the lower American River. Because fall-run chinook salmon represent the greatest percentage of all four runs, they continue to support commercial and recreational fisheries of significant economic importance.

Adult fall-run chinook salmon migrate into the Sacramento River and its tributaries from July through December, with immigration peaking from mid-October through November (Reynolds et al., 1990). Fall-run chinook salmon spawn in numerous tributaries of the Sacramento River, including the lower American River, lower Yuba River, Feather River, as well as tributaries to the upper Sacramento River. The majority of mainstem Sacramento River spawning occurs

between Keswick and Red Bluff Diversion dams. A greater extent of fall-run chinook salmon spawning (relative to the other three runs) occurs below Red Bluff Diversion Dam, with limited spawning potentially occurring as far downstream as Princeton (RM 163) (Burmester, pers. comm., 1996). Spawning generally occurs from October through December, with fry emergence typically beginning in late December and January. Fall-run chinook salmon emigrate as post-emergent fry, juveniles, and as smolts after rearing in their natal streams for up to six months. Consequently, fall-run chinook salmon emigrants may be present in the lower American and Sacramento rivers from January through June (Reynolds et al., 1990; Herbold et al., 1992), and remain in the Delta for variable lengths of time prior to ocean entry.

Adult chinook salmon begin entering the lower American River annually in August and September, with immigration continuing through December in most years and January in some years. Once in the lower American River, the timing of adult chinook salmon spawning activity is strongly influenced by water temperature. When daily average water temperatures decrease to approximately 60°F, female chinook salmon begin to construct nests (redds) into which their eggs (simultaneously fertilized by the male) are eventually released. Fertilized eggs are subsequently buried with streambed gravel. Approximately 98 percent of all redds observed during these years were located between Watt Avenue (RM 9.5) and Nimbus Dam (RM 23).

The intragravel residence period of incubating eggs and alevins (i.e., yolk-sac fry) is highly dependent upon water temperature. The intragravel egg and fry incubation lifestage for fall-run chinook salmon in the lower American River generally extends from about mid-October through March. Egg incubation survival rates are dependent on water temperature and intragravel water movement. CDFG (1980) reported egg mortalities of 80 percent and 100 percent for chinook salmon at water temperatures of 61° and 63°F, respectively. Egg incubation survival is highest at water temperatures at or below 56°F.

Fall-run chinook salmon fry emergence generally occurs from late-December through mid-May in the lower American River (Snider and Titus, 1996). Fall-run chinook salmon emigrate from the lower American River during two distinct time periods. The primary period of emigration occurs from mid-February through early March. Other fry rear in the lower American River where they feed and grow for up to six months, prior to emigrating as juveniles or smolts through June.

Water temperatures between 45° and 58°F have been reported to be optimal for rearing of chinook salmon fry and juveniles (Reiser and Bjornn, 1979; Rich, 1987). Raleigh et al., (1986) suggested a range of approximately 53.6° to 64.4°F as suitable rearing temperatures, and 75°F as an upper limit. Lower American River water temperatures at Watt Avenue generally range from about 46°F to 60°F during the period December through April, and from 60°F to 69°F during the months of May and June.

3.13.2.3 Winter-run Chinook Salmon. Winter-run chinook salmon only occur in the mainstem Sacramento River. Adult winter-run chinook salmon migrate upstream through the Delta and into the lower Sacramento River occurs from December through July, with peak immigration during the period January through April (USFWS, 1995). Winter-run chinook salmon primarily spawn in the mainstem Sacramento River between Keswick Dam (RM 302) and Red Bluff Diversion Dam (RM 258). Winter-run chinook salmon spawn between late-April and mid-August, with peak spawning generally occurring in June.

Winter-run chinook salmon fry rearing in the upper Sacramento River exhibit peak abundance during September, with fry and juvenile emigration past Red Bluff Diversion Dam occurring from August through March (Reclamation, 1992). Peak abundance of juveniles in the Delta generally occurs during February, March, or April (Steven, 1989). Juvenile winter-run chinook salmon may exhibit a sustained residence in the middle or lower Sacramento River or upper Delta prior to seaward migration. The location and extent of this middle-area rearing is unknown, although it has been suggested that the duration of fry presence in an area is directly related to the magnitude of river flows during the rearing period (Stevens, 1989). Additional information on the life history and habitat requirements of winter-run chinook salmon is contained in the NOAA Fisheries Biological Opinion for this species (NOAA Fisheries 1993).

Critical habitat for the winter-run chinook salmon is defined to occur in the Sacramento River from Keswick Dam (RM 302) to Chipps Island (RM 0) in the Delta. Also included are waters west of the Carquinez Bridge, Suisun Bay, San Pablo Bay, and San Francisco Bay north of the Oakland Bay Bridge (NMFS, 1993).

3.13.2.4 Spring-run Chinook Salmon. Spring-run chinook salmon enter the Sacramento River during the period late March through September (Reynolds et. al., 1990), with peak abundance in the Delta and lower Sacramento River from April through June (USFWS, 1994). Adult spring-run chinook salmon hold in areas downstream of spawning grounds during the summer months until their eggs fully develop and become ready for spawning. This is the primary characteristic distinguishing the spring-run from the other runs of chinook salmon. Spring-run chinook salmon spawn primarily upstream of Red Bluff Diversion Dam, and in several upper Sacramento River tributaries (e.g., Mill and Deer creeks). Spawning has been reported to primarily occur during mid-August through early October (Reynolds et al., 1990). Although some portion of an annual year-class may emigrate as post-emergent fry (i.e., individuals less than 45 millimeters (mm) in length), most are believed to rear in the upper river and tributaries during the winter and spring, and emigrate as juveniles (i.e., individuals greater than 45 mm in length, but not having undergone smoltification) or smolts (silvery colored fingerlings having undergone the smoltification process in preparation for ocean entry). The timing of juvenile emigration from the spawning and rearing grounds varies among the tributaries of origin, and can occur during the period November through June.

3.13.2.5 Late Fall-run Chinook Salmon. Adult immigration of late fall-run chinook salmon in the Sacramento River generally begins in October, peaks in December, and ends in April (Reclamation, 1991b). Primary spawning grounds for late fall-run chinook salmon are in tributaries to the upper Sacramento River (e.g., Battle, Cottonwood, Clear, and Mill creeks), although late fall-run chinook salmon are believed to return to the Feather and Yuba rivers as well (USFWS, 1994). Spawning in the mainstem Sacramento River occurs primarily from Keswick Dam (RM 302) to Red Bluff Diversion Dam (RM 258), and generally occurs from December through April (Reclamation, 1991b). Postemergent fry and juveniles emigrate from their spawning and rearing grounds in the upper Sacramento River and its tributaries during the period May through November. Juveniles emigrate through the Delta primarily during the period October through December (USFWS, 1994).

3.13.2.6 Steelhead. Adult steelhead migrate through the Sacramento River system beginning in August and continue through March. They return to spawning grounds in the upper Sacramento River and tributaries (the lower American River). Steelhead also are produced at the Coleman Fish Hatchery on Battle Creek, the Nimbus Hatchery on the American River, and the Feather River Hatchery on the Feather River (Reynolds et al., 1990). Spawning generally occurs from January through April (McEwan, pers. comm., 1997). Juvenile steelhead rear in their natal streams for one to two years prior to emigrating from the river. Emigration of one- to two-year-old fish primarily occurs from April through June (Reynolds et al., 1990; McEwan, pers. comm., 1997).

The lower American River steelhead population is believed to be supported primarily by fish produced at Nimbus Hatchery. Adult steelhead immigration into the lower American River typically begins in November and continues into April. The steelhead spawning immigration generally peaks during January (CDFG, 1986). Optimal immigration temperatures have been reported to range from 46° to 52°F (CDFG, 1991).

Spawning usually begins during late-December and may extend through March, but can range from November through April (CDFG, 1986). Optimal spawning temperatures have been reported to range from 39° to 52°F (CDFG, 1991). The egg and fry incubation lifestage for steelhead in the lower American River typically extends from December through May.

Fry emergence from the gravel generally begins in March and occurs through June, with peak emergence occurring during April (CDFG, 1986; Snider and Titus, 1996). Optimal egg and fry incubation temperatures have been reported to range from 48° to 52°F (CDFG, 1991). The optimal temperature range for fry and juvenile rearing is reported to be from 45° to 60°F (CDFG, 1991). As with chinook salmon, it is believed that temperatures up to 65°F are suitable for steelhead rearing, with each degree increase between 65°F and the upper lethal limit of 75°F (Bovee, 1978) being increasingly less suitable and thermally more stressful. The primary period of steelhead emigration from the lower American River is believed to occur from March through June (Castleberry et al., 1991).

3.13.2.7 American Shad. American shad occur in the Sacramento River, its major tributaries (including the lower American River), and the Delta. A popular sport fishery for American shad exists annually in the Sacramento River and certain tributaries, including the lower American River (CDFG, 1980). Adult American shad typically enter the lower American River from April through early July (CDFG, 1986), with the spawning migration peaking from mid-May through June (CDFG, 1987).

Water temperature is an important factor influencing the timing of spawning. American shad are reported to spawn at water temperatures ranging from approximately 46° to 79°F (USFWS, 1967), although optimal spawning water temperatures are reported to range from about 60° to 70°F (Leggett and Whitney, 1972; Painter et al., 1977; Bell, 1976; CDFG, 1980; Rich, 1987).

Based on their 1990 field investigation, Jones and Stokes Associates (1990) reported that water velocity was the most important physical variable determining shad spawning habitat preference in the lower Yuba River, followed by depth and water temperature. In contrast to salmonids, distributions of spawning virgin shad are determined by river flow rather than homing behavior (Painter et al., 1979). Substrate and cover played no apparent role in habitat selection. Snider and Gerstung (1986) recommended flow levels of 3,000 to 4,000 cfs in the lower American River

during May and June as sufficient attraction flows to sustain the river's American shad fishery. When suitable spawning conditions are found, American shad school and broadcast their eggs throughout the water column.

Based on laboratory experiments conducted on American shad incubation, Walburg and Nichols (1967) concluded that water temperatures suitable for normal egg development ranged from about 54° to 70°F. These investigators further reported that eggs hatched in 3 to 5 days at 68° to 74°F and in 4 to 6 days at water temperatures of 59° to 64.4°F. Egg incubation and hatching, therefore, are coincident with the primary spawning period (i.e., May through June). A large percentage of the eggs spawned in the lower American River probably do not hatch until they have drifted downriver and entered the Sacramento River (CDFG, 1986). Few juvenile American shad have been collected in the lower American River (CDFG, 1980). Therefore, the presence of American shad in the lower American River is primarily restricted to adult immigration, spawning, and fry lifestages.

3.13.2.8 Striped Bass. Striped bass occur in the Sacramento River, its major tributaries (including the lower American River), and the Delta. Substantial striped bass spawning and rearing occurs in the Sacramento River and Delta. Year-class strength of striped bass in the Delta has been correlated with survival and growth during the first 60 days after hatching. The abundance of young striped bass, in turn, was positively correlated with freshwater outflow from the Delta, and negatively correlated with the percentage of Delta inflow diverted from Delta channels during spring and early summer by the SWP and CVP (USFWS, 1988).

Adult striped bass are present in the lower American River throughout the year (DeHaven, 1977), with peak abundance occurring during the summer months (DeHaven, 1977, 1979; CDFG, 1971). No studies have definitively determined whether striped bass spawn in the lower American River (CDFG, 1971; CDFG, 1986). However, the scarcity of sexually ripe adults among sport-caught fish indicates that minimal, if any, spawning occurs in the lower American River (DeHaven, 1977, 1978). Most striped bass spawning is believed to occur in the Sacramento River and Delta. The majority of Sacramento River spawning occurs in the lower Sacramento River, downstream of RM 140 (USFWS, 1988).

The number of striped bass entering the lower American River during the summer is believed to vary with flow levels and food production (CDFG, 1986). 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 fishery in the lower American River. However, these investigators reported that, in any given year, the population level of striped bass in the Delta was probably the greatest factor determining the relative number of striped bass occurring in the lower American River.

The lower American River apparently is a nursery area for young striped bass (CDFG, 1971; 1986). Numerous schools of five- to eight-inch-long fish have been reported in the river during the summer months (CDFG, 1971). In addition, juveniles and young adults have been reported to be abundant in the lower American River during the fall (DeHaven, 1977). Optimal water temperatures for juvenile striped bass rearing has been reported to range from approximately 61° to 71°F (USFWS, 1988).

3.13.2.9 Sacramento Splittail. Splittail are members of the minnow family, achieving lengths of up to approximately 16 inches. Adults can tolerate a wide range salinities, but require freshwater for spawning. Adult migrate upstream to freshwater areas in the late fall to early winter prior to spawning activities. Spawning occurs from mid-winter through July in water temperatures between 48° to 68°F (Wang, 1986) at times of high winter or spring runoff (DWR, 1994). Splittail prefer to spawn over flooded streambank vegetation or beds of aquatic plants, and the timing of their upstream movements and spawning corresponds to the historically high-flow period associated with snowmelt and runoff each spring. The precise timing and location of spawning varies among years, and the timing and magnitude of winter and spring runoff may play a substantial role in determining the temporal and spatial distribution of spawning in any given year. Water temperature and photoperiod also influence the timing of spawning.

Historically, splittail could be found in the upper reaches of the Sacramento River. Today, Red Bluff Diversion Dam appears to be a complete barrier to upstream movement. The presence of splittail in the Sacramento River and its tributaries (including the lower American River) is believed to be largely restricted to their upstream and downstream movements associated with spawning. Juvenile splittail are not believed to use the Sacramento River or its tributaries for rearing to a great extent (USFWS, 1994). Downstream emigration into the Delta is believed to peak during the period April through August.

Low numbers of splittail have been collected in the lower American River. CDFG has conducted fish sampling surveys on the lower American River annually from 1991 through 1995 (Brown et al., 1992; Snider and McEwan, 1993; Snider and Titus, 1994; Snider and Titus, 1996). The fish sampling surveys were conducted from approximately January through June, when adult and larval splittail likely would be in the river. Splittail were collected in very low numbers, primarily at the lowest sampling station located downstream of U.S. Interstate Business 80 (RM 4) (Brown et al., 1992). All splittail captured in 1991 were young-of-the-year. Only two splittail have been captured above RM 9.

3.13.2.10 Delta Smelt. Delta smelt are a short-lived, slender-bodied fish endemic to the Delta. As a euryhaline species, delta smelt can tolerate wide-ranging salinities, but rarely occur in waters with salinities greater than 10-14 parts per thousand (ppt). Historically, they have been abundant in low (around 2 ppt) salinity habitats.

Delta smelt occur in open surface waters and shoal areas (USFWS, 1994). They are generally found in the lower reaches of the Sacramento River below Isleton, the San Joaquin River below Mossdale, through the Delta and into Suisun Bay (Moyle, 1976; Moyle et al., 1992). Critical habitat for delta smelt is defined (USFWS, 1994) as:

> *Areas and all water and all submerged lands below ordinary high water and the entire water column bounded by and contained in Suisun Bay (including the contiguous Grizzly and Honker Bays); the length of Goodyear, Suisun, Cutoff, First Mallard (Spring Branch), and Montezuma Sloughs; and the existing contiguous waters contained within the Delta.*

When not spawning, adult delta smelt tend to concentrate just upstream from the entrapment zone (the saltwater-freshwater interface) (USFWS, 1994), The location of which varies daily, seasonally, and annually in response to tidal action and the volume of freshwater inflow to the Delta.

Adults migrate from brackish water areas to freshwater areas to spawn during the winter. Migration can begin as early as October and continue through April, but movement peaks during the period December through April (USFWS, 1994). The adults and young-of-the-year remain in the spawning areas until late summer, when they begin emigrating downstream. In the Sacramento River, delta smelt have been found as far upstream as the confluence with the American River (USFWS, 1994).

3.13.2.11 Green Sturgeon. Green sturgeon are an anadromous species, migrating from the ocean to freshwater to spawn. They inhabit the Sacramento River system, as well as in the Eel, Mad, Klamath, and Smith rivers in the northwest portion of California. Little information is available on the lifestage-specific environmental requirements of this species in the Sacramento River. In the Sacramento River, most spawning is believed to occur in the upper portion of the river. Egg fertilization occurs in the water column of relatively fast-flowing rivers (Emmett et al., 1991 in Moyle et al., 1992). In the Sacramento River, green sturgeon presumably spawns at water temperatures ranging from 46° to 57°F (Beak Consultants, 1993). Small numbers of juvenile green sturgeon have been captured and identified each year from 1993 through 1996 in the Sacramento River at the Hamilton City Pumping Plant (RM 206) (J. Brown, pers. comm., 1996). Lower American River (Gerstung, 1977), fish surveys conducted by the CDFG in recent years have not collected green sturgeon (Snider, pers. comm., 1997).

3.13.2.12 San Pablo and Suisun Bays. Winter-run Chinook salmon and Sacramento splittail migrate through San Pablo and Suisun Bays during spawning runs. Several creeks and streams in the EBMUD service area historically supported populations of steelhead, Chinook salmon, or other native fish species, but these populations are no longer extant because of urban development, creek channelization, and dam construction.

3.13.3 Environmental Consequences

3.13.3.1 Alternative 1: No Action. The No Action Alternative includes the operations of the CVP consistent with all requirements as described in the Biological Assessment for the Continued Long-term Operations of the Central Valley Project and the State Water Project (2008). This includes the reasonable and prudent alternatives contained in the U.S. Fish and Wildlife Service December 15, 2008 Biological Opinion on the Effects of the Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP) to the Threatened Delta Smelt (*Hypomesus transpacificus*) and Its Designated Critical Habitat (Delta Smelt BO) and the CVP/SWP Operations BO. Actions taken to protect sensitive species in the American River include an annual water temperature management plan for steelhead, use of CVPIA section 3406 (b)(2) water supplies to supplement flows in the lower American River, increased minimum flow targets, and examinations of potential improvements to fish passage and structural temperature control options. Execution of contracts with Roseville and PCWA with tiered pricing included would not alter CVP operations, water storage or release patterns from CVP facilities, temperature management plans, or the maximum volume of water to be delivered to the American River Division.

3.13.3.2 Alternative 2: Proposed Action. Aquatic resources under Alternative 2 would be identical to conditions under the No Action Alternative. Alternative 2 would not alter

CVP operations, water storage or release patterns from CVP facilities, or the maximum volume of water to be delivered to the American River Division as compared to the No Action Alternative. Therefore, biological resource conditions under Alternative 2 would be identical to those under the No Action Alternative.

3.13.3.3 Cumulative Affects. The interim contract renewals in the American River Division would not result in cumulative adverse impacts to aquatic resources when considered in combination with future projects. These issues were evaluated as part of the PEIS and other environmental documents completed for the local agencies and Reclamation. That analysis indicated that future projects, including future water transfer projects, may improve CVP water supply reliability. These types of programs would modify water supply reliability but not change long-term CVP contract amounts or deliveries from within the historical ranges. Therefore, aquatic resources would not change under any of the alternatives due to cumulative effects of other projects.

3.14 WILDLIFE HABITAT AND WILDLIFE

3.14.1 Affected Environment

The following describes the major habitats found in the project area and the wildlife species typically found in these habitats with particular reference to special-status species. The general description of habitats is followed by a description of existing habitats and wildlife in the service area of the American River Division contractors.

3.14.2 Habitat Types. The types, amounts, and distribution of habitats in the service areas were derived from the California GAP Analysis Project (California Department of Fish and Game, 1998). In the California GAP Analysis, habitats were typed based on the California Wildlife Habitats Relationship System (CWHR) (Mayer and Laudenslayer, 1988). This project focused on mapping habitats at a landscape scale and has a resolution of 274 acres for upland habitats and 98.8 ac for wetland habitat. The database identifies general habitat types throughout the service areas but does not distinguish small habitat patches, such as stringers of riparian habitat or small wetlands, which can have high wildlife value. Additional information is provided on the occurrence of important habitat types not distinguished in the California GAP Analysis.

3.14.2.1 Conifer Forest. Within the project area, the GAP Analysis identified five CWHR habitat types dominated by conifers: Ponderosa pine (*Pinus ponderosa*), Sierran mixed conifer, Douglas-fir (*Pseudotsuga menziesii*), Jeffrey pine (*Pinus jeffreyi*), and redwood *(Sequoia sempervirens)*.

For this EIS, these five CWHR habitat types are grouped as conifer forest habitat. Conifer forest habitats occur in eastern portions of the project area, in foothill and higher elevation areas of the Sierra Nevada Mountains. A small amount of conifer forest habitat also is present in the coast Range in the western portion of the project area. The species composition of the conifer forest habitat varies with elevation, soil composition, and rainfall. Conifer forest habitats occur at elevations as low as 2,500 feet in elevation (Placer County, 1994). Ponderosa pine occurs at the lowest elevation where it can be interspersed with montane hardwood (described below). At

higher elevations, ponderosa pine is replaced by Sierran mixed conifer and Douglas-fir. Sierran mixed conifer habitat consists of a mix of five conifer species and one hardwood species - white fir (*Abies concolor*), Douglas-fir, ponderosa pine, sugar pine (*Pinus lamertiana*), incense-cedar (*Calocedrus decurrens*), and California black oak (*Quercus kelloggii*) (California Department of Forestry and Fire Protection, 1988).

The Sierran mixed conifer habitat type occurs from about 4,000 to 10,000 feet in elevation in the project area (California Department of Forestry and Fire Protection, 1988) and grades with ponderosa pine and Douglas-fir habitats. In the Sierra Nevada, the Douglas-fir habitat is largely a subset of the Sierran mixed conifer type, where Douglas-fir occurs as a pure stand. Jeffery pine typically occurs at high elevations (above Sierran mixed conifer), but because it is tolerant of serpentine soils it occurs as pure stands in some areas of serpentine soils. A small amount of redwood forest occurs in the Coast Range in the western portion of the project area.

Conifer forest habitat of the Sierra Nevada Mountains has been estimated to support about 355 species of vertebrates (Verner and Boss 1980). Mixed conifer forest typically supports greater species diversity than single-species conifer stands because of the greater plant species diversity. The variety in plant species composition of mixed conifer forest provides a diversity of food and cover types. Nonetheless, many wildlife species will exploit all of the conifer forest types to varying degrees.

Special-status species potentially inhabiting conifer forest habitat in the project area include California spotted owl (*Strix occidentalis occidentalis*), northern goshawk (*Accipiter gentilis*), Pacific fisher (*Martes pennanti*), and bald eagle (*Haliaeetus leucocephalus*).

3.14.2.2 Montane Hardwood Forest. Montane hardwood forest occurs in eastern portions of the project area at lower elevations than conifer forest habitat, although it can be interspersed with ponderosa pine. This forest type is dominated by hardwood tree species including canyon live oak (*Quercus chrysolepis*), California black oak, tanoak (*Lithocarpus densiflorus*), and Pacific madrone (*Arbutus menziesii*), but often includes some conifers, such as gray pine (*Pinus sabiniana*) and ponderosa pine. Typical understory shrub species include manzanita (*Arctostaphylos* sp.), poison-oak (*Toxicodendron diversilobum*), coffeeberry (*Rhamnus californica*), currant (*Ribes* sp.), and ceanothus (*Ceanothus* sp.) (California Department of Forestry and Fire Protection, 1988).

The oaks comprising montane hardwood forest habitat attract and support a diversity of bird and mammal species that exploit and depend on acorns. Typical species include scrub jays (*Aphelocoma californica*), acorn woodpeckers (*Melanerpes formicivorus*), gray squirrels (*Sciurus griseus*), wild turkey (*Meleagris gallopavo*), dusky-footed woodrats (*Neotoma fuscipes*), black bear (*Ursus americanus*), and mule deer (*Odocoileus hemionus*). Reptiles are found in the litter on the forest floor and include western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus*), and western rattlesnake (*Rotalus viridis*).

3.14.2.3 Blue Oak Woodland and Coastal Oak Woodland. Blue Oak Woodland occurs in foothill regions of the project area at elevations of 250 to 3,000 feet (Mayer and Laudenslayer, 1988). Blue oak (*Quercus douglasii*) is the dominant overstory species of this

habitat, although at the higher elevations of this habitat's distribution, gray pine becomes an important overstory species. Where gray pine or other conifers comprise 25 to 49 percent of the overstory with blue oak comprising at least 50 percent of the overstory canopy, the CWHR classifies this habitat as Blue Oak - Foothill Pine woodland. Both CWHR habitat types (Blue Oak - Foothill Pine woodland and Blue Oak Woodland) are considered collectively in this EIS as blue oak woodland. Typical shrub species in blue oak woodland are poison-oak, coffeeberry, redbud (*Cercis occidentalis*), ceanothus, and manzanita with ground cover consisting of annuals such as bromegrass (*Bromus* sp.), wild oats (*Avena* sp.), foxtail (*Hordeum murinum*), and filaree (*Erodium* sp.) (Mayer and Laudenslayer, 1988).

Coastal oak woodland occurs in the Coast Ranges of the project area. Coast live oak is the dominant overstory species and can be the only overstory species in some locations. In mesic areas, California bay, madrone, tan oak, and canyon live oak contribute to the overstory. The understory typically consists of shade-tolerant shrubs such as California blackberry, creeping snowberry, and toyon.

Blue oak and coastal oak woodlands provide habitat for a diversity of wildlife species, although no species appear to be completely dependent on this habitat type. Barrett (1980) reported that over 60 species of mammals use oaks and Verner (1980) reported that 110 species of birds have been observed during the breeding season in California habitats with oaks. Acorns produced by blue oaks are an important food resource for a diversity of bird and mammal species. Typical species inhabiting oak woodlands in the project area include scrub jays, yellow-billed magpies (*Pica nuttalli*), gray squirrels, and California ground squirrels (*Spermophilus beecheyi*). Special-status species associated with oak woodland habitats include oak titmouse, Lawrence's goldfish, and Nuttall's woodpecker.

3.14.2.4 Valley Oak Woodland. Valley oak woodland can occur throughout much of the Central Valley and into the Sierra Nevada foothills up to an elevation of about 2,000 feet. The overstory canopy of this habitat type is almost exclusively valley oak (*Quercus lobata*). California sycamore (*Platanus racemosa*), black walnut (*Juglans californica*), interior live oak (*Quercus wislizenii*), boxelder (*Acer negundo*) and blue oak occur sporadically. Shrubs such as poison-oak, toyon (*Heteromeles arbutifolia*), and coffeeberry can occur in the understory although typically, the understory is comprised of annuals such as wild oats, bromegrass, barley (*Hordeum* sp.), and ryegrass (*Lolium* sp.) (Mayer and Laudenslayer, 1988). Valley oak woodland merges with annual grasslands and often borders agricultural fields. This habitat also occurs adjacent to valley foothill riparian habitats As distance from the watercourse increases, tree density declines, thus transitioning from a forest-like structure, to savanna-like to grassland.

Like other habitats containing oaks, valley oak woodland is used by a variety of wildlife species that exploit the acorn food resource. Cavities formed in oaks are also an important habitat feature for cavity-nesting birds and mammals. Common species inhabiting valley oak woodland include California quail (*Callipepla californica*), red-shouldered hawk (*Buteo lineatus*), acorn woodpecker, scrub jay, bushtit (*Psaltriparus minimus*), gray squirrel, mule deer, red-tailed hawk (*Buteo jamaicensis*), and white-tailed kite (*Elanus leucurus*). Special-status species associated with oak woodland habitats include oak titmouse (*Baeolophus inornatus*), Lawrence's goldfish (*Carduelis lawrenci*), and Nuttall's woodpecker (*Picoides nuttallii*).

3.14.2.5 Chaparral and Coastal Scrub. Chaparral habitats consist of structurally homogenous brushland dominated by shrubs. Shrub height and crown cover vary considerably with fire frequency, precipitation, aspect, and soil type. Chaparral habitats in the project area include two types of habitats distinguished by CWHR: Chemise-Redshank Chaparral and Mixed Chaparral. These two habitats are very similar and their differentiation is somewhat subjective. In general, Chemise-Redshank Chaparral consists of at least 60 percent coverage by chemise (*Adenostoma fasciculatum*) and redshank (*Adenostoma sparsifolium*) combined. Mixed chaparral supports a greater diversity of plant species, including scrub oak (*Quercus berberidifolia*), ceanothus, manzanita, toyon, and yerba-santa (*Eriodictyon californicum*), in addition to chemise and redshank. The upper and lower elevation limits of chaparral habitat varies considerably with precipitation, aspect and soil type, but typically occurs below 5,000 feet.

The project area also contains a small amount of coastal scrub habitat. This habitat is structurally similar to the chaparral habitats but consists of a different mix of plant species. Coyotebush is the predominant overstory shrub species. Other plant species contributing to the overstory include ceanothus, coffeeberry, salal, bush monkeyflower, poison-oak, blackberry, and woolly sunflower.

No wildlife species are restricted to chaparral and coastal scrub habitats of the project area. Common species include western fence lizard, racer (*Coluber constrictor*), common garter snake (*Thamnophis sirtalis*), turkey vultures, red-tailed hawk, golden eagle (*Aquila chrysaetos*), mountain quail (*Oreortyx pictus*), ash-thoated flycatcher (*Myiarchus cinerascens*), sage sparrow (*Amphispiza belli*), opossum (*Didelphis virginiana*), coyote (*Canis latrans*), California ground squirrel, and black-tailed jackrabbit (*Lepus californicus*). No special-status species are dependent on this habitat type although several use chaparral habitats in addition to other habitats.

3.14.2.6 Annual Grassland. Annual grassland is a common habitat type in the project area. Historically, grasslands in the Central Valley were dominated by native perennial grasses such as needlegrass. Currently, most grasslands in the area are dominated by introduced annual grasses of Mediterranean origin and a mixture of native and introduced forbs. Introduced annual grasses are the dominant plant species and include wild oats, soft chess (*Bromus hordeaceus*), ripgut brome (*Bromus rigidus*), red brome (*Bromus rubens*), barley, and foxtail. Annual native forbs also occur in annual grassland habitat and include filaree, California poppy (*Eschscholtzia californica*), owls clover (*Gilia* spp.), tarweed (*Holocarpha virgata*) and various lupines (*Lupinus* spp.). Yellow star-thistle (*Centaurea solstitialis*), a noxious weed, has invaded many annual grassland habitats and degraded their quality for wildlife and as livestock pasture. Annual grassland habitat merges with valley oak and blue oak woodlands, occurring where soil moisture is insufficient to support tree growth or is suppressed due to grazing.

Many species of birds, mammals, reptiles and amphibians use annual grasslands. Raptors, such as ferruginous hawks (*Buteo regalis*), red-tailed hawks, white-tailed kites, American kestrel (*Falco sparverius*) and northern harriers (*Circus cyaneus*) commonly forage in annual grasslands. Short-eared owls (*Asio flammeus*) and burrowing owls (*Athene cunicularia*) forage and breed in this habitat. Horned larks (*Eremophila alpestris*), western meadowlarks (*Sturnella neglecta*), and savannah sparrows (*Passerculus sandwichensis*) are other common bird species. Characteristic reptiles and amphibians include western fence lizard, common garter snake, and western

rattlesnake. Common mammals include black-tailed jackrabbits, California ground squirrels, California voles (*Microtus californicus*), badgers (*Taxidea taxus*), coyotes, and Botta's pocket gophers (*Thomomys bottae*). A number of special-status species use annual grassland habitat, including white-tailed kite, burrowing owl, and prairie falcon (*Falco mexicanus*).

3.14.2.7 Vernal Pools. Vernal pools are typically found in association with annual grassland habitat but constitute a unique habitat type. Vernal pools form in shallow depressions that are underlain by hardpan or volcanic rock. The hardpan or volcanic rock impedes drainage such that, in winter, the depressions fill with water and retain moist soil into late spring. The pools are then dry during the summer and fall until the rains commence the following winter. The soils and moist microhabitat of these pools provides a unique habitat within a general matrix of annual grassland habitat. Plant species of vernal pools differ from those of the surrounding annual grassland habitat and many animals associated with annual grassland habitat depend on vernal pools within the annual grassland landscape.

Common plant species found in vernal pools include popcorn flower (*Plagiobothrys stipitata*), navarretia (*Navarretia leucocephala*), toad rush (*Juncus bufonius*), goldfields (*Lathenia chrysostoma*), yellow carpet (*Blennosperma nanum*), coyote thistle (*Eryngium vaseyi*), tidy tips (*Layia* spp.), water buttercup (*Ranunculus* spp.), and hairgrass (*Deschampsia danthonioides*).

The number and distribution of vernal pools in the Central Valley have been greatly reduced as a result of agricultural practices and conversion to urban land uses. Holland (1978) estimated that 5 to 30 percent of California's vernal pools are intact today; the Central Valley has about 5 percent of its vernal pools remaining. The reduction in vernal pool habitat has resulted in several plant and animal species being listed under the federal Endangered Species Act.

3.14.2.8 Freshwater Emergent Wetland. Freshwater emergent wetlands occur in areas that are seasonally or perennially inundated. They form a transitional habitat between open water and upland habitats, and occur in backwater areas of rivers, streams and lakes, and in the flood plains of rivers and streams. Wetlands are characterized by erect rooted, herbaceous vegetation that emerges above the water surface. Water depths are shallow, up to about 1 to 2 feet. Common plant species include cattails (*Typha* sp.), bulrushes (*Scirpus* sp.), and rushes (*Juncus* sp.).

Urban and agricultural development, as well as hydrologic changes from flood control and water supply development, have substantially reduced the amount of wetland habitat in the Central Valley. In the 1940s, freshwater emergent wetlands occupied about 554,000 acres of the Central Valley (Frayer et al., 1989; Central Valley Habitat Joint Venture, 1990). By 1990, only 86,704 acres remained (CDFG, 1998). Regional reductions in freshwater emergent wetlands have been estimated at 88.7 percent in the Sacramento Basin, 96.2 percent in the San Joaquin Basin, 99.2 percent in the Tulare Basin, 98.3 percent in the Delta, and 97.2 percent in the San Francisco Bay area.

Freshwater wetlands are among the most important habitats for wildlife. In winter, waterfowl rely on wetlands in the Central Valley as a stopover during their migration or as habitat throughout the winter. Raptors such as golden eagles, and northern harriers frequent wetlands while

foraging. Birds such as marsh wrens (*Cistothorus palustris*), tricolored blackbirds (*Agelaius tricolor*), red-winged blackbirds (*Agelaius phoeniceus*), American bitterns (*Botaurus lentiginosus*), great egrets (*Ardea alba*), great blue herons (*Ardea herodias*), black-crowned night herons (*Nycticorax nycticorax*), and green herons (*Butorides virescens*) are common in wetland habitats in the project area and depend on this habitat. Numerous amphibians and mammals also depend on wetlands or frequent this habitat because of its high productivity and diversity. Because much of the wetland habitat in California has been lost, a number of species that require wetlands have been listed as threatened or endangered or are species of concern to the Service or Department of Fish and Game. Special-status species associated with wetlands in the project area include giant garter snake (*Thamnophis gigas*), tricolored blackbird, white-faced ibis (*Plegadis chihi*), and western pond turtle (*Clemmys marmorata*).

3.14.2.9 Saline Emergent Wetland. Saline emergent wetlands encompass salt and brackish water marshes in the EBMUD service area. They occur along the margins of bays, lagoons, and estuaries. These wetlands form above intertidal sand and mud flats and below upland communities not subject to tidal action. Plant species composition and structure varies with the salinity, substrate, and wave action. Characteristic plant species of more saline marshes are cordgrass and pickleweed while bulrushes and cattails occur in lower salinity marshes.

Only a small portion of the saline emergent wetlands that existed in the San Francisco Bay area in the mid-1800s remains. Many of the wetlands were dredged or filled in association with urban development. Runoff and discharges from urban and industrial development also has reduced and degraded wetlands. The suitability of the remaining wetlands for many species has been further limited, and in some cases precluded, by their small size, fragmentation, and lack of other habitat features.

The remaining saline emergent wetlands of the San Francisco Bay area provide important habitat for a variety of birds and mammals. Several species of lizards and snakes use edges of the marshes, and a few amphibians can occur in brackish portions of these wetlands. Saline emergent wetlands provide important wintering and migratory stopover habitat for many birds. Common birds species include waterfowl, herons, egrets, rails, and shorebirds. Several endemic subspecies birds inhabit saline emergent wetlands of the San Francisco Bay area including California clapper rails, California black rails, salt marsh, yellowthroat, and Belding's savannah sparrow. Common mammals include shrews, bats, mice, and raccoons. Special-status species that use this habitat include California's clapper rail, California black rail, and salt marsh harvest mouse.

3.14.2.10 Valley Foothill Riparian. Valley foothill riparian habitat develops in the flood plains of low-gradient rivers and streams. Riparian habitats form a transitional community between the aquatic, riverine environment and upland habitats. Dominant tree species of valley foothill riparian habitat are cottonwood (*Populus fremontii*), California sycamore, and valley oaks. Typical shrub species include willows (*Salix* sp.), elderberry (*Sambucus* sp.), and wild grape (*Vitis californica*).

The composition of riparian plant communities is shaped by the timing, intensity, and duration of flooding. Willows predominate in areas subject to regular inundation, and quickly colonize newly deposited gravel bars or recently scoured areas. Cottonwoods occur farther from the river channel

in areas subject to less frequent and intense flooding. Still, the persistence of cottonwoods is linked to the natural seasonal pattern of flows. Cottonwoods evolved to release seeds at the same time as high spring flows would deposit nutrient rich sediments where germination and seedling survival would be enhanced. Thus, the timing and intensity of flows is critical to the persistence of riparian vegetation. Flood control and water supply projects have resulted in hydrologic alterations that have changed the species composition, structure, and extent of riparian habitats.

In addition, most rivers have been channelized and are confined by levees, which limit the area available to support riparian habitat. As a result of these changes, the extent of riparian habitat in the Central Valley has been substantially reduced.

The structural and compositional diversity, abundant food resources, and availability of water in valley foothill riparian habitat make this habitat particularly valuable to wildlife. Wildlife species diversity is often higher in riparian habitats than in adjacent habitats. Many resident birds, amphibians, reptiles, and mammals breed in riparian habitats, while other species frequent this habitat in winter or during migration (Sanders et al., 1985.)

3.14.2.11 Agricultural Habitat. Agricultural field habitat in the project area consists of row crops, orchards, vineyards, and field crops. Crop types vary from year to year depending on market conditions on other factors. Agricultural fields have replaced native habitats consisting of grasslands, wetlands, and oak woodlands. Some wildlife species have adapted to using agricultural fields. Pheasants (*Phasianus colchicus*) and other game birds use tall crops for cover and grain crops for foraging. Waterfowl and sandhill cranes (*Grus canadensis*) and other game birds also forage on waste grains after harvest. Small mammals such as black-tailed hare and several species of mice are often abundant in agricultural fields and attract foraging raptors such as red-tailed hawks, Swainson's hawks, northern harriers, and white-tailed kites. No special-status species are dependent on this habitat but some special-status species, such as Swainson's hawk and white-tailed kites frequent agricultural fields for foraging.

3.14.3 Habitats Associated with Central Valley Project Waterways of the Project Area. The following section describes the terrestrial habitats and wildlife associated with the principal waterways potentially affected by the proposed action and alternatives: Folsom Lake, lower American River, and lower Sacramento River.

3.14.3.1 Folsom Lake. Habitats associated with Folsom Reservoir include oak woodland and annual grassland. The oak woodland habitat, located on the upland banks and slopes of the reservoir, is dominated by live oak, blue oak, and foothill pine with several species of understory shrubs and forbs including poison oak, manzanita, California wild rose, and lupine. Annual grasslands occur around the reservoir, primarily at the southern end and consist of wild oats, soft chess brome, ryegrass, mustard, and foxtail.

The reservoir rim is surrounded by a barren band (the drawdown zone) as a result of historic fluctuations in water elevations. The majority of this zone is devoid of vegetation, although arroyo willows and narrow-leaved willows have established in some areas (USFWS, 1991). The only contiguous riparian vegetation occurs along Sweetwater Creek at the southern end of the reservoir (USFWS, 1991). Because the drawdown zone is virtually devoid of vegetation and the

sparse willows that have established in some areas do not form a contiguous riparian community, the drawdown zone does not possess substantial habitat value.

Oak woodlands and annual grasslands in the reservoir area support a variety of birds, including acorn woodpecker, Nuttall's woodpecker, western wood pewee, scrub jay, Bewick's wren, plain titmouse, hermit thrush, loggerhead shrike, black-headed grosbeak, dark-eyed junco, and Bullock's oriole. A number of raptors also will use oak woodlands for nesting, foraging, and roosting. These include red-tailed hawk, American kestrel, sharp-shinned hawk, Cooper's hawk, red-shouldered hawk, great horned owl, and long-eared owl. Mammal species likely to occur in the woodland habitat include mule deer, coyote, bobcat, gray fox, Virginia opossum, raccoon, striped skunk, black-tailed jackrabbit, California ground squirrel, and a variety of rodents. Amphibians and reptiles that may be found in oak woodlands include California newt, Pacific tree frog, western fence lizard, gopher snake, common kingsnake, and western rattlesnake.

The annual grassland surrounding Folsom Reservoir represents habitat for a variety of rodents, which, in turn, serve as a prey base for carnivores such as hawks and owls, coyote, bobcat, gray fox, and some snakes. Although very few birds will nest in the grassland areas, a number of species will forage in this habitat, including white-crowned sparrow, lesser goldfinch, western meadowlark, and several raptor species. Migratory waterfowl are known to feed and rest in the grasslands associated with the north fork of Folsom Reservoir (USFWS, 1991). Several of the reptiles and amphibians that inhabit the oak woodlands also will occur in the adjacent non-native grasslands.

3.14.3.2 Lower American River. The lower American River provides a diverse assemblage of vegetation communities, including freshwater emergent wetland, riparian forest and scrub, and in the upper, drier areas further away from the river, oak woodland and annual grassland. The current distribution and structure of riparian communities along the river has been determined by human-induced changes such as gravel extraction, dam construction and operations, and levee construction and maintenance, as well as by both historic and ongoing streamflow and sediment regimes and channel dynamics (Sands et al., 1985; Watson, 1985). As a result of these factors, several riparian vegetation zones exist along the banks of the lower American River. The composition and vegetative structure of these zones at any particular location along the river depends on the geomorphology and other physical characteristics of the riverbank.

In general, willow and alders tend to occupy areas within the active channel of the river, which are repeatedly disturbed by river flows, thus prohibiting successional stages in advancement of plant communities leading to full development of the plant community. Plant species in this zone typically include various species of willow. Cottonwood-willow thickets and cottonwood forests occupy the narrow belts along the active river channel where repeated disturbance by occasional large flows keep the communities at earlier stages. Fremont cottonwood dominates these riparian forest zones but willow, poison oak, wild grape, blackberry, northern California black walnut, and white alder also are present.

Cottonwood forest is typical of the steep, moist banks along much of the river corridor. Valley oak woodland occurs on upper terraces composed of fine sediment where soil moisture provides

a long growing season. Valley oak is the dominant tree species in these areas, although some of the sites also have a cottonwood component as a result of infrequent flood inundation. Live oak woodland occurs in the more arid and gravelly terraces that are isolated from the fluvial dynamics and moisture of the river. Annual grassland commonly occurs in areas that have been disturbed by human activity and can be found on many of the sites within the river corridor.

Backwater areas and off-river ponds that are recharged during high flows support emergent wetland vegetation. These habitat areas are located throughout the length of the river, but occur more regularly downstream of the Watt Avenue bridge. Plant species that dominate this habitat type include various species of willow, sedge, cattail, bulrush, rush, barnyard grass, slough grass, and lycopus.

Previous studies have determined that the cottonwood-dominated riparian forest and areas associated with the backwater and off-river ponds are highest in wildlife diversity and species richness relative to other river corridor habitats (Sands et. al., 1985; Watson, 1985; USFWS, 1991). More than 220 species of birds have been recorded along the lower American River and more than 60 species are known to nest in the riparian habitats (USFWS, 1991). Common species that can be found along the river include great blue heron, mallard, red-tailed hawk, red-shouldered hawk, American kestrel, California quail, killdeer, belted kingfisher, western scrub jay, ash-throated flycatcher, tree swallow, and American robin. Additionally, more than 30 species of mammals reside along the river, including striped skunk, Virginia opossum, brush rabbit, raccoon, western gray squirrel, California ground squirrel, meadow vole, muskrat, black-tailed deer, gray fox, and coyote. The most common reptiles and amphibians that depend on the riparian habitats along the river include western toad, Pacific tree frog, bullfrog, western pond turtle, western fence lizard, common garter snake, and gopher snake.

3.14.3.3 Lower American River Channel Hydrology and Riparian Vegetation Relationships. The type and distribution of riparian vegetation along a river is generally a function of the complex hydrologic and geomorphic conditions of the river (Watson, 1985). In particular, water availability and magnitude (i.e., flow regimes), floodplain geology, and channel morphology are the driving forces behind the ability of various riparian plants to germinate, establish, and grow. Flood flows mobilize bank and riverbed sediments that result in the deposition of nutrient-rich sediments on the floodplain that, when timed with the release of seeds in the spring, provides suitable areas for seed germination. High water (flushing) flows, usually occurring in late winter and early spring, are necessary to clear the river channel of debris, control the encroachment of vegetation, and unclog sediments. Water availability during the summer and early fall months can determine growth rates and plant types. The structure and composition of the channel bed and banks affects the rate of channel migration, the elevation of the water surface during low flow periods, the lateral movement of groundwater into the banks, the transport and deposition of sediments, and how often certain areas are inundated by flood flows. These, in turn, affect overall plant diversity, growth, and generation.

3.14.3.4 Cottonwood Growth Along the Lower American River. The germination, establishment, growth, and long-term survival of Fremont cottonwoods 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 process of the lower American River, maintenance of this regime is vital to maintain a viable cottonwood riparian system.

Successful regeneration of cottonwoods relies on the synchronous timing of seed dispersal to appropriate soil moisture levels to germinate and establish successfully (Stromberg, 1995). Cottonwoods disperse seeds over a two- to six-week period, typically in the early to mid-spring months. Dispersed seeds rapidly lose the ability to germinate, so seeds must encounter suitable germination sites soon after release. Germination takes place on freshly deposited alluvial soils in areas along the river bank low enough in elevation to provide adequate moisture but high enough to avoid subsequent flooding after establishment. Peak water flows of sufficient magnitude are necessary, just prior to seed dispersal, to provide these suitable germination sites.

To survive, cottonwood seedlings require a continuous source of adequate moisture (Scott et al., 1996). Consequently, river flows must decline at a rate that allows seedling roots to maintain continuous contact with saturated or sufficiently moist substrate. If river flows and the alluvial groundwater table drop too rapidly, seedling survival decreases appreciably (Scott et al., 1996). Studies have shown that first-year seedlings of Fremont cottonwood survive only where the groundwater depth is less than one meter, and tolerate daily declines of no more than a few centimeters per day (Stromberg and Patten et al., 1991). Summer flows are critical to the continued survival of newly established seedlings and provide necessary moisture when evapotranspiration is highest (Scott et al., 1996). Long-term survival of established cottonwoods is generally related to the depth to groundwater and to river flows. While cottonwoods can adapt to drought periods, overall growth and long-term maintenance of these trees depends on the ability of root systems to reach the alluvial groundwater table, the recharging of which depends on adequate river flows.

3.14.3.5 Backwater Ponds of the Lower American River. Backwater ponds are areas adjacent to the mainstem of a river that may be connected to the river by surface water during high winter flood flows and by groundwater during other times of the year. 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 Avenue and Howe Avenue (Sands et al., 1985).

Vegetation around these ponds 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, American bittern, green heron, common merganser, white-tailed kite, wood duck, yellow warbler, warbling vireo, dusky-footed woodrat, western gray squirrel, Pacific tree frog, and western toad.

3.14.3.6 Lower Sacramento River. Much of the Sacramento River is confined by levees that reduce the natural diversity of riparian vegetation. Agricultural land (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. Riparian vegetation along the lower Sacramento River is largely confined to narrow bands between the river and the river side of the levee. The riparian communities consist of valley oak, cottonwood, wild grape, box elder, elderberry, and willow. The largest and most significant tract of riparian forest remaining on the Sacramento River is a stretch between Chico Landing and Red Bluff. Freshwater emergent wetlands occur in the slow moving backwaters and are primarily dominated by tules, 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, wood duck, great blue heron, great egret, green heron, black phoebe, ash-throated flycatcher, sora, great horned owl, Swainson's hawk, California ground squirrel, and coyote. Agricultural areas adjacent to the river also represent foraging habitat for many raptor species.

3.14.4 Habitat within the Central Valley Project Service Areas. The following section describes habitat identified in each of the American River Division CVP water service contractor service areas. In addition, habitats in the vicinity of proposed new facilities associated with the Freeport diversion are presented.

3.14.4.1 City of Roseville. Most of the City of Roseville's service area has been developed for urban, residential, and industrial uses. Remaining wildlife habitat is generally located in the northeastern portion of the service area (California Department of Fish and Game, 1998). Annual grassland is the predominant habitat with only small fragmented areas of oak woodland (blue oak woodland and valley oak woodland). The remaining patches of valley oak woodland are primarily associated with drainages in the northwestern portion of the service area. Blue oak woodland is present in the eastern portion of the service area. Based on the GAP data, the City of Roseville service area contains 3,020 acres of annual grasslands, 420 acres of blue oak woodland, 2,550 acres of cropland, and 345 acres of valley oak woodland.

The City of Roseville's service area contains several small streams: Kaseberg Creek, Dry Creek, Cirby Creek, Linda Creek, Pleasant Grove Creek, and Antelope Creek. Valley foothill riparian habitat and valley oak woodland habitat occurs in association with these creeks and other small drainages. However, the extent of habitat is limited to areas immediately adjacent to the stream channels because the streams have been channelized for flood control purposes, and adjacent lands have typically been converted to agricultural or urban development.

The annual grasslands within the City of Roseville's service area contain numerous vernal pools. Over 1,500 vernal pools have been identified in the service area (Roseville, 1992). The vernal pool complexes have been documented to support listed species and other special-status species associated with this habitat. The CNDDB reports the occurrence of the following species in vernal pool habitats in the City of Roseville's service area: vernal pool fairy shrimp, California

linderiella, vernal pool tadpole shrimp, legenere, hispid bird's beak, and Bogg's Lake hedge hyssop. Other special-status species have been reported in grassland or riparian habitats in the service area, including valley elderberry longhorn beetle, white-tailed kite, and Swainson's hawk (CNDDB, 2003; Roseville, 1992).

3.14.4.2 Placer County Water Agency. Placer County Water Agency's service area encompasses a wide diversity of habitats. Conifer forest and montane hardwood habitat predominate in the higher elevation areas in the eastern portion of the service area. Lower elevation areas in the western portion of the service area support annual grassland, blue oak woodland, and agricultural fields. Valley foothill riparian habitats exist along larger rivers and streams such as the North Fork American River. Based on the GAP data, the Placer County Water Agency service area contained 9,760 acres of annual grasslands, 25,620 acres of blue oak woodland, 30,600 acres of cropland, 20,570 acres of conifer forest, approximately 4 acres of chaparral, and 20,875 acres of montane hardwood.

The Placer County Water Agency service area borders Folsom Lake. The lake is generally surrounded by oak woodland and annual grassland habitats. The rim of the reservoir is surrounded by a relatively barren band as a result of fluctuations in the water surface elevation. Only in areas near the mouths of the North and South Forks where water surface fluctuations are less dramatic have wetland and riparian vegetation been able to persist. Wildlife communities and special-status species found in the Placer County Water Agency service area are similar to those described above for specific habitats.

3.14.5 Special Status Wildlife Species. A large number of special-status wildlife species potentially use habitats in the project area. Species associated with habitats that do not occur in the project area would not be affected by the proposed action and alternatives and were not further considered. In addition to the federally listed species and species of concern, state listed species and California Species of Special Concern with the potential to occur in the project area were identified. Table 4-3 lists the special-status wildlife species with the potential to occur in the project area, each species state and federal status, and the general habitat types used by each species.

TABLE 3-2
SPECIAL-STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE AMERICAN RIVER DIVISION

Species	Status	General Habitat Association
LISTED AND PROPOSED SPECIES		
MAMMALS		
Salt marsh harvest mouse *Reithrodontomys raviventris*	Federal – E State – E	Saline emergent wetlands
BIRDS		
Bald Eagle *Haliaeetus leucocephalus*	Federal – T State – E; FP	Open water habitats, lakes, rivers, and marshes
Bank swallow *Riparia riparia*	Federal – none State – T	Riparian areas, nests in friable soils of vertical riverbanks
California black rail *Laterallus jamaicensis coturniclulus*	Federal – none State – T, FP	Freshwater and saline emergent wetlands
California clapper rail *Rallus longirostrius obsoletus*	Federal – E State – E, FP	Saline emergent wetlands

TABLE 3-2
SPECIAL-STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE AMERICAN RIVER DIVISION

Species	Status	General Habitat Association
Greater sandhill crane *Grus canadensis tabida*	Federal – none State – T	Freshwater emergent wetlands; agricultural fields
Little Willow Flycatcher *Empidonax traillii brewsteri*	Federal – none State – E	Montane riparian areas and wet meadows, in dense willows
Peregrine Falcon *Falco peregrinus anatum*	Federal – D State – E	Wetlands, lakes, rivers, grasslands, and agricultural fields
Swainson's Hawk *Bueto swainsoni*	Federal – none State – T	Mature riparian forests, oak groves, agricultural fields, grasslands
REPTILES		
Alameda whipsnake *Masticophis lateralis euryxanthus*	Federal – T State – T	Chaparral
Giant Garter Snake *Thamnophis gigas*	Federal – T State – T	Wetlands, sloughs, irrigation ditches, rice fields
AMPHIBIANS		
California Red-legged Frog *Rana aurora draytonii*	Federal – T State – CSC	Streams, ponds, marshes, and stock ponds
INVERTEBRATES		
Bay checkerspot butterfly	Federal – T State – none	Plantain plants on serpentine soils
Conservancy Fairy Shrimp *Branchinecta conservation*	Federal – E State – none	Vernal pools
Valley Elderberry Longhorn Beetle *Desmocercus californicus dimorphus*	Federal – T State – none	Elderberry shrubs in riparian areas, savannas, and woodlands
Vernal Pool Fairy Shrimp *Branchinecta lynchi*	Federal – T State – none	Vernal pools
Vernal Pool Tadpole Shrimp *Lepidurus packardi*	Federal – E State – none	Vernal pools
OTHER SPECIAL-STATUS SPECIES		
BIRDS		
Alameda song sparrow *Melospiza melidia pusillula*	Federal – SC State – CSC	Saline emergent wetlands
Aleutian Canada Goose *Branta canadensis leucopareia*	Federal – D State – none	Freshwater emergent wetlands and agricultural fields
Allen's hummingbird *Selasphorus sasin*	Federal – SC State – none	Chaparral, conifer forest
American bittern *Botaurus lentiginosus*	Federal – SC State – none	Freshwater emergent wetlands
American dipper *Cinclus mexicanus*	Federal – SLC State – none	Mountain streams
Bell's sage sparrow *Amphispiza belli belli*	Federal – SC State – CSC	Chaparral
Bewick's wren *Thryomanes bewickii*	Federal – SC State – none	Chaparral, riparian forest and scrub, oak woodlands
Black Swift *Cypseloides niger*	Federal – SC State – CSC	Coastal bluffs and mountain canyons
Black tern *Chlidonas niger*	Federal – SC State – CSC	Freshwater emergent wetlands; agricultural fields
California horned lark *Eremophila alpestris actia*	Federal – none State – CSC	Grasslands and open woodlands
California thrasher *Toxostoma redivivum*	Federal – SC State – none	Chaparral; riparian forest and scrub

TABLE 3-2
SPECIAL-STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE AMERICAN RIVER DIVISION

Species	Status	General Habitat Association
California spotted owl *Strix occidentalis occidentalis*	Federal – SC State – CSC	Conifer forest
Cooper's Hawk *Accipiter cooperii*	Federal – none State – CSC	Woodlands, riparian forests, and agricultural fields
Ferruginous Hawk *Buteo regalis*	Federal – SC State – CSC	Grasslands and agricultural fields
Flammulated owl *Otus flammeolus*	Federal – SC State – none	Conifer forest
Golden Eagle *Aquila chrysaetos*	Federal – none State – CSC; FP	Grasslands, open woodland, chaparral, wetlands, and agricultural areas
Grasshopper sparrow *Ammodramus savannarum*	Federal – SC State – none	Grassland
Hermit warbler *Dendroica occidentalis*	Federal – SC State – none	Oak woodland, conifer forest
Lark sparrow *Chondestes grammacus*	Federal – SC State – none	Oak woodland, grassland, chaparral
Lawrence's Goldfinch *Carduelis lawrencei*	Federal – SC State – none	Oak woodlands
Lewis' Woodpecker *Melanerpes lewis*	Federal – SC State – none	Open woodlands, savannas, and riparian areas
Loggerhead Shrike *Lanius ludovicianus*	Federal – SC State – CSC	Grasslands, savannas, and chaparral
Long-billed Curlew *Numenius americanus*	Federal – SC State – CSC	Wetlands, irrigated agricultural fields
Marbled godwit *Limosa fedoa*	Federal – SC State – none	Saline emergent wetlands, agricultural fields
Mountain Plover *Charadrius montanus*	Federal – SC State – CSC	Agricultural fields
Northern goshawk *Accipiter gentilis*	Federal – SC State – CSC	Conifer forest
Northern Harrier *Circus cyaneus*	Federal – none State – CSC	Freshwater and saline emergent wetlands, grasslands, and agricultural fields
Nuttall's Woodpecker *Picoides nuttallii*	Federal – SLC State – none	Riparian forest, oak woodland
Oak Titmouse *Baeolophus inornatus*	Federal – SLC State – none	Riparian forest, oak woodland
Olive-sided flycatcher *Contopus cooperi*	Federal – SC State – none	Conifer forest
Osprey *Pandion haliaetus*	Federal – none State – CSC	Open water habitats, lakes, and rivers
Pacific-slope flycatcher *Empidonax difficilis*	Federal – SC State – none	Conifer forest; oak woodland
Prairie Falcon *Falco mexicanus*	Federal – none State – CSC	Grasslands, agricultural fields, chaparral
Purple Martin *Progne subis*	Federal – none State – CSC	Grasslands, wet meadows, wetlands, woodlands, and riparian areas
Red-breasted sapsucker *Sphyrapicus ruber*	Federal – SC State – none	Conifer forest
Rufous Hummingbird *Selasphorus rutus*	Federal – SC State – none	Riparian areas, open woodlands, chaparral, orchards, and gardens
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	Federal – SC State – CSC	Saline and freshwater emergent wetlands

TABLE 3-2
SPECIAL-STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE AMERICAN RIVER DIVISION

Species	Status	General Habitat Association
Sharp-shinned Hawk *Accipiter striatus*	Federal – none State – CSC	Oak woodlands, riparian forests, and chaparral
Short-eared owl *Asio flammeus*	Federal – none State – CSC	Annual grasslands, freshwater emergent wetlands
Tri-colored Blackbird *Agelaius tricolor*	Federal – SC State – CSC	Freshwater emergent wetlands
Vaux's Swift *Chaetura vauxi*	Federal – SC State – CSC	Conifer forests
Western Burrowing Owl *Athene cunicularia hypougea*	Federal – SC State – CSC	Grasslands, pastures, agricultural fields, road embankments
White-faced Ibis *Plegadis chihi*	Federal – SC State – CSC	Freshwater emergent wetlands; agricultural fields
White-headed woodpecker *Picoides albolarvatus*	Federal – SC State – none	Conifer forest
White-tailed Kite *Elanus leucurus*	Federal – SC State – CSC; FP	Grasslands, oak savannas and woodlands, and open riparian areas and agricultural fields
Yellow-breasted Chat *Icteria virens*	Federal – none State – CSC	Riparian areas
Yellow Warbler *Dendroica petechia*	Federal – none State – CSC	Riparian areas
REPTILES		
California Horned Lizard *Phrynosoma coronatum frontale*	Federal – SC State – CSC	Grasslands, chaparral, and riparian areas
San Joaquin Coachwhip *Masticophis flagellum ruddocki*	Federal – SC State – CSC	Grassland, chaparral habitat
Silvery legless lizard Anniella pulchra pulchra	Federal – SC State – CSC	Chaparral; coastal scrub
Western Pond Turtle *Clemmys marmorata*	Federal – SC State – CSC	Wetlands, ponds, irrigation ditches, rivers, and streams
AMPHIBIANS		
California Tiger Salamander *Ambystoma californiense*	Federal – C State – CSC	Vernal pools and associated grasslands
Foothill Yellow-legged Frog *Rana boylii*	Federal – SC State – CSC	Large streams with open gravel bars and rocks
Mountain Yellow-legged Frog *Rana mucosa*	Federal – SC State – CSC	Lake, ponds and streams at elevations of 4,500 to 12,000 feet
Western Spadefoot Toad *Scaphiopus hammodii*	Federal – SC State – CSC	Quiet streams and pools in grasslands and woodlands
INVERTEBRATES		
Antioch Dunes Anthicid Beetle *Anthicus antiochensis*	Federal – SC State –none	Sandbars and sandy riparian areas
Bridge's Coast Range shoulderband snail *Helminthoglypta nickliniana bridgese*	Federal – SC State – none	Grassland
Button's Sierra sideband snail *Monadenis mormonum buttoni*	Federal – SC State – none	Conifer forest riparian areas
California linderiella fairy shrimp *Linderiella occidentalis*	Federal – SC State – none	Vernal pools
Curved-foot hygrotus diving beetle *Hygrotus curvipes*	Federal –SC State – none	Ponds, ditches and canals
Fairmont microblind harvestman *Microcina lumi*	Federal –SC State – none	Chaparral

TABLE 3-2
SPECIAL-STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE AMERICAN RIVER DIVISION

Species	Status	General Habitat Association
Gold rush handing fly *Obittacus obscures*	Federal – SC State – none	Conifer forest riparian areas
Midvalley Fairy Shrimp *Branchinecta mesovallensis*	Federal – SC State – none	Vernal pools
Molestan blister beetle *Lytta molesta*	Federal –SC State – none	Grassland
Ricksecker's water scavenger beetle *Hydrochara ricksecker*i	Federal – SC	Aquatic habitats and freshwater emergent wetland
Sacramento Anthicid Beetle *Anthicus sacramento*	Federal – SC State – none	Sandbars and sandy riparian areas
Sacramento Valley tiger beetle *Cicindela hirticolis abrupt*	Federal – SC State – none	Sandy soils along rivers, streams, and lakes
Sagehen Creek goracean caddisfly *Goeracea oregona*	Federal – SC State – none	Rocky streams
San Francisco lacewing *Nothochrysae californica*	Federal – SC State – none	Freshwater streams
South Forks ground beetle *Nebria darlingtoni*	Federal – SC State – none	Freshwater streams
Spiny rhycaophilan caddisfly *Rhyacophila spinata*	Federal – SC Statec – none	Mountain streams
MAMMALS		
American marten *Martes Americana*	Federal – SC State – none	Conifer forest
Fringed Myotis *Myotis thysanodes*	Federal – SC State – none	Foothill woodlands and mixed conifer-hardwood forests
Greater Western Mastiff Bat *Eumops perotis californicus*	Federal – SC State – CSC	Grassland, chaparral, woodlands and conifer forests
Long-eared Myotis *Myotis evotis*	Federal – SC State – none	Chaparral, woodlands, and conifer forests
Long-legged Myotis *Myotis volans*	Federal – SC State – none	Chaparral, woodlands, and conifer forests
Marysville Heerman's Kangaroo Rat *Dipodomys californicus eximius*	Federal – SC State – CSC	Grassland
Pacific fisher *Martes pennant*	Federal – SC State – CSC	Conifer forest
Pale Big-eared Bat *Corynorhinus townsendii palescens*	Federal – SC State – CSC	Grasslands, chaparral, woodlands, and conifer forests
Salt marsh vagrant shrew *Sorex vagrans halicoetes*	Federal – SC State – CSC	Saline emergent wetlands
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	Federal – SC State – SC	Riparian forest and scrub, chaparral, oak woodland
San Joaquin Pocket Mouse *Perognathus inornatus inornatus*	Federal – SC State – none	Grasslands and oak savannas
Sierra Nevada snowshoe hare *Lepis americanus tahoensis*	Federal – SC State – CSC	Conifer forest
Small-footed Myotis *Myotis ciliolabrum*	Federal – SC State – none	Open forests, woodlands, and chaparral
Spotted Bat *Euderma maculatum*	Federal – SC State – CSC	Grasslands and mixed conifer forests
Townsend's Western Big-eared Bat *Corynorhinus townsendii townsendii*	Federal – SC State – CSC	Grasslands, chaparral, woodlands, and conifer forests
Yuma Myotis	Federal – SC	Open forests and woodlands, open waters

TABLE 3-2
SPECIAL-STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR IN THE AMERICAN RIVER DIVISION

Species	Status	General Habitat Association
Myotis yumanensis	State – CSC	

Federal: E = Endangered
T = Threatened
PT = Proposed Threatened
SC = Species of Concern
SLC = Species of Concern
D = Delisted
C = Candidate for Federal Listing
State: E = Endangered
T = Threatened
CSC = California Species of Concern
FP = California Fully Protected

3.14.6 Special Status Plant Species. A large number of special-status plant species have the potential to occur in the project area. Species associated with habitats or environmental conditions that do not occur in the project area would not be affected by the proposed action and alternatives and were not further considered. In addition to the federally listed species and species of concern, state listed species and with the potential to occur in the project area were identified. Table 4-4 lists the special-status wildlife species with the potential to occur in the project area, each species state and federal status, and the general habitats and conditions each species prefers.

TABLE 3-3
SPECIAL-STATUS PLANTS WITH POTENTIAL TO OCCUR IN THE AMERICAN RIVER DIVISION

Species	Status	General Habitat Associations
LISTED AND PROPOSED SPECIES		
Boggs Lake hedge-hyssop *Gratiola heterosepala*	Federal – none State – E CNPS – 1B	Vernal pools
El Dorado bedstraw *Galium californinicum* ssp. *sierrae*	Federal – E State – R CNPS – 1B	Chaparral, gabbroic soils
Layne's butterweed *Senecio layneae*	Federal – E State – R CNPS – 1B	Chaparral, rocky, serpentine or gabbroic soils
Pallid manzanita *Arctostaphylols pallida*	Federal – T State – E CNPS – 1B	Chaparral; coastal scrub
Pine Hill ceanothus *Ceanothus roderickii*	Federal – E State – R CNPS – 1B	Chaparral, serpentine or gabbroic soils
Pine Hill flannelbush *Fremontodendron californicum* ssp*. decumbens*	Federal – E State – R CNPS – 1B	Chaparral, serpentine or gabbroic soils
Sacramento Orcutt grass *Orcuttia viscida*	Federal – E State – E CNPS – 1B	Vernal pools
Santa Cruz tarplant *Holocarpha macradenia*	Federal – T State – E CNPS – 1B	Coastal scrub, grassland
Scadden Flat checkermallow *Sidalcea stipularis*	Federal – none State – E CNPS – 1B	Freshwater emergent wetland
Slender Orcutt Grass *Orcuttia tenuis*	Federal – T State – E CNPS – 1B	Vernal pools
Soft bird's beak *Cordylanthus mollis* ssp. *mollis*	Federal – E State – R CNPS – 1B	Saline emergent wetlands
Stebbin's morning-glory *Calystegia stebbensii*	Federal – E State – E CNPS – 1B	Chaparral, serpentine/gabbroic soils
OTHER SPECIAL-STATUS SPECIES		
Ahart's rush *Juncus leiospermus* var. *Ahartii*	Federal – SC State – none CNPS – 1B	Vernal pools
Amador rush-rose *Helianthemum suffrutescens*	Federal – SLC State – none CNPS – 3	Chaparral
Bent-flowered fiddleneck *Amsinckia lunaris*	Federal – SLC State – none CNPS – 1B	Grassland, chaparral
Big-scale balsamroot *Balsamorhiza macrolepis var. macrolepis*	Federal – SC State – none CNPS – 1B	Chaparral; grassland
Brandegee's clarkia *Clarkia biloba* ssp. *brandegeae*	Federal – SLC State – none	Chaparral

TABLE 3-3
SPECIAL-STATUS PLANTS WITH POTENTIAL TO OCCUR IN THE AMERICAN RIVER DIVISION

Species	Status	General Habitat Associations
	CNPS – 1B	
Brewer's dwarf-flax *Hesperolinon breweri*	Federal – SC State – none CNPS – 1B	Chaparral, grassland, oak woodland
Chaparral harebell *Campanula exigua*	Federal – SC State – none CNPS – 1B	Chaparral, serpentine soils
Congdon's tarplant *Hemizonia parryi* ssp. *congdonii*	Federal – SC State – none CNPS – 1B	Grassland
Diablo helianthella *Helianthella castanea*	Federal – SC State – none CNPS – 1B	Riparian areas, chaparral, oak woodland, grassland
El Dorado mule-ears *Wyethia reticulata*	Federal – SC State – none CNPS – 1B	Chaparral, conifer forest, oak woodland
Fragrant fritillary *Fritillaria liliacea*	Federal – SC State – none CNPS – 1B	Grassland, chaparral, serpentine soils
Franciscan thistle *Cirsium andrewsii*	Federal – SC State – none CNPS – 1B	Coastal chaparral
Hall's bush mallow *Malacothamnus hallii*	Federal – SLC State – none CNPS – 1B	Coastal chaparral
Hispid bird's-beak *Cordylanthus millos* ssp. *hispidus*	Federal – SC State – none CNPS – 1B	Grassland
Legenere *Legenere limosa*	Federal – SC State – none CNPS – 1B	Vernal Pools
Most beautiful jewelflower *Streptanthus albidus* ssp. *peramoenus*	Federal – SC State – none CNPS – 1B	Chaparral, grassland, oak woodland
Mt. Diablo fairy-lantern *Calochortus pulchellus*	Federal – SLC State – none CNPS - 1B	Riparian, grassland, chaparral
Mt. Diablo jewelflower *Streptanthus hispidus*	Federal – SC State – none CNPS – 1B	Grassland, chaparral
Mt. Diablo phacelia *Phacelia phacelioides*	Federal – SC State – none CNPS – 1B	Chaparral
Oregon meconella *Meconella oregana*	Federal – SC State – none CNPS – 1B	Coastal chaparral
Pincushion navarretia *Navarretia myersii* spp. *myersii*	Federal – SC State – none CNPS – 1B	Vernal pools
Red Hills Soaproot *Chlorogalum grandiflorum*	Federal – SC State – none CNPS – 1B	Conifer forest, oak woodland and chaparral
Robust monardella *Monardella villosa* ssp. *globosa*	Federal – SLC State – none	Grassland, chaparral,

TABLE 3-3
SPECIAL-STATUS PLANTS WITH POTENTIAL TO OCCUR IN THE AMERICAN RIVER DIVISION

Species	Status	General Habitat Associations
	CNPS – 1B	
Rock sanicle *Sanicula saxatilis*	Federal – SC State – none CNPS – 1B	Grassland, chaparral
San Joaquin Spearscale *Atriplex joaquiniana*	Federal – SC State – none CNPS – 1B	Scrub habitat, grassland, meadows
Tiburon buckwheat *Eriogonum caninum*	Federal – SC State – none CNPS – 3	Grassland, chaparral
Valley Sagittaria S*agittataria sanfordii*	Federal – SC State – none CNPS – 1B	Freshwater emergent wetlands
Water sack clover T*rifolim depauperatum* var. *hdrophilum*	Federal – SC State – none CNPS – 1B	Vernal pools, freshwater emergent wetlands
Western leatherwood *Dirca occidetalis*	Federal – SLC State – none CNPS – 1B	Riparian areas, chaparral, coastal oak woodland and conifer forest

Federal: E = Endangered
T = Threatened
SC = Species of Concern (Former Category 2 Candidates)
SLC = Species of Local Concern
State: E = Endangered
T = Threatened
R = Rare
CNPS: 1B = Rare or Endangered in California and elsewhere
2 = Rare or Endangered in California, more common elsewhere
3 = Additional information needed to determine status

3.14.7 Environmental Consequences

3.14.7.1 Alternative 1: No Action. The No Action Alternative includes the operations of the CVP consistent with all requirements as described in the Biological Assessment for the Continued Long-term Operations of the Central Valley Project and the State Water Project (2008. This includes the reasonable and prudent alternatives contained in Delta Smelt BO and the CVP/SWP Operations BO. Execution of contracts with Roseville and PCWA with tiered pricing included would not alter CVP operations, water storage or release patterns from CVP facilities, temperature management plans, or the maximum volume of water delivered to the American River Division. It is also anticipated that growth would continue to occur as described in the county general plans Under the No Action Alternative, projections by the Department of Finance, City of Roseville, Placer County Water Agency, and Reclamation. The use of CVP water service contracts is not the sole factor driving growth and land use change. Demographic, economic, political, and other factors, independent of the water supply availability are causing changes with direct and indirect effects to land use that are beyond the range of Reclamation's responsibilities. All of the interim contract renewal actions are within the range of existing conditions. This includes the area of use, types of use, range of river flows, and reservoir fluctuations.

3.14.7.2 Alternative 2: Proposed Action. Wildlife resources under Alternative 2 would be identical to conditions under the No Action Alternative. Alternative 2 would not alter CVP operations, water storage or release patterns from CVP facilities, or the maximum volume of water to be delivered to the American River Division as compared to the No Action Alternative. Therefore, biological resource conditions under Alternative 2 would be identical to those under the No Action Alternative.

3.14.7.3 Cumulative Affects. The interim contract renewals in the American River Division would not result in cumulative impacts to biological resources in addition to those occurring under the Affected Environment and those addressed in environmental documents completed by Reclamation or local agencies. These issues were evaluated as part of previous environmental documentation. It is not foreseen that land use plans and resource conservation plans would change without additional environmental documentation. As Habitat Conservation Plans programs are prepared, additional environmental benefits to biological resources may occur.

3.15 RECREATION

Recreation opportunities described in this EIS are primarily related to activities at CVP facilities or along streams influenced by CVP activities and opportunities within the service areas of the CVP water service contractors.

3.15.1 Affected Environment

3.15.1.1 City of Roseville. Parks, public golf courses, and open spaces in the City are managed and maintained by the City Parks and Recreation Department. The City also manages pedestrian and bicyclist pathways, and non-traditional, park/open space areas such as vernal pool preserves, oak woodlands, and watershed/riparian areas, typically used for passive recreation and for visual and aesthetic enjoyment (Roseville, 1992).

In the City of Roseville, there are 39 parks, a community center, an interpretive center, a children's arts center, a civic center, two golf courses, 3 public pools, and other private recreational facilities (City of Roseville, 2003).

3.15.1.2 Placer County. Recreation areas in western and central Placer County serve the entire American River Division, and include areas within the Placer County Water Agency service area.

Numerous federal, state, and local jurisdictions and private entities provide recreation opportunities in Placer County. Park facilities and recreation opportunities in the County range from small neighborhood and community parks and programs to regional recreation areas, natural open space areas, public and private museums and historical sites, and specialized sports facilities (Placer County, 1994c).

Local parks in the western portion of the County are provided primarily by Placer County, the Auburn Recreation District, and incorporated cities such as Roseville, Rocklin, and Lincoln. Placer County owns 30 parks, campgrounds, community halls, trails, equestrian areas, reserves, and beaches. Two parks are currently under construction, In addition, Placer County and the California Department of Parks and Recreation are working on a plan to expand the existing network of trails throughout the American River Canyon (Placer County, 2003). Parks are concentrated mainly along the I-80 corridor between Roseville and Auburn. Unincorporated communities along I-80, such as Granite Bay, Penryn, Newcastle, Applegate, and Weimar, depend on nearby community facilities or incorporated city park facilities for local park and recreation facilities and programs (Placer County, 1994c).

Park and recreation facilities that are located in western and central Placer County include recreation areas at the following locations:

- Folsom Lake and Lake Clementine and along the American River managed by Reclamation and Department of Parks and Recreation
- Auburn State Recreation Area managed by California State Parks
- Camp Far West Reservoir managed by South Sutter Irrigation District
- Lake Combie and Rollins Reservoir managed by Nevada Irrigation District
- McBean Park in Lincoln
- Parks managed by Placer County (Alta Dutch Flat swimming pool, Sabre City, Treelake Park, Sheridan Community Park, Loomis Regional Park, Bear River Park, Sunrise-Loomis Park, Griffith Quarry Park, Miners Ravine Park, and North Park)
- French Meadows and Hell Hole Reservoir managed by Placer County Water Agency and U.S. Forest Service
- Lake Valley Reservoir managed by Pacfic Gas & Electric Company

3.15.2 Environmental Consequences

3.15.2.1 Alternative 1: No Action. The general plans for Sacramento and Placer counties and all of the CVP water service contractors in the American River Division recognize the importance of recreational opportunities and continue to provide protections and support for the recreational sites. Potential impacts associated with interim contract renewals would primarily be associated with changes in reservoir storage volumes or stream flows. The No Action Alternative includes the operations of the CVP consistent with all requirements as described in the Biological Assessment for the Continued Long-term Operations of the Central Valley Project and the State Water Project (2008). This includes the reasonable and prudent alternatives contained in the Delta Smelt BO and the CVP/SWP Operations BO.

3.15.2.2 Alternative 2: Proposed Action. Recreational opportunities in the American River Division under Alternative 2 would be identical to conditions under the No Action Alternative. Alternative 2 would not alter CVP operations, water storage or release patterns from CVP facilities, or the maximum volume of water to be delivered to the American River Division as compared to the No Action Alternative. Therefore, there are no environmental impacts of this alternative as compared to the No Action Alternative.

3.15.2.3 Cumulative Affects. The cumulative effect of future programs with interim contract renewals in the American River Division were considered as part of the PEIS. That analysis indicated that future projects, including future water transfer projects, may improve CVP water supply reliability and associated storage volumes in Trinity, Shasta, and Folsom lakes and flows in the American River. Therefore, reservoir and stream recreational opportunities would continue to occur within the historical ranges.

3.16 CULTURAL RESOURCES

Cultural resources could be affected by changes in reservoir or stream levels that would allow access to exposed artifacts or by disturbances due to development of CVP water service contractor service areas.

3.16.1 Affected Environment

Human occupation of northern California may have begun shortly after 8,000 years Before Present (B.P.), termed the early Milling Stone Horizon, representing a subsistence pattern based largely on wild seeds and other plant foods. Hokan groups may have been the earliest permanent inhabitants of California (Reclamation, et al., 1998).
A dramatic intensification of land use began around 4,000-5,000 years ago, possibly linked to a more moderate climate and related to changes in the distribution of plant species or to the appearance in the Central Valley of an early, riverine-adapted Penutian population. This marks the approximate beginning of the Early period. Surviving Early-period sites are rare in the Central Valley; most studies of them have concentrated on burials and associated artifacts, especially charmstones and shell beads and ornaments. Skeletal analyses have suggested that Early-period populations suffered from starvation (Reclamation, et al., 1998).

A cultural transition seems to have occurred in the region about 2,500 years ago, marked by changes in burial practices (increased evidence of cremation and of flexed burials), tool types (increased use of mortars and bone tools), and ceremonial items (changing styles of shell beads and ornaments and charmstones). This is referred to as the Middle Period or Middle Horizon; the transition may reflect the eastward spread of Miwok people from the Bay Area. Evaluation of Middle-period burials indicates that they suffered less nutritional stress (Reclamation, et al., 1998).

The Late Period in the Central Valley began sometime around 1,500 years ago, reflected by changes in archaeological assemblages throughout the region. Late Period sites reflect dense populations with highly developed social organizations, trade networks, food storage and redistribution systems, ceremonial/funerary complexes, and a strong sense of territoriality. The settlement and subsistence patterns changed possibly from more ingestion of acorns as a staple food and the increase in fishing implements and riverine fauna, which may have been triggered by a warm/dry interval at 1,500 B.P. that would have altered vegetation and hydrologic patterns, and the entry into central California of the ancestral Wintun. The increased regional population (and resulting increased population pressure) may have forced the intensified use of land and fish and shellfish resources. By the Proto-historic and Historic periods, fishing had become a primary

subsistence activity for Central Valley tribes who by that time had come to occupy relatively stable and well-defined territories centered on the major rivers (Reclamation, et al., 1998).

3.16.1.1 City of Roseville. Prior to exploration by Spanish explorers and American trappers, Roseville and the surrounding area was inhabited by the Valley Nisenan, also known as the Southern Maidu. The Nisenan made their home along tributaries and drainages of the American, Yuba, and Bear rivers and the lower reaches of the Feather River. Near Roseville, the Nisenan inhabited a major village named Pitchiku. Structures included brush shelters, sweat houses, acorn granaries, and dance houses. Two large permanent Nisenan sites located within the Maidu Regional Park in Roseville are listed in the National Register of Historic Places. These sites include petroglyphs, grinding rocks, a burial ground, and a midden area (Roseville, 1992).

Little Euro-American use of the Roseville area occurred prior to the discovery of gold in 1848. Exploration that did occur was conducted primarily by Spanish missionaries and American trappers. Soon after the discovery of gold, the region became heavily populated with prospectors, entrepreneurs, and others seeking easy fortunes. Roseville quickly became established as a railroad town and a local commerce center. Evidence of mining, including ditches, pits, small mounds, and low terraces, is still present along several of the creeks within the City. Within the City are 11 sites of historic and cultural importance (Roseville, 1992).

Historic sites include unmortared rock walls built by immigrants. Four historic isolated artifacts or features were recorded including two buildings on the Diamond K Ranch property identified as eligible for the National Register of Historic Places. These buildings have been preserved and will not be affected by future development. Other historic sites identified in a 1986 survey consist of an old wooden stave pipeline and a barn was constructed in about 1910 using mortise and tenon construction, which is a highly unusual construction method used in California after 1850. The City has planned a public park around the barn (Roseville, 1992).

3.16.1.2 Placer County. Cultural resources in western and central Placer County may be affected by operations of Placer County Water Agency. Placer County is known to have been occupied by two groups of Native Americans; west of the Sierra Nevada crest were the Nisenan, and east of the Sierran crest were the Washo Indians, whose territory centered on the Tahoe Basin and included the Truckee River Valley. Descendants of the Nisenan are known to live in Placer County (Placer County, 1994).

Both the Nisenan and the Washo were hunter-gatherers. The Washo lived a much more mobile life in smaller groups than the Nisenan. The migratory patterns of the two groups have left unique archaeological remains that include habitation sites, burial sites, and resource procurement and processing sites (Placer County, 1994).

The first documented presence of North Americans of European descent in Placer County was during the 1840s. The earliest towns were Auburn (founded in 1849), Ophir (1852), and Rattlesnake (1853). The economic development of the county was originally based on mining of gold, then coal, granite, iron, copper, quartz, and clay. Timber and agriculture became important industries; by 1869, 15 saw mills produced 17 million board feet of lumber in the county (Placer County, 1994).

Agricultural activity began because of the need for fruit, vegetables, and flour to feed the miners and immigrants during the gold rush. During the 1920s, Placer County was considered the largest fruit-producing area in the state. In the late 1950s, a disease called "pear decline" and the lower yield of foothill ranches compared to those in the valley contributed to the demise of Placer County's fruit industry. Dairy farming became locally important after the decline of the fruit industry, but by 1960 had also diminished significance. Other agricultural enterprises in the county include raising beef cattle, horses, rice, sheep, turkeys, and producing honey, wine, and brandy (Placer County, 1994).

The Central Pacific Railroad completed track from Sacramento to Auburn in 1865. Placer County's growth and development was greatly enhanced by the Central Pacific Railroad. Few early gold rush era buildings are left in Placer County because early miners and immigrants generally lived outside or in cloth tents; several buildings, structures, and features are left from the later mining era. In addition, structures associated with the early lumber mills, buildings and other features associated with the fruit-growing industry, Depression-era concrete bridges, and other historic resources such as school houses, residences, commercial buildings, community halls, churches, and cemeteries exist throughout the County (Placer County, 1994).

3.16.2 Environmental Consequences

3.16.2.1 Alternative 1: No Action. Potential impacts to cultural resources for the interim contract renewals would be primarily related to secondary growth issues. Under the No Action Alternative, it is anticipated that growth would continue to occur as described in the county general plans, projections by the Department of Finance, City of Roseville, Placer County Water Agency, and Reclamation. The use of CVP water service contracts is not the sole factor driving growth and land use change. Demographic, economic, political, and other factors, independent of the water supply availability are causing changes with direct and indirect effects to land use that are beyond the range of Reclamation's responsibilities. All of the interim contract renewal actions are within the range of existing conditions. This includes the area of use, types of use, range of river flows, and reservoir fluctuations.

3.16.2.2 Alternative 2: Proposed Action. Factors influencing regional growth in the American River Division under Alternative 2 would be identical to conditions under the No Action Alternative. Therefore, there are no environmental impacts of this alternative as compared to the No Action Alternative.

3.16.2.3 Cumulative Effects. The cumulative effect of future programs with interim contract renewals in the American River Division were considered as part of the PEIS. That analysis indicated that future projects, including future water transfer projects, may improve CVP water supply reliability. These types of programs would modify water supply reliability but not change long-term CVP contract amounts or deliveries from within the historical ranges.

3.17 INDIAN TRUST ASSETS

3.17.1 Affected Environment

There are three Native American resources and sites within or near the American River Division, including tribal trust assets recognized by the Bureau of Indian Affairs, as shown in Table 4-8.

TABLE 3-4

INDIAN TRUST ASSETS IN AMERICAN RIVER DIVISION

Indian Trust Asset	Nearest CVP Water Service Contractor	Comments
Auburn Rancheria	Placer County Water Agency	Miwok Tribe near Auburn, Placer County
Shingle Springs Rancheria	near El Dorado Irrigation District	Miwok Tribe - 160 acres near El Dorado, El Dorado County
Wilton Rancheria	near Sacramento Municipal Utility District and Sacramento County Water Agency	Tribal affiliation unknown near Wilton, Sacramento County Rancheria was terminated in 1964 and transferred into fee title (Reclamation, et al., 1998)

Source: Welch, Patrick, pers. comm., 2001.

3.17.2 Environmental Consequences

3.17.2.1 Alternative 1: No Action. Indian Trust Assets in the American River Division would be the same as described under existing conditions. The assets are not directly located within or adjacent to CVP facilities.

3.17.2.2 Alternative 2: Proposed Action. Conditions at Indian Trust Assets in the American River Division would be identical under Alternative 1 as under the No Action Alternative. Therefore, there are no environmental impacts of this alternative as compared to the No Action Alternative.

3.17.2.3 Cumulative Affects. The cumulative affect of future programs with long-term contract renewals in the American River Division were considered as part of the PEIS and in environmental documents for other programs, as discussed in Chapter 3. That analysis indicated that future projects, including future water transfer projects, may improve CVP water supply reliability. These types of programs would modify water supply reliability but not change long-term CVP contract amounts or deliveries from within the historical ranges or cause additional construction activities or access near the Indian Trust Assets.

3.18 AIR QUALITY

Most of the air pollutants in Sacramento, Placer, and El Dorado counties may be associated with either urban or agricultural land uses. Pollutants commonly associated with agricultural land uses include particulate matter less than 10 microns in diameter (PM_{10}), carbon monoxide (CO),

nitrogen oxides (NO_x), and ozone precursors. No clear relationship exists between agricultural acres and the occurrence or resulting concentrations of ozone (O_3) and PM_{10} in the atmosphere. Several variables other than land uses can affect air quality conditions, and these variables may change over time.

3.18.1 Affected Environment

3.18.1.1 Climate. The climate in northern and central Sacramento County, including City of Folsom, Expanded Zone 40, San Juan Water District, SMUD Rancho Seco site, and agricultural areas located south of Expanded Zone 40; and City of Roseville in western Placer County is characterized by cool, wet winters and hot, dry summers. The seasons are so distinctly different that the period from May to October may be termed the dry season and November to April the wet season. Precipitation varies throughout the area, ranging from 16 to 20 inches on the valley floor to about 70 inches in the foothills near Folsom Lake. Annual precipitation occurs almost entirely between November to March (Reclamation, et al., 1998). Winds in the area tend to be fairly strong and predominate from the west through the Carquinez Strait from the Pacific Ocean (SMUD, 1994). During the winter, the sea breezes diminish and winds from the north occur more frequently; however, winds from the south still predominate. Between late spring and early fall, a layer of warm air often overlays a layer of cool air from the Delta and the San Francisco Bay, resulting in an inversion. Air pollution problems tend to develop when calms combine with inversions (Roseville, 1992).

The areas served with CVP water by Placer County Water Agency and EID are in a transition zone between the climate of the Central Valley and that of the higher Sierra Nevada Mountains. Most winds on the western slopes are from the west and southwest. Summer winds allow for good local mixing, but often bring air pollutants from the Central Valley and Bay Area. During the winter, winds are from the south or southeast (El Dorado County, 1994). In addition to the wind patterns that affect the rate and orientation of horizontal pollutant transport, temperature inversions control the vertical depth through which pollutants are mixed.

3.18.1.2 Air Quality. Air quality is regulated in accordance with federal and state mandates. These regulations are enforced by local and regional authorities. The federal Clean Air Act was passed in 1967, and provided the first national program to control pollution from automobiles and stationary sources. The U.S. Environmental Protection Agency (USEPA) subsequently established national ambient air quality standards in 1971 for the following air pollutants: O_3, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and PM_{10}.

California ambient air quality standards were established by the California Air Resources Board starting in 1969, pursuant to the Mulford-Carrell Act. The California ambient air quality standards are generally more stringent and include more pollutants than the national ambient air quality standards.

Sacramento County and western Placer County (west of Colfax) are located in the Sacramento Valley Air Basin. The eastern portion of Placer County Water Agency (east of Colfax) and the portion of EID served by CVP water service contracts are located in the Mountain Counties Air Basin. The EBMUD service area is located in the San Francisco Bay Area Air Basin. Eleven air

quality monitoring stations existed in the Sacramento County portion of the Sacramento Valley Air Basin as of 2000-2001. Within the Mountain Counties Air Basin in 2000-2001, there were two monitoring stations in El Dorado County and one monitoring station in Placer County. Within the EBMUD service area, there are two monitoring stations in Alameda County and three monitoring stations in Contra Costa County.

3.18.1.3 Portion of the Study Area in Sacramento Valley Air Basin. Sacramento County (including the City of Folsom, San Juan Water District, Expanded Zone 40, SMUD Rancho Seco site, and agricultural areas located south of Expanded Zone 40) and western Placer County (including City of Roseville and most of Placer County Water Agency) are located in the Sacramento Valley Air Basin.

Sacramento County is within the jurisdiction of the Sacramento Metropolitan Air Quality Management District. The District's overall mission is to achieve clean air goals by leading the region in protecting public health and the environment.

Suspended particulates are generally a regional problem, except when intense emission sources (such as construction activities) affect a small area (Reclamation et al., 1998). In the Sacramento area, pollutants of greatest concern include ozone precursors (reactive organic gases (ROG) and nitrogen oxides[NO_x]), CO, PM_{10}, and other visibility-reducing material. The largest single source of pollutants in the Sacramento area is automobile exhaust; O_3 and CO pollution are largely attributable to automobile use. Other sources, such as agricultural and construction/demolition activities, also contribute to high levels in suspended particulates (Reclamation et al., 1998). Prior to 1991, the Sacramento Area Council of Governments was responsible for preparing state implementation plans required by the federal Clean Air Act for the Sacramento Air Quality Maintenance Area. Since 1991, local air districts are responsible for preparing state implementation plans with Sacramento Area Council of Governments taking a support role in document preparation (Placer County, 1994c).

The Placer County Air Pollution Control District, headquartered in Auburn, is responsible for managing the County's air quality in a manner to protect and promote public health by controlling and seeking reductions of air pollutants while recognizing and considering the economic and environmental impacts. The District performs several functions:

- Monitors air quality
- Controls air pollution from stationary sources
- Enforces the Statewide Portable Equipment Program
- Responds to citizen complaints regarding air pollution
- Works with County fire districts and agencies
- Administers the County Burn Program
- Assists applicants for land use projects
- Reviews land use development proposals
- Prepares long-range attainments plans for state and federal clean air acts
- Provides information regarding funding opportunities and grants for projects intended to improve air quality in the County

The primary sources of PM_{10} in Placer County are entrained road dust and construction and demolition activities. No CO monitoring stations are located in Placer County; the entire county has been designated as unclassified for CO. The primary source of CO emissions in Placer County is motor vehicle emissions. Ozone is monitored at stations located in Rocklin, Auburn, and in Colfax. Ozone problems are the cumulative result of regional development patterns, rather than the result of a few significant sources. Motor vehicles are the primary source of Placer County NO_x and ROG emissions (NO_x and ROG are precursors to O_3 formation) (Placer County, 1994c).

3.18.1.4 Portion of the Study Area in Mountain Counties Air Basin. Areas served by CVP water in EID and areas of Placer County Water Agency located in Colfax or east of Colfax are in the Mountain Counties Air Basin. Within El Dorado County, primary responsibility for air pollution monitoring and control from stationary sources lies with the El Dorado County Air Quality Management District.

As part of the 1988 California Clean Air Act, air districts that are in violation of state ambient air quality standards are required to prepare plans to bring their jurisdictions into compliance with air quality standards. The California Air Resources Board reviews and approves the plans and coordinates the statewide air pollution effort. The El Dorado County Air Quality Management District performs several functions:

- Prepares plans for the attainment of ambient air quality standards
- Adopts and enforces rules and regulations concerning sources of air pollution
- Issues permits for stationary sources of air pollution
- Inspects stationary sources of air pollution
- Responds to citizen complaints
- Monitors ambient air quality and meteorological conditions
- Implements programs and regulations required by the federal and California Clean Air Acts (El Dorado County, 2003)

Air quality in El Dorado County is affected by both stationary sources and mobile sources. Stationary source emissions are composed of point source and area source emissions. Point sources of emissions are limited in the County. They include emissions produced from mining operations, lumber processing, and industrial boilers. Area sources include refuse burning; wildfires; service station operations; pesticide use; farm equipment operations; construction equipment operations; utility equipment; range improvement; forest management; residential wood combustion; residential space and water heating; fuel production and transfer; formulation and application of paints, solvents, and other coatings; organic waste disposal; dry cleaning operations; soil decontamination; wastewater processing; and graphic arts processes. Limited data are available on the amount of area source emissions currently being produced in El Dorado County (El Dorado County, 1994).

Mobile sources include automobiles, trucks, buses, and other vehicles. Vehicle pollutants are produced by vehicles traveling within the County, but are also carried into the County by prevailing wind patterns from the Sacramento County urbanized area and the San Francisco Bay

Area. Vehicular traffic along U.S. Highway 50 between Sacramento and South Lake Tahoe is also a significant contributor of contaminants (El Dorado County, 1994).

3.18.2 Environmental Consequences

3.18.2.1 Alternative 1: No Action. Potential impacts to air quality for the interim contract renewals would be primarily related to secondary growth issues. Under the No Action Alternative, it is anticipated that growth would continue to occur as described in the county general plans, projections by the Department of Finance, City of Roseville, Placer County Water Agency, and Reclamation. The use of CVP water service contracts is not the sole factor driving growth and land use change. Demographic, economic, political, and other factors, independent of the water supply availability are causing changes with direct and indirect effects to land use that are beyond the range of Reclamation's responsibilities. All of the interim contract renewal actions are within the range of existing conditions. This includes the area of use, types of use, range of river flows, and reservoir fluctuations.

3.18.2.2 Alternative 2: Proposed Action. Factors influencing regional growth in the American River Division under Alternative 2 would be identical to conditions under the No Action Alternative. Therefore, there are no environmental impacts of this alternative as compared to the No Action Alternative.

3.18.2.3 Cumulative Affects. The cumulative affect of future programs with interim contract renewals in the American River Division were considered as part of the PEIS. That analysis indicated that future projects, including future water transfer projects, may improve CVP water supply reliability. These types of programs would modify water supply reliability but not change long-term CVP contract amounts or deliveries from within the historical ranges.

3.19 SOILS

Soils could be affected by changes in reservoir or stream levels that would allow increase erosion or by disturbances due to development of CVP water service contractor service areas.

3.19.1 Affected Environment

3.19.1.1 Sacramento County and Western Placer County. The area in Sacramento County served by CVP water service contracts and areas in the adjacent Sacramento metropolitan areas and the southwestern areas of Placer County are located in the Central Valley Province. This province is composed of tertiary sediments and volcanic material, and is a northwest-trending asymmetric trough 400 miles long and averaging 50 miles wide. It is bound on the west by the pre-Tertiary and Tertiary semi-consolidated to consolidated marine sedimentary rocks of the Coast Range. The faulted and folded sediments of the Coast Range extend eastward beneath most of the Central Valley. The east side of the valley is underlain by pre-Tertiary igneous and metamorphic rocks of the Sierra Nevada.

Pre-Tertiary marine sediments account for about 25,000 feet of the total amount of sediments deposited in the sea before the rise of the Coast Range. Marine deposits continued to fill the

Sacramento Valley until the Miocene Epoch and portions of the San Joaquin Valley until the late Pliocene, when the last seas receded from the valley. Then continental alluvial deposits from the Coast Range and the Sierra Nevada began to collect in the newly formed valley. In total, the Sacramento and San Joaquin valleys are filled with about 10 and 6 vertical miles of sediment, respectively.

The valley floor is divided into several geomorphic land types including dissected uplands, low alluvial fans and plains, river flood plains and channels, and overflow lands and lake bottoms. The dissected uplands consist of consolidated and unconsolidated continental deposits of Tertiary and Quaternary that have been slightly folded and faulted.

The alluvial fans and plains consist of unconsolidated continental deposits that extend from the edges of the valleys toward the valley floor. The alluvial plains cover most of the valley floor and make up some of the intensely developed agricultural lands in the Central Valley. Alluvial fans along the Sierra Nevada consist of high percentages of clean, well sorted gravel and sand.

River flood plains and channels lie along the major rivers and to a lesser extent the smaller streams that drain into the valley from the surrounding Coast Range and Sierra Nevada. Some flood plains are well-defined where rivers are incised into their alluvial fans. These deposits tend to be coarse and sandy in the channels and finer and silty in the flood plains. Many of these deposits have been used for gravel mining activities.

Calcic brown and noncalcic brown alluvial soils are found in the Sacramento Valley on deep alluvial fans and flood plains occurring in intermediate rainfall (10 to 20 inches annually). These two soils tend to be brown to light brown with a loam texture that forms soft clods. Calcic brown soil is calcareous; noncalcic soil is usually neutral or slightly acid. These soils are highly valued for irrigated crops.

Terrace soils characterized by a red-iron hardpan layer are found along the east side of the Sacramento Valley. These soils consist of reddish surface soil with a dense silica-iron cemented hardpan, which is generally 1 foot thick. Some of these hardpan soils have considerable amounts of lime. Dry farming practices support hay, grains, and pastures, although following ripping, these soils are well suited for orchards and vineyards. These soils are subject to expansive traits which could lead to special building design criteria. These soils are subject to localized landslides and erosion, especially along road cuts or stream banks.

Sacramento County contains no known fault zones or Alquist-Priolo special studies zones. However, the area is subject to influence from fault zones in the surrounding counties (Sacramento County, 1993). Western Placer County also has low seismic potential (Placer County, 1994).

3.19.1.2 Central Placer County and Western/Central El Dorado County. The area in Central Placer County (east of Rocklin) and areas within western and central El Dorado County that are served by CVP water service contract water are located in the Sierra Nevada Province. This province is generally composed of Mesozoic Sierran granitic batholiths and associated older metamorphic rocks. In some areas of the northern Sierra Nevada, Tertiary

sediments and volcanic material overlies the igneous core. The Sierra Nevada resembles a tilted plateau that is depressed on the west side with the eastern side elevated. The Sierra Nevada batholiths rises from beneath the sediments of the Central Valley at 3 to 5 degrees to its highest point in eastern peaks before it abruptly drops off along a fault escarpment. This fault marks the eastern end of the Sierra Nevada and the western limit of the Basin and Range Province.

The terrace soils from the Central Valley Province area extend into this area. Upland soils continue onto the hilly to mountainous topography and are formed in place through the decomposition and disintegration of the underlying parent material. The more widespread upland soil groups include shallow depth, moderate depth, and deep depth to bedrock. Soils on the east side of the Sacramento Valley have mostly developed on igneous rocks. In the study area, the upland soils are primarily shallow. The soil has a loam-to-clay-loam texture with low organic matter, and some areas have calcareous subsoils. These soils usually have a shallow depth to weathered bedrock, less than 2 feet. These soils are found in areas of low to moderate rainfall that support grasslands used primarily for grazing. Tilled areas are subject to considerable erosion.

Potential for seismic activity is low, however the area can be influenced by seismic events in the eastern Sierra Nevada. The soils are subject to erosion and landslides near road cuts and stream banks. Gravel mining occurs in some streams that are characterized by rocky cobbles.

3.19.2 Environmental Consequences

3.19.2.1 Alternative 1: No Action. Potential impacts to soils for the interim contract renewals would be primarily related to secondary growth issues. Under the No Action Alternative, it is anticipated that growth would continue to occur as described in the county general plans, projections by the Department of Finance, City of Roseville, Placer County Water Agency, and Reclamation. The use of CVP water service contracts is not the sole factor driving growth and land use change. Demographic, economic, political, and other factors, independent of the water supply availability are causing changes with direct and indirect effects to land use that are beyond the range of Reclamation's responsibilities. All of the interim contract renewal actions are within the range of existing conditions. This includes the area of use, types of use, range of river flows, and reservoir fluctuations.

3.19.2.2 Alternative 2: Proposed Action. Factors influencing regional growth in the American River Division under Alternative 2 would be identical to conditions under the No Action Alternative. Therefore, there are no environmental impacts of this alternative as compared to the No Action Alternative.

3.19.2.3 Cumulative Affects. The cumulative affect of future programs with interim contract renewals in the American River Division were considered as part of the PEIS. That analysis indicated that future projects, including future water transfer projects, may improve CVP water supply reliability. These types of programs would modify water supply reliability but not change long-term CVP contract amounts or deliveries from within the historical ranges.

3.20 VISUAL RESOURCES

Visual resources could be affected by changes in reservoir or stream levels or by construction at the CVP facilities.

3.20.1 Affected Environment

3.20.1.1 Folsom Lake and Lake Natoma. Folsom Lake, a man-made reservoir consisting of nearly 75 miles of shoreline, is a significant visual entity that contrasts sharply with the foothill landscape, creating a vivid landscape. Reservoir levels are drawn down as summer progresses creating a ring of bare soil along the water's edge. This ring is a dominant negative visual feature, affecting the visual quality of the area, and is accentuated in dry years. Folsom Lake is generally considered to provide a pleasing visual setting (Reclamation, et al., 1998). Views of Folsom Lake have become increasingly limited due to restricted access and residential development abutting public lands and recreation areas (Water Forum, 1999).

Lake Natoma, the regulating reservoir for releases from Folsom Dam, is a long, narrow lake. Land surrounding the lake is mostly undeveloped and consists primarily of wooded and undeveloped canyon areas, sheer bluffs, and dredge tailings (cobble piles remaining from the gold mining era).

3.20.1.2 City of Roseville. The City of Roseville lies in transitional topography between the Sacramento Valley and the Sierra Nevada foothills. Terrain ranges from gently sloping hills to wooded ravines and open space areas. Roseville is characterized by a mix of older and newer development. Typical views include existing urban development, natural and altered open spaces, and open space corridors. Areas in the City that provide visual opportunities include the many creeks, City parks and recreation areas, community-wide parks, open space areas adjacent to ravines, golf courses, and resource preserves. Among the most prominent views from major roadway corridors include views of Miner's Ravine from Eureka Road at I-80, views from Old Auburn Road near the Sacramento County border, and views of Dry Creek from roadways in the downtown area. Urban areas that offer visual interest and are unique to Roseville include Old Town and Downtown (Roseville, 1992).

3.20.1.3 Placer County Water Agency. Placer County has a diverse physical and natural environment and as such, it exhibits variety in its visual resources. Landscapes in the County include the urban areas of Roseville, Auburn, Rocklin, Lincoln, and other small unincorporated communities; timber production and mineral extraction areas; agricultural preserves (lands under Williamson Act contract); areas for preservation of natural resources; recreation areas such as the Granite Chief Wilderness, the Folsom Lake State Recreation Area, and the Auburn State Recreation Area; U.S. Forest Service lands, Bureau of Land Management lands, and private ski areas along I-80 and State Highway 89. Placer County rivers, streams, lakes, and reservoirs add a significant element to the County's visual resource inventory (Placer County, 1994).

3.20.2 Environmental Consequences

3.20.2.1 Alternative 1: No Action. Potential impacts to visual resources for the interim contract renewals would be primarily related to secondary growth issues. Under the No Action Alternative, it is anticipated that growth would continue to occur as described in the county general plans, projections by the Department of Finance, City of Roseville, Placer County Water Agency, and Reclamation. The use of CVP water service contracts is not the sole factor driving growth and land use change. Demographic, economic, political, and other factors, independent of the water supply availability are causing changes with direct and indirect effects to land use that are beyond the range of Reclamation's responsibilities. All of the interim contract renewal actions are within the range of existing conditions. This includes the area of use, types of use, range of river flows, and reservoir fluctuations.

3.20.2.2 Alternative 2: Proposed Action. Factors influencing regional growth in the American River Division under Alternative 2 would be identical to conditions under the No Action Alternative. Therefore, there are no environmental impacts of this alternative as compared to the No Action Alternative.

3.20.2.3 Cumulative Affects. The cumulative affect of future programs with interim contract renewals in the American River Division were considered as part of the PEIS. That analysis indicated that future projects, including future water transfer projects, may improve CVP water supply reliability. These types of programs would modify water supply reliability but not change long-term CVP contract amounts or deliveries from within the historical ranges.

3.21 ENVIRONMENTAL JUSTICE

3.21.1 Affected Environment

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires all federal agencies to adopt strategies to address environmental justice concerns within the context of agency operations. The Census of Population and Housing and the California Department of Finance, Demographic Research Unit compiles numbers of both minority and property residents. Minority populations included in the census are identified as Black; American Indian, Eskimo, or Aleut; Asian or Pacific Islander; Hispanic; or Other, as summarized in Table 4-9. It is not possible to identify the specific ethnicity of individual areas served by CVP water.

TABLE 3-5
ETHNIC DIVERSITY IN AMERICAN RIVER DIVISION

Sacramento County

Year	White	Hispanic	Asian & Pacific Islander	Black	American Indian	Total
1990	727,447	122,959	93,594	95,034	9,976	1,049,010

TABLE 3-5
ETHNIC DIVERSITY IN AMERICAN RIVER DIVISION

2000	772,453	161,797	142,862	122,635	12,780	1,212,527
2010	826,680	218,551	218,143	157,184	15,728	1,436,286
2020	864,828	284,772	287,365	196,190	18,610	1,651,765
2030	892,152	367,793	368,164	234,847	21,254	1,884,210

Placer County

Year	White	Hispanic	Asian & Pacific Islander	Black	American Indian	Total
1990	154,578	14,100	3,705	988	1,608	174,979
2000	212,634	20,896	6,540	1,604	1,972	243,646
2010	279,802	30,343	10,597	2,230	2,676	325,648
2020	329,820	41,126	14,023	2,892	3,384	391,245
2030	376,172	54,773	18,081	3,546	4,072	456,644

El Dorado County

Year	White	Hispanic	Asian & Pacific Islander	Black	American Indian	Total
1990	114,737	8,933	2,331	581	1,204	127,396
2000	143,492	13,543	3,827	748	1,587	163,197
2010	185,939	20,427	5,844	932	2,013	215,155
2020	216,407	28,676	7,521	1,106	2,409	256,119
2030	242,982	38,913	9,457	1,241	2,752	295,345

Contra Costa County

Year	White	Hispanic	Asian & Pacific Islander	Black	American Indian	Total
1990	562,840	92,310	74,784	73,224	4,450	807,608
2000	595,579	128,844	115,549	87,000	4,974	931,946
2010	610,578	165,154	146,993	97,846	5,286	1,025,857
2020	613,699	205,627	170,772	109,182	5,445	1,104,725
2030	609,372	256,969	199,286	118,458	5,416	1,189,501

Alameda County

TABLE 3-5
ETHNIC DIVERSITY IN AMERICAN RIVER DIVISION

Year	White	Hispanic	Asian & Pacific Islander	Black	American Indian	Total
1990	682,947	183,577	187,527	223,994	6,780	1,284,825
2000	648,127	267,915	295,366	251,959	6,788	1,470,155
2010	611,935	343,463	417,633	274,310	7,144	1,654,485
2020	554,490	415,804	516,352	299,151	7,342	1,793,139
2030	485,412	502,217	627,276	316,369	7,273	1,938,547

Source: California Department of Finance, 1998.

The U.S. Census Bureau estimates poverty levels by county. In 1999 in Alameda County, it is estimated that 11.0 percent of the population was in poverty. In Contra Costa County, an estimated 7.6 percent of the population was in poverty. In El Dorado County, an estimated 7.1 percent of the population was in poverty. In Placer County, an estimated 5.8 percent of the population was in poverty. In Sacramento County, an estimated 14.1 percent of the population was in poverty (U.S. Census Bureau, 2003a, 2003b, 2003c, 2003d, and 2003e).

In 2000, Alameda County had a civilian labor force of 740,400. Civilian employment was 718,500 and unemployment was 21,900, equaling an unemployment rate of 3 percent. Per capita income in 1999 was $34,131, with the average wages per job equal to $40,563 (California Department of Finance 2002a).

In 2000, Contra Costa County had a civilian labor force of 505,100. Civilian employment was 491,400 and unemployment was 13,700, equaling an unemployment rate of 2.7 percent. Per capita income in 1999 was $37,994, with the average wages per job equal to $40,306 (California Department of Finance 2002b).

In 2000, El Dorado County had a civilian labor force of 82,500 eligible adults of which 79,300 individuals were employed. This was equivalent to an unemployment rate of 3.9 percent. Average per capita income in 1999 was $28,487, with the average wages per job equal to $27,305 (California Department of Finance, 2002c).

In Placer County in 2000, there was a civilian labor force of 124,800 eligible adults of which 120,800 individuals were employed, equaling an unemployment rate of 3.2 percent. Average per capita income in 1999 was $34,972, with the average wages per job equal to $31,608 (California Department of Finance, 2002d).

In 2000, in Sacramento County, the civilian labor force was 605,800 eligible adults of which 580,100 individuals were employed, equaling an unemployment rate of 4.2 percent. Average per capita income in 1999 was $27,485, with the average wages per job equal to $34,938 (California Department of Finance, 2002e). Although the per capita incomes for these counties is higher than the poverty level, it may be difficult for many people to maintain a household on these wages.

3.21.2 Environmental Consequences

3.21.2.1 Alternative 1: No Action. Changes to minority or low-income populations are projected to occur as indicated in Table 3-5. Execution of interim contracts with Roseville and PCWA will not alter total water supplies in the American River Division.

3.21.2.2 Alternative 2: Proposed Action. Impacts to Environmental Justice issues in the American River Division counties under Alternative 1 would be identical to conditions under the No Action Alternative. Alternative 2 would not alter total water supplies in the American River Division. Therefore, there are no environmental impacts of this alternative as compared to the No Action Alternative.

3.21.2.3 Cumulative Affects. Several factors could influence future growth rates. Economic recessions in the high technology industries or the cost of living could limit economic growth which could reduce the number of individuals that could afford housing in the Sacramento, Placer, and El Dorado counties as well as in the EBMUD service area. Land use restrictions due to resource protections and limitations of public works facilities including water supply, treatment, and distribution facilities also could change future growth patterns.

Chapter 4
Consultation and Coordination

4.1 Introduction

The following federal laws have directed, limited, or guided the NEPA analysis and decision-making described in the EA.

4.2 Fish and Wildlife Coordination Act (16 USC § 651 et seq.)

The Fish and Wildlife Coordination Ace (FCWA) requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. The implementation of the CVPIA, of which their action is a part, has been jointly analyzed by Reclamation and the FWS and is being jointly implemented. The Proposed Action would not involve construction projects; therefore, the FWCA does not apply.

4.3 Endangered Species Act (16 USC § 1531 et seq.)

Section 7 of the ESA requires Federal agencies, in consultation with the Secretaries of Commerce and the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, of result in the destruction or adverse modification of the critical habitat for these species.

The Proposed Action would support existing uses and conditions. Interim contract renewal contracts would not change the amount of water contracted, the authorized uses, or authorized place of use of the contracted water supply. A Biological Assessment detailing the effects of contract renewals was prepared and formally submitted to the USFWS and NMFS as part of the long-term contract renewal process (USBR, 2004). Reclamation concluded that the renewal of long-term American River Division contracts may affect, but not likely adversely affect listed fish species or critical habitat because contract renewals would not affect the habitat or populations of those sensitive fish, wildlife, or plant species that have a moderate potential of occurring in the Division's contractor service areas; and, that the measures required to protect listed species due to the operations of the CVP have been established as part of the separate criteria contained in ongoing BOs on CVP operations, by the CVPIA, and by hydrologic conditions. An identical determination has been reached for the Proposed Action.

The NMFS determined that the effects of long-term contract renewals were wholly and previously considered as part of the then current Biological Opinion on CVP and SWP Project operations and that no additional measures were required in their June 18, 2005 response letter to Reclamation' request to concur with a not-likely to adversely affect determination for long-term contract renewals (NMFS, 2005). The USFWS concurred with Reclamation's determination that long-term contract renewals may affect, but would not likely to adversely affect listed species under their jurisdiction in separate responses. The response regarding the Roseville long-

term contract renewals was issued on January 19, 2006. The response letter for PCWA was issued on 31 January, 2006.

4.4 National Historic Preservation Act (16 USC § 470 et seq.)

Section 106 of the NHPA requires Federal agencies to evaluate the effects of federal undertakings on historical, archaeological, and cultural resources. Reclamation has made a determination that as the Proposed Action would result in no change in the amount of water, how the water is managed, or land disturbing activities associated with this project. Therefore, there is no potential to affect historic properties pursuant to 36 DFR Part 800.3(a) (1). As described in the regulations, Reclamation has no further obligation under section 106.

4.5 Indian Trust Assets

ITA is legal interest in property held in trust by the United States for federally-recognized Indian tribes or individual Indians. An Indian trust has three components: (1) the trustee, (2) the beneficiary, and (3) the trust asset. ITA can include land, minerals, federally-reserved hunting and fishing rights, federally-reserved water rights, and in-stream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally-recognized Indian tribes with trust land; the United States is the trustee. By definition, ITA cannot be sold, leased, or otherwise encumbered without approval of the United States. The characterization and application of the United States trust relationship have been defined by case law that interprets Congressional acts, executive orders, and historic treaty provisions.

In compliance with 36 CFR 800.4(a)(4), Reclamation sent letters to Indian tribes requesting their input in identification of any properties that may be affected as part of the long-term contract renewal process. No comments were received. No Indian Trust Assets within the American River Division would be impacted by the proposed Action.

4.6 Migratory Bird Treaty Act (16 USC § 703 et seq.)

The Migratory Bird Treaty Act implements various treaties and conventions between the U.S and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess, offer to sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the Act, the Secretary of the Interior (Secretary) may adopt regulations determining the extent to which, if at all, handing, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed, having regard for temperatures zones, distribution, abundance, economic value, breeding habits and migratory flight patterns.

The proposed Action would have no effect on birds protected by the Migratory Bird Treaty Act.

4.7 Clean Air Act (42 USC § 7506 (C))

Section 176 of the CAA requires that any entity of the Federal government that engages in, supports, or in any way provided financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable SIP required under Section 110(a) of the CAA (42 USC § 7401 (a)) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with a State Implementation Plan's (PIP) purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards and achieving expeditious attainment of those standards. Each federal agency must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements will, in fact conform to applicable SIP before the actions is taken.

The Proposed Action does not require a conformity analysis.

4.8 Clean Water Act (33 USC § 1311 et seq.)

4.8.1 Section 401. Section 401 of the Clean Water Act (CWA) (33 USC § 1311) prohibits the discharge of any pollutants into navigable waters, except as allowed by permit issued under sections 402 and 404 of the CWA (33 USC § 1342 and 1344). If new structures (e.g. treatment plants) are proposed, that would discharge effluent into navigable waters, relevant permits under the CWA would be required for the project applicant(s). Section 401 requires any applicant for an individual U.S. Army Corps of Engineers dredge and fill discharge permit to first obtain certification form the state that the activity associated with dredging or filling will comply with applicable state effluent and water quality standards. This certification must be approved or waived prior to the issuance of a permit for dredging and filling.

No pollutants would be discharged into any navigable waters under the Proposed Action so no permits under Section 401 of the CWA are required.

4.8.2 Section 404. Section 404 of the CWA authorizes the U.S. Army Corps of Engineers to issue permits to regulate the discharge of "dredged or fill materials into waters of the United States" (33 USC § 1344). No activities requiring dredging or filling of wetlands or surface waters would be required for implementation of the Proposed Action; therefore section 404 permits are not required.

Chapter 5
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Chapter 6
Public Review Period

Reclamation poster this draft EA for a 30 day public review period on the public web site located at http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=6430. The public review period began on September 27, 2010 and ended October 29, 2010.

Chapter 7
References

General References

Placer County, Placer County General Plan Update, 1994

Placer County Water Agency and U.S. Bureau of Reclamation, American River Pump Station Project, Environmental Impact Statement/Environmental Impact Report, 2002

City of Roseville, General Plan Update, Water System Study, 1993

City of Sacramento and Sacramento County, Final Environmental Impact Report for the Water Forum Proposal, 2000

Sacramento County, Sacramento County General Plan Update, Subsequent Environmental Impact Report, Volume 1, June 1993

San Juan Water District, Water Master Plan

U.S. Army Corps of Engineers, American River Watershed, California, Folsom Dam Modification Report, Final Limited Reevaluation Report, 2001

U.S. Army Corps of Engineers, American River Long-Term Watershed Study, Final Supplemental Plan Formulation Report/Environmental Impact Statement/Environmental Impact Report, 2002

U.S. Bureau of Reclamation, American River Water Resources Investigation, Planning Report, August 1997

U.S. Bureau of Reclamation, American River Water Resources Investigation, Environmental Impact Statement, 1997

U.S. Bureau of Reclamation and Sacramento County, Central Valley Project Water Supply Contracts Under Public Law 101-514, Final Environmental Impact Statement/Environmental Impact Report, 1998

U.S. Bureau of Reclamation and U.S. Fish and Wildlife Service, Central Valley Project Improvement Act, Final Environmental Impact Statement, 2000

U.S. Bureau of Reclamation, Long-Term Central Valley Project Long-term Water Service Contract Renewals, American River Division Environmental Impact Statement, June 2005.

U.S. Bureau of Reclamation, Long-Term Central Valley Project Operations Criteria and Plan and Biological Assessment, CVP-OCAP, 2008

Air Quality

California Air Resources Board, 2002, State and Local Air Monitoring Network Plan, http://www.arb.ca.gov/aqd/namslams/namslams.htm

Biological Resources

Bell, M.C, 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., 1986

Brown, L.R., P.B. Moyle, and C.D. Vanicek, 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, 1992.

Bovee, K.D, Instream Flow Information Paper 12, FWS/OBS-78/07. Probability-of-use criteria for the family Salmonidae. United States Fish and Wildlife Service, 1978

California Department of Fish and Game, California trout, salmon, and warmwater fish production and costs, 1969-1970. Inland Fisheries Branch. Inland Fisheries Administrative Report 71-8, 1971

California Department of Fish and Game, California trout, salmon, and warmwater fish production and costs, 1978-1979. Inland Fisheries Branch. Inland Fisheries Administrative Report 80-1, 1980

California Department of Fish and Game, Stream evaluation Report No. 86-1. Instream flow requirements of the fish and wildlife resources of the lower American River, 1986

California Department of Fish and Game, Steelhead Restoration Plan for the American River, 1991

California Department of Fish and Game, Requirements of American Shad in the Sacramento-San Joaquin River System, Exhibit 23. State Water Resources Control Board 1987 Water Quality/Water Rights Proceeding on the San Francisco Bay/Sacramento-San Joaquin River Delta, 1987.

Castleberry, D.T., J.J. Cech, Jr., M.K. Saiki, and B.A. Martin, Growth, Condition and Physiological Performance of Juvenile Salmonids from the Lower American River. February through June 1991. U.S. Fish and Wildlife Service, National Fisheries Containment Research Center, 1991

Cech, J.J., Jr., S.J. Mitchell, D.T. Castleberry, and M. McEnroe. Distribution of California Stream Fishes: Influence of Environmental Temperature and Hypoxia. Environmental Biology of Fishes, 1990

DeHaven, R.W, 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., 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, 1978.

DeHaven, R.W, An Angling Study of Striped Bass Ecology in the American River, California. U.S. Fish and Wildlife Service, 1979.

Gerstung, E.R, A Report to the California State Water Resources Control Board on the Fish and Wildlife Resources of the American River to be Affected by the Auburn Dam and Reservoir and the Folsom South Canal and Measures Proposed to Maintain These Resources. California Department of Fish and Game, Region 2, 1971.

Moyle, P.B, Inland Fishes of California. University of California Press, Berkeley, CA, 1976

Moyle, P.B., R.M. Yoshiyama, J.E. Williams, and E.D. Wikramanayake, Fish Species of Concern in California. Second Edition. Report Prepared for the California Department of Fish and Game, 1995.

National Marine Fisheries Service, Biological Opinion for Winter-run Chinook Salmon. 1993.

Raleigh, R.F., W.J. Miller, and P.C. Nelson, Habitat suitability index models and instream flow suitability curves: chinook salmon. United States Fish and Wildlife Service Biol. Rep. 82 (10.1222). 64 pp, 1986.

Reiser, D.W. and T.C. Bjornn, Habitat Requirements of Anadromous Salmonids. In: Influence of Forest and Rangeland Management on Anadromous Fish Habitat in the Western United States and Canada. W.R. Meehan, editor. U.S. Department of Agriculture Forest Service General Technical Report. Pacific Northwest Forest and Range Experiment Station, Portland, 1989

Reynolds, F.L., R.L. Reavis, and J. Schuler, Central Valley Salmon Steelhead Restoration and Enhancement Plan. California Department of Fish and Game, 1990.

Snider, W.M. and E. Gerstung, 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, 1986.

Snider, W.M. and D. McEwan, Final Report, Fish Community Survey, Lower American River, February-July 1992. California Department of Fish and Game, Environmental Services Division., 1993

Snider, W.M. and R. Titus, Fish Community Survey, Lower American River, January-July 1994. California Department of Fish and Game, Environmental Services Division, 1994

Snider, W. and R. Titus, Fish Community Survey, Lower American River, January-June 1995. California Department of Fish and Game, Environmental Services Division, 1996.

U.S. Bureau of Reclamation. Appendices to Shasta outflow temperature control planning report/environmental statement. Part I - Fisheries, 1991

United States Fish and Wildlife Service, American River Watershed Investigation, detailed report on fish and wildlife resources. Fish and Wildlife Coordination Act Report. Ecological Services, Sacramento Field Office, 1991

Environmental Justice

California Department of Finance. County Population Projections with Race/Ethnic detail Estimated July 1, 1990-1996 and Projections for 1997 through 2040, 1998

California Department of Finance. California county profiles, 2001
Available: <http://www.dof.ca.gov/HTML/FS_DATA/profiles/pf_home.htm>.

Groundwater

Planert, M., and Williams, J. S. Ground water atlas of the United States—Segment 1 California Nevada. Hydrologic Investigations Atlas 730-B, 2000
Available: <http://ca.water.usgs.gov/gwatlas/summary/>.

Land Use

California Department of Conservation, Division of Land Resource Protection. Williamson Act Program. Status Reports. The California Land Conservation (Williamson) Act Status Report 2002.

California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program. 2002a. California Farmland Conversion Report 1998-2000.

California Department of Conservation, Division of Land Resource Protection, Williamson Act Program. 2003. Enrollment Statistics. Total Enrollment: 1991-2001 by County.

California Department of Finance, Demographic Research Unit. 2003. Table E-1: City/County Population Estimates with Annual Percent Change, January 1, 2002 and 2003.
http://www.dof.ca.gov/HTML/DEMOGRAP/E-1table.xls.

California Department of Finance, Demographic Research Unit. 2001. Interim County Populations Projections, Estimated July 1, 2000 and Projections for 2005, 2010, 2015, and 2020. June.

California Department of Finance, Reports and research papers: City/county population estimates with annual percent change, January 1, 2000 and 2001.
Available: <http://www.dof.ca.gov/HTML/DEMOGRAP/e-1table.htm>.

California Department of Finance, California county profiles.
Available: <http://www.dof.ca.gov/HTML/FS_DATA/profiles/pf_home.htm>. Last revised: March 20, 2001. Accessed: October 12, 2001.

City of Auburn, Modified Final EIR. City of Auburn General Plan/Rezone Environmental Impact Report, 1994

City of Folsom, Land Use Data received via email from Steve Banks and Chris Longley/City of Folsom, Planning Services, 2003.

City of Folsom, Population Projections, 2003.
http://www.folsom.ca.us/indez.asp?page=39.

City of Folsom, General Plan, 1993

City of Lincoln, Lincoln General Plan, 1988

City of Rocklin, City of Rocklin General Plan, 1991.

City of Roseville, General Plan 2010; Land Use Element, 2002.

Placer County, Placer County General Plan, General Plan Background Report, 1994

Sacramento Area Council of Governments, 2001, Projections.
http://www.sacog.org/demographics/proj2001/pdf/cities/sac.pdf.

Sacramento Area Council of Governments, 2001, SACOG Projections.
http://www.sacog.org/demographics/proj2001/pdf/cities/plac.pdf.

Sacramento Area Council of Governments, 2001. SACOG Projections.
http://www.sacog.org/demographics/proj2001/pdf/cities/eldo.pdf.

Town of Loomis, General information regarding Loomis.
http://www.loomis.ca.gov/.

U.S. Bureau of Reclamation, Central Valley Habitat Monitoring Program, 2003

Recreation

Placer County, Parks and Grounds Division, List of County-Owned Park Facilities, 2003
http://www.placer.ca.gov/facility/parkgrnd.htm

City of Roseville, List of Roseville Parks and Recreation Areas, 2003
http://www.roseville.ca.us/index.asp?page=293

Wallace Roberts & Todd, LLC, Recreation, Scenic and Cultural Resources. Recreation Resources. Folsom Lake State Recreation Area, 2003

Sociological Resources

California Department of Finance, E-1 City/County Population Estimates, with Annual Percent Change, January 1, 2002 and 2003. May.

California Department of Finance, Placer County Profile.
www.dof.ca.gov/HTML/FS_DATA/profiles/pf_home.htm

California Department of Finance, Sacramento County Profile.
www.dof.ca.gov/HTML/FS_DATA/profiles/pf_home.htm

California Department of Finance, County Population Projections with Race/Ethnic Detail Estimated July 1, 1990-1996 and Projections for 1997 through 2040. December.

California Department of Finance, California demographics—summary file 1: Census 2000.
Demographic Research Unit.
Available: <http://www.dof.ca.gov/HTML/DEMOGRAP/2000Cover1.htm>.

California Department of Finance, California county profiles, 2001
Available: <http://www.dof.ca.gov/HTML/FS_DATA/profiles/pf_home.htm>.

Placer County, Placer County Housing Element 2000-2007. Draft. April.

Sacramento Area Council of Governments, Projections Sacramento County, 2001.
http://www.sacog.org/demographics/proj2001/pdf/cities/sac.pdf

Sacramento Area Council of Governments, Projections Placer County, 2001
http://www.sacog.org/demographics/proj2001/pdf/cities/plac.pdf

Sacramento Area Council of Governments, Projections El Dorado County, 2001
http://www.sacog.org/demographics/proj2001/pdf/cities/eldo.pdf

U.S. Census Bureau, Placer County Quick Facts, 2003
http://quickfacts.census.gov/qfd/states/06/06061.html

U.S. Census Bureau, Sacramento County Quick Facts, 2003
http://quickfacts.census.gov/qfd/states/06/06067.html

U.S. Census Bureau, California Housing Unit Estimates by County: April 1, 2000 to July 1, 2002. Table HU-EST2002-05-06-County Housing Unit Estimates, 2003

Soils

U.S. Forest Service, Ecological subregions of California: section and subsection descriptions. May. Internet number: R-5-EM-TP-0005-NET. Prepared in cooperation with Natural Resources Conservation Service and Bureau of Land Management, 1998.
Available: <http://www.r5.fs.fed.us/ecoregions/toc.htm>.

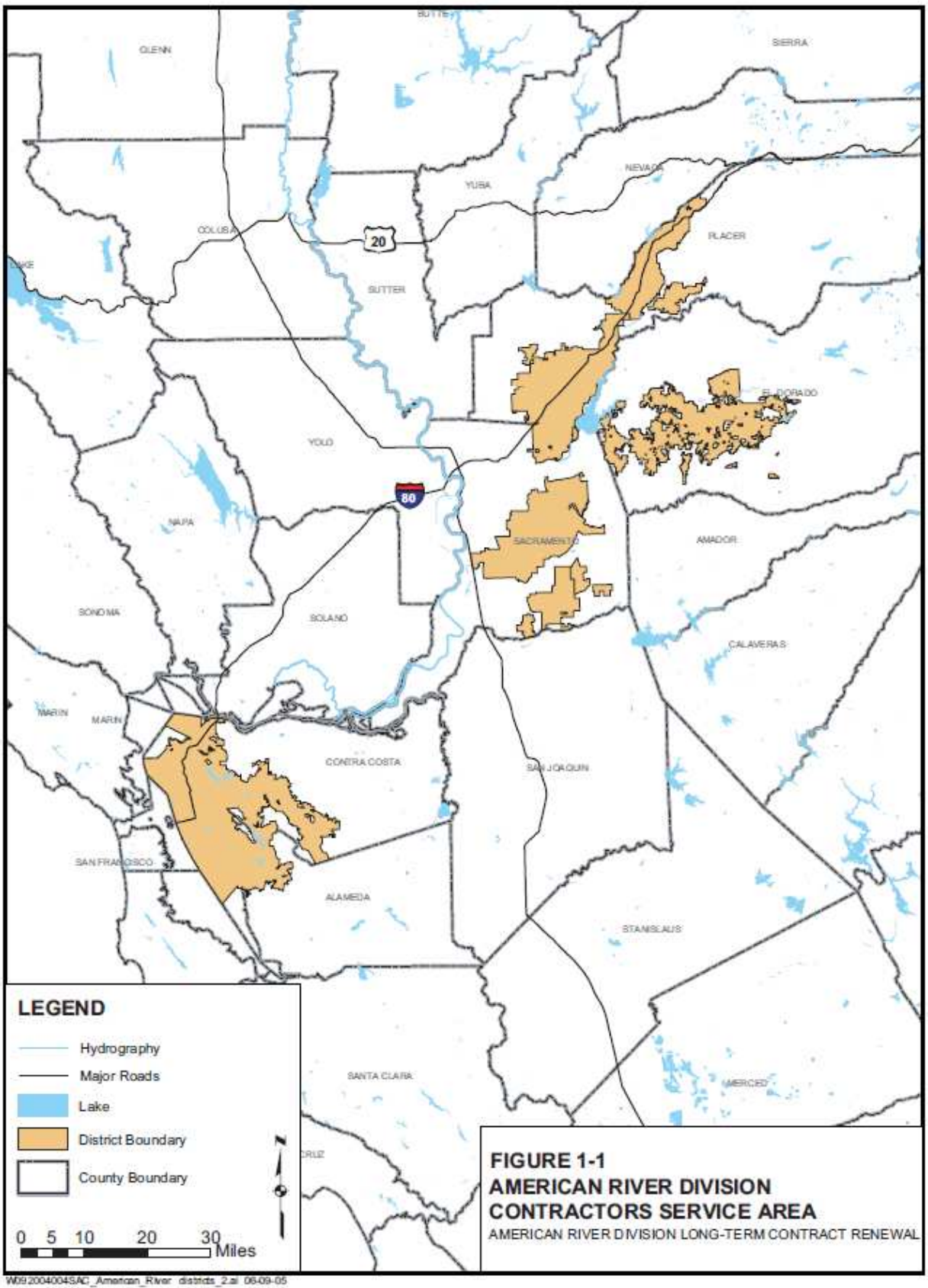

FIGURE 1-1
AMERICAN RIVER DIVISION
CONTRACTORS SERVICE AREA
AMERICAN RIVER DIVISION LONG-TERM CONTRACT RENEWAL

W09 2004004SAC_American_River_districts_2.ai 06-09-05

Appendix A
Division and CVP Service Area Maps

Appendix B
Draft Interim Renewal Contracts

Appendix C
Acronyms, Abbreviations, and Metric Conversions

AF	Acre-foot
AFRP	Anadromous Fisheries Restoration Project
BA	Biological Assessment
BO	Biological Opinion
BP	Before Present
CAA	Clean Air Act
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
CO	Carbon Monoxide
COA	Coordinated Operations Agreement
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
Delta	Sacramento-San Joaquin Delta
EA	Environmental Assessment
EID	El Dorado Irrigation District
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
EWA	Environmental Water Account
Folsom	City of Folsom
FWCA	Fish and Wildlife Coordination Act
FLPMA	Federal Land Policy and Management Act of 1976
HCP	Habitat Conservation Plan
IRC	Interim Contract Renewal
ITA	Indian Trust Asset
LAFCO	Local Area Formation Commission
LTCR	Long-Term Contract Renewal
M&I	Municipal and Industrial
MSHCP	Multi-Species Habitat Conservation Plan
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
NRHP	National Register Historic Places
OCAP	Operations Criteria and Plan
PCWA	Placer County Water Agency
PG&E	Pacific Gas & Electric Company

PEIS	Programmatic Environmental Impact Statement
PM	Particulate Matter
PL	Public Law
Reclamation	U.S. Bureau of Reclamation
ROD	Record of Decision
ROG	Reactive Organic Gases
Roseville	City of Roseville
SAFCA	Sacramento Area Flood Control Agency
SDWA	Safe Drinking Water Act
Secretary	Secretary of the Interior
Service	U.S. Fish and Wildlife Service
SIP	State Implementation Plan
SMUD	Sacramento Municipal Utility District
SO_2	Sulfur Dioxide
SWP	State Water Project
SWRCB	State Water Resources Control Board
TCD	Temperature Control Device
°F	degrees Fahrenheit

CONVERSION TABLES

U.S. CUSTOMARY TO METRIC

Multiply	By	To Obtain
inches (in)	25.4	millimeters
inches (in)	2.54	centimeters
feet (ft)	0.3048	meters
miles (mi)	1.609	kilometers
square feet (ft^2)	0.0929	square kilometers
acres (ac)	0.4047	hectares
square miles (mi^2)	2.590	square kilometers
gallons (gal)	3.785	liters
cubic feet (ft^3)	0.02832	cubic meters
acre-feet (af)	1,233.0	cubic meters
pounds (lb)	0.4536	kilograms
tons (ton)	0.9072	metric tons

Temperature in degrees Fahrenheit can be converted to degrees Celsius as follows:
degrees Celsius = 5/9 (degrees Fahrenheit - 32)

OTHER USEFUL CONVERSION FACTORS

Multiply	By	To Obtain
acre-feet	43,560	cubic-feet
acre-feet	325,851	gallons